THE SANTA ROSA FARM GROUP CANNABIS CULTIVATION, MANUFACTURE, AND DISTRIBUTION FACILITY 800 YOLANDA AVENUE SANTA ROSA, SONOMA COUNTY, CALIFORNIA DRAFT MITIGATED NEGATIVE DECLARATION / INITIAL STUDY

Lead Agency

City of Santa Rosa
Community Development Department
100 Santa Rosa Avenue, Room 3
Santa Rosa, California 95404

Prepared for

800 Yolanda LLC
9030 National Boulevard
Los Angeles, California 90034

Prepared by

Terraphase Engineering Inc.
1404 Franklin Street, Suite 600
Oakland, California 94612

Date: June 2020

Terraphase Project Number: 0223.001

THIS PAGE LEFT INTENTIONALLY BLANK

CONTENTS

TABLES

FIGURES

APPENDICES

ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

ABAG	Association of Bay Area Governments
ACMs	asbestos-containing materials
ADT	average daily traffic
AUMA	Adult Use of Marijuana Act
BAAQMD	Bay Area Air Quality Management District
Basin	San Francisco Bay Area Air Basin
BCC	Bureau of Cannabis Control
bgs	below ground surface
BMPs	Best Management Practices
BTU	British thermal unit
Cal/OSHA	California Occupational Safety and Health Administration
CalEEMod	California Emissions Estimator Model
CalFire	California Department of Forestry and Fire Protection
CALGreen	California Green Building Standards Code
CalRecycle	California Department of Resources Recycling and Recovery
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAT	Climate Action Team
CBC	California Building Code
CBD	cannabinoid
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Public Health
CESA	California Endangered Species Act
CGP	Construction General Permit
CH4	methane
CNEL	Community Noise Equivalent Level

CO2	carbon dioxide
CPP	concrete pressure pipe
CTS	California tiger salamander
CUA	Compassionate Use Act of 1996
dB	decibels
dBA	A-weighted decibels
DCA	Department of Consumer Affairs
DEHP	bis(2-ethylhexyl)phthalate
Emergency Regulations	Emergency Regulations for Cannabis Cultivation
EO	Executive Order
ESA	Environmental Site Assessment
EZRIM	Earthquake Zone of Required Investigation Map
Fawcett	Fawcett Environmental Consulting
FESA	Federal Endangered Species Act
FIGR	Federated Indians of Graton Rancheria
FTA	Federal Transit Administration
GHG	greenhouse gas
gpd	gallons per day
HFCs	hydrofluorocarbons
HMBP	Hazardous Materials Business Plan
HSC	Health & Safety Code
HVAC	heating, ventilation and air conditioning
IL	Light Industrial zone
kw	kilowatt
lb	pound
LBP	lead-based paint
Ldn	Day-Night Average Level
Leq	equivalent noise level
LEV	Low Emission Vehicle
LRP	Legally Responsible Person

LSA	Lake or Streambed Alteration
LUL	Land Use and Livability
LWTP	Laguna Sub-Regional Wastewater Treatment Plant
MAUCRSA	Medicinal and Adult-Use Cannabis Regulation and Safety Act
MCRSA	Medical Cannabis Regulation and Safety Act
MCSB	Manufactured Cannabis Safety Branch
mg/kg	milligrams per kilogram
MMT	million metric tons
the Monk & Associates CTS report	Monk & Associates Environmental Consultants' *California Tiger Salamander Impact Analysis,* April 2020
MTC	Metropolitan Transportation Commission
MUTCD	Manual on Uniform Traffic Control Devices
N2O	nitrous oxide
NAHC	Native American Heritage Commission
NBC	North Bay Corporation
NOX	nitrogen oxide
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Services
NWIC	Northwest Information Center
Origer	Tom Origer & Associates
PCBs	polychlorinated biphenyls
PD	planned development
PFCs	perfluorocarbons
PG&E	Pacific Gas & Electric
PHCs	petroleum hydrocarbons
PJD	preliminary jurisdiction determination
POTW	publicly owned treatment works
ppb	parts per billion
ppm	parts per million
PPV	peak particle velocity

Project	Santa Rosa Farm Group project located at 800 Yolanda Avenue in the City of Santa Rosa, Sonoma County, California
RCNM	Roadway Construction Noise Model
RGH	RGH Consultants Incorporated
Rincon	Rincon Consultants
RMP	Risk Management Plan
RMS	root mean squared
RWQCB	North Coast Regional Water Quality Control Board
SB	Senate Bill
SCBC	Sonoma County Building Code
SCS	SCS Engineers
SCWA	Sonoma County Water Agency
SF6	sulfur hexafluoride
SLIC	Spills, Leaks, Investigation, and Cleanup
SMARA	Surface Mining and Reclamation Act
SRCC	Santa Rosa City Code
SRFD	Santa Rosa Fire Department
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TCMs	Transportation Control Measures
TCR	Tribal Cultural Resources
TPH-mo	total petroleum hydrocarbons in the motor oil range
tpy	tons per year
UGB	Urban Growth Boundary
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VdB	vibration decibels
VMT	vehicle miles traveled

VOCs	volatile organic compounds
Wiemeyer	Wiemeyer Ecological Sciences
WUI	Wildland-Urban Interface

THIS PAGE LEFT INTENTIONALLY BLANK

I. ENVIRONMENTAL CHECKLIST FORM

Project Title:	The Santa Rosa Farm Group – Cannabis Cultivation, Manufacture, and Distribution Facility
Lead Agency Name and Address:	City of Santa Rosa, Planning and Economic Development 100 Santa Rosa Avenue Santa Rosa, California 95404
Contact Person and Phone Number:	Andrew Trippel, Principal Planner 707-543-3223
Project Location:	800 Yolanda Avenue, Santa Rosa, Sonoma County, California Assessor's Parcel Number: 044-091-063
Project Sponsor's Name and Contact Information:	800 Yolanda LLC 9030 National Boulevard Los Angeles, California 90034
General Plan / Zoning Designation:	Light Industrial (IL)
Description of Project	The Santa Rosa Farm Group proposes to redevelop an industrially-zoned parcel with an approximately 120,000-square-foot cannabis facility ("the Project") for commercial cultivation, manufacturing, and distribution uses The Project also includes removal of the existing residential building and ancillary buildings (i.e., sheds and garage) on the Project site. The Project site is located at the southwest corner of the intersection of Yolanda Avenue and Petaluma Hill Road. The eastern half of the parcel includes undeveloped land, which is regularly disked, and a gravel access route driveway from Petaluma Hill Road. The western portion of the parcel is currently improved with the developed residence and ancillary buildings, as well as approximately three acres of gravel cover. The proposed development would occur on the western portion of the Project site, which is approximately 3 acres of gravel cover. Proposed site modifications would include construction of a new facility building, perimeter wall installation, potential street and sidewalk improvements, which have been analyzed in the document, small tree and shrub removal, and grading and utility trenching Construction duration would be approximately 11 months.
Surrounding land uses and setting	To the north of the Project site, across Yolanda Avenue, is Mario's RV Service parking lot, the one-to-two-story Goodwill building, and Wyatt Irrigation Services comprising several single-story buildings and construction materials storage areas. Adjacent to and west of the Project site is Yolanda Industrial Park comprising multiple single-story buildings surrounded by parking lots. Adjacent to and south of the Project site are two two-story residences (southwest corner of the Project site) and agricultural lands designated in the Santa Rosa

	General Plan for low-density residential use. East of the Project site across Petaluma Hill Road is Cunningham Dairy.
Other public agencies whose approval is required	The following agencies may review and rely on the document, but are not necessarily considered Responsible Agencies at this time: • California Department of Food and Agriculture • Bureau of Cannabis Control • California Department of Public Health's Manufactured Cannabis Safety Branch • California Department of Fish and Wildlife • State Water Resources Control Board • North Coast Regional Water Quality Control Board • City of Santa Rosa Fire Department • Sonoma County Department of Health Services • Bay Area Air Quality Management District
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.?	In accordance with AB 52, notification of the Project was mailed by City of Santa Rosa Planning Department staff to the following local tribes on May 10, 2018: • Lytton Rancheria of California • Federated Indians of Graton Rancheria None of the contacted tribes requested consultation under AB 52.

II. PROJECT DESCRIPTION

II.1 Overview

The Santa Rosa Farm Group proposes to redevelop an industrially zoned parcel with an approximately 120,000-square-foot cannabis facility ("the Project"). The Project also includes removal of the existing residential building and ancillary buildings (i.e., sheds and garage) on the Project site. The Project site is located at the southwest corner of the intersection of Yolanda Avenue and Petaluma Hill Road. The eastern half of the parcel includes undeveloped land, which is regularly disked, and a gravel access driveway from Petaluma Hill Road. The western portion of the parcel is currently improved with the developed residence and ancillary buildings, as well as approximately 3 acres of gravel cover. The Project would be limited to the developed areas of the Project site. Proposed site modifications would include construction of the building, perimeter wall installation, small tree and shrub removal, and grading and utility trenching. It is estimated that the duration of construction activities would be approximately 11 months.

II.2 Project Location

The Project site is located at 800 Yolanda Avenue in Santa Rosa, Sonoma County, California, and is identified with Assessor's Parcel Number 044-091-063 (EBA 2016). The Project site covers approximately 5.53 acres and is zoned for Light Industrial (IL) use, per the current City of Santa Rosa Zoning Map, dated August 2015 (City of Santa Rosa 2015).

The Project site is bound to the north by Yolanda Avenue, with commercial and industrial properties including Wyatt Irrigation at 747 Yolanda Avenue, Goodwill at 651 Yolanda Avenue, and Marlo's RV Service at 467 Yolanda Avenue. The Project site is bound to the east by Petaluma Hill Road. South of the Project site is vacant land. Cunningham Dairy at 3018 Petaluma Hill Road is southeast of the Project site along Petaluma Hill Road. The Project site is bound to the west by commercial and industrial uses including Hensley's Auto Smog and Repair. Southwest of the Project site are single-family residences along Summercreek Drive and Teaberry Street.

The project location and vicinity are shown on **Figures II.1** and **II.2**, respectively.

II.3 Existing Conditions

The Project site is currently unoccupied but is improved with the following buildings and structures generally located on the central portion (**Figure II.3**):

- a 1,105-square-foot single-family residence with a partial basement foundation (residence);
- an approximately 400-square-foot, wood-framed former garage with slab-on-grade foundation, most recently used as an office, located northwest of the residence;
- an approximately 100-square-foot, wood-framed "well shed" with slab-on-grade foundation, which houses an abandoned hand-dug well, located north of the garage and residence;

- an approximately 600-square-foot, two-story former water tower with slab-on-grade foundation, which was most recently used as an office and is located west of the residence;
- an approximately 400-square-foot mobile office trailer, located southwest of the residence; and
- an approximately 900-square foot wood-framed shed, the eastern portion of which is referred to as the "mower shop" and has slab-on-grade foundation, and the western portion of which is an out-of-use storage area with post and pier foundation.

The remainder of the Project site is largely vacant. The western portion of the Project site is covered with gravel, and the eastern portion consists of disturbed, undeveloped, vacant land with a gravel driveway accessing Petaluma Hill Road. The Project site is generally level with limited topographic relief, and grade is at approximately 155 feet above mean sea level.

II.4 Project Elements

Proposed improvements, security measures, utilities infrastructure, and other site features are described below, and an overview of the proposed site layout is shown in **Figures II.4** and **II.5**. A rendering of the Project is shown in **Figure II.6**.

II.4.1 Proposed Improvements

During Project site development, the proposed main building would be a three-story, approximately 120,000-square-foot industrial building constructed on the western portion of the Project site, approximately 104 feet south of the northern property boundary, approximately 400 feet west of the eastern property boundary, approximately 27 to 31 feet east of the western property boundary, and 70 feet north of the southern property boundary. The overall height of the building would be 50 feet, with a width of approximately 293 feet and a maximum length of 176 feet. One guard building would be constructed for security at each of the two northern entrances.

On the ground floor of the main building, approximately 14,000 square feet would be used for manufacturing, drying and trimming, packing and labeling, and distribution; approximately 2,700 square feet would be used as the laboratory and kitchen; approximately 3,500 square feet would be used for warehousing and receiving; approximately 6,800 square feet would be used as offices, conference rooms, lounge areas, breakrooms, and the lobby; and the remaining approximately 13,000 square feet for restrooms, vaults, hallways, and utility areas.

The second and third stories of the main building would total approximately 80,000 square feet and would be equipped with grow rooms with approximately 20,960 square feet of table space to be used for cannabis cultivation on each floor.

A single-story-with-mezzanine utility building, approximately 3,200 square feet in area, would be constructed on the central portion of the Project site, northeast of the main building. The utility building would house up to five 550-kilowatt (kW) natural-gas cogeneration units; up to three 500-ton adsorption chillers; up to two 5,000-British-thermal-unit (BTU) boilers; and associated pumps, compressors and ancillary equipment. Depending on space constraints, the pumps, compressors and chillers may be placed on the first floor of the main building. The design goal for the cooling tower would be to place it outside between the utility building and the eastern wall but this will depend on future and more detailed mechanical design.

Trees would be planted along the southern and western property boundaries in continuous planters as shown in the site plans. Vegetable plots and decorative plants onsite would be watered and maintained with City-supplied water. Landscaping will conform to City of Santa Rosa development codes. The majority of the eastern portion of the site, as well as the area north of the main building, would consist of undeveloped area.

Public street, sidewalk, and utility improvements along the parcel's Petaluma Hill Road and Yolanda Avenue frontages, as well as any associated right-of-way or easement dedications, shall be designed, installed, and dedicated in a manner consistent with the requirements and allowances set forth in the City of Santa Rosa's General Plan, Design and Construction Standards, and Chapter 18-12 of the Santa Rosa City Code.

II.4.2 Site Access and Parking

A paved parking area with a total of 85 parking spaces would be constructed (**Figures II.4** and **II.5**). Three of the parking stalls would be handicapped-accessible, and two would be designated for electric vehicles. The existing gravel driveway on the eastern portion of the Site leading eastward to Petaluma Hill Road will not be modified or used and will be outside the wall that would be constructed around the facility.

Nine bicycle parking spaces would be located along the northern exterior of the main building, adjacent to the main entrance.

II.4.3 Security and Monitoring

A security plan would be implemented and would consist of a monitored security system, access control, surveillance cameras, and security patrols to secure the property. The Project would utilize the services of a minimum of three security guards, who will monitor and patrol the Project site continuously. A local security company, SOCO Private Security, would patrol the Project site 24 hours per day.

The security office would be secure and utilize industry-standard vaults for cash and inventory control. Two security booths would be constructed along Yolanda Avenue, one at each accessway. Additionally, a perimeter wall will be constructed (**Figure II.7**), controlling access through two points of entry at the security booths.

The main entrance of the building will feature access code keys to allow entry into the building for approved members of staff only. Double doors and biometric scanning will be used for sensitive sections of the facility.

Closed-circuit television would be installed throughout the Project, including infrared and motion sensors. The monitored security system would be installed and maintained by First Alarm and would feature a commercial alarm control panel. Each perimeter door to the proposed facility would be alarmed and linked to the central control panel. Internal motion sensors would be installed. The alarms would comport with the City's Alarm System requirements as contained in City of Santa Rosa City Code (SRCC) Chapter 6-68.

Surveillance cameras would be installed at each perimeter door to the facility and strategically on the outside of the main building. All recordings from the security cameras will be recorded onsite and would be backed up offsite daily, and they will be made available to the Santa Rosa Police Department at their request.

II.4.4 Employee Security

Hiring practices would focus on the Santa Rosa and Sonoma County employee pool. Employees and managers will receive extensive training on safe industry practices, best management practices, City regulations and the requirements of the permits called for under the Use Permit, California regulations and the requirements of any State license subsequently obtained, and Federal Guidelines regarding diversion and protection of minors.

II.4.5 Utilities

Utilities at the Project will consist of water allocation, stormwater management, electrical improvements, and waste management, as summarized below.

II.4.5.1 Water Allocation and Use

Water would be consumed by cultivation operations, which would require approximately 9,000 gallons of water per day. Additional water usage for sanitary purposes and incidental usage (e.g., cleaning, ancillary operations, landscape irrigation, etc.) would bring the total water usage to approximately 12,000 gallons per day (gpd). As discussed in Section II.4.5.4 of the Project Description, approximately 70% to 90% of wastewater from cannabis cultivation operations would be reclaimed and reused onsite for cannabis cultivation. Depending on the efficiency of the wastewater reclamation system, between 5,300 gallons and 6,800 gallons of potable water per day would be needed to support the Project and would be provided by the existing connection to the City's public water supply.

II.4.5.2 Stormwater Management

Stormwater inlets would be located in the paved areas of the Project site. Inlets installed in the parking areas and asphalt-covered areas north and east of the main building would be connected via underground concrete pressure piping (CPP) to a proposed rock outfall located on the northern portion of the Project site, adjacent to Yolanda Avenue. An inlet installed southwest of the main building and a slot drain installed at the base of the loading dock along the main building's eastern exterior would connect underground via CPP to an outfall located at the southwestern corner of the Project site. Underslab and/or foundation drains would be installed per the structural drawings and would be kept separate from stormwater drainpipes. As discussed in Section 10, Hydrology and Water Quality, the final stormwater management system would be designed in accordance with the City's 2017 Low Impact Development (LID) design standards.

The eastern portion of the Project site would remain undeveloped and unpaved, and stormwater would percolate through unpaved areas or travel overland to adjacent roadways.

II.4.5.3 Electrical Improvements

The power that would be required for the proposed cultivation and ancillary equipment (e.g., lighting, heating, ventilation and air conditioning [HVAC]) is up to approximately 5,000 kW. At this time, the Project design includes a natural gas cogenerator system as the primary electrical power source. The Project may also use electricity from the existing municipal utility provider to supplement the co-generation system. In the event that additional electrical services are required, those electrical services would be provided by Pacific Gas & Electric (PG&E).

II.4.5.4 Recycling and Waste Management

In support of the City's commitment to a sustainable, clean supply of drinking water, and in acknowledgment of the City's zero discharge order imposed by the State Water Resources Control Board (SWRCB), the Project would implement a water reclamation system for cultivation operations to recapture and reconstitute usable water. This system can reclaim approximately 70% to 90% of the water from cannabis cultivation operations.

Wastewater generated during cannabis cultivation or processing activities would pass through a multi-media filter to prevent the discharge of contaminants, residue, sediment, or nutrients from cannabis production or processing activities to the City's wastewater system. Depending on the efficiency of the wastewater reclamation system, between 2,700 gallons and 4,100 gpd of sanitary wastewater would be discharged to the City's sanitary sewerage system (which was previously connected to the Project site). The Project would also install water-saving toilets and sinks for employee use.

Municipal solid waste (e.g., office trash) would be collected in an onsite dumpster along the eastern exterior of the main building and disposed of off-site by a commercial disposal company. Cannabis waste would be managed in a secured waste area and transported by a licensed waste hauler for offsite disposal in accordance with the California Department of Food and Agriculture (CDFA) requirements.

II.4.5.5 Other Utilities

Natural gas services are provided to the property by the PG&E. HVAC system would be in compliance with California Code of Regulations (CCR), Title 24, specifically Part 11 – California Green Building Standards Code (referred to as CALGreen).

II.4.6 Noise and Light Control

Within the main building's cultivation area (further discussed below), grow lights would be used; however, no windows or exterior doorways would be located in the cultivation area. Additionally, exterior lighting would be installed in the parking lots and around the building perimeter for security, as shown in **Figure II.8**. Lighting installed in the parking areas would consist of poles a maximum of 15 feet in height (SRCC Section 20-30.080) and mounted light fixtures that would be hooded to minimize glare. The light poles would be installed at the parking area perimeters. Wall-mounted hooded light fixtures will be mounted at a maximum height of 13.5 feet along the building exterior. Lighting is further discussed in the Aesthetics section. Additionally, the project design locates mechanical and electrical equipment in areas of the project site so as to maximize the distance of the noise point sources from surrounding receptors.

II.4.7 Ventilation and Odor Control

The Project includes odor control mechanisms to reduce potential cannabis odors outside of the facility. Odor controls are achievable through various methods including engineering controls, carbon filtration, neutralization and oxidation. The Project has also considered other factors that can affect odor dispersion such as facility siting (setback), building configuration (wake effects), prevalent wind direction, wind speed (atmospheric meteorology), and surrounding site topography.

Per City of Santa Rosa requirements, a certified odor control and monitoring plan will be submitted. The Project will include an odor control plan that monitors effluent air and incorporates a carbon adsorption system during grow periods. In addition, if needed for further odor control the Project may incorporate post-carbon adsorption technologies (prior to atmospheric dilution) that may include, but not be limited to, mist eliminators via spray application, oxidation using hydrogen peroxide or ozone, or other neutralizing agents.

II.4.8 Sustainability Features

The Project would incorporate the following sustainability features:

- water reclamation and
- natural gas cogeneration system.

Additionally, the following features would be included as part of the site development, consistent with Santa Rosa's Climate Action Plan (CAP):

- implement CALGreen Tier 1 standards,
- incorporate PG&E's Smart Meter System (cost/energy savings),

- use cool paving materials for high solar reflectivity,
- pre-wire and plumb for solar thermal/photovoltaic systems,
- promote non-vehicular transportation methods such as walking and biking through installation of bicycle parking, implementation of the Bicycle and Pedestrian Master Plan, and features to improve the pedestrian and bicyclist experience,
- install electric vehicle charging systems,
- use water meters to track water use,
- meet onsite meter separation requirements in locations with current/future recycled water capabilities,
- provide outdoor outlets for charging landscaping equipment,
- install low water use landscapes, and
- during construction, divert construction waste, minimize idling times to five minutes or less, maintain construction equipment to manufacturer specifications, and limit greenhouse gas (GHG) construction equipment emissions by using electric or alternative fuel as available.

II.5 Proposed Operations

Proposed operations would be performed by approximately 105 full-time employees, including security personnel. The employees would monitor the cultivation and manufacture of cannabis, manage the extraction process, manage the product inventory system, perform laboratory testing and ancillary operations including packaging, shipping and receiving and office work and keep the operations going on a day-to-day basis. Hours of operation would be permitted 24 hours per day, 7 days per week, with the following shifts:

- 45 employees onsite during the 9:30 AM to 6:30 PM shift,
- 25 employees onsite during the 6:30 PM to 3:30 AM shift,
- 10 employees onsite during the overlapping 7:00 PM to 4:00 AM shift, and
- 25 employees onsite during the 4 AM to 10 AM shift.

Santa Rosa Farm Group will not maintain or operate supply or delivery trucks. Trucks used for shipping and receiving will be owned by third parties. Supply deliveries will generally occur once a week during the day shift (typical business hours), and shipping pickups will occur between 10 AM and 5 PM, by appointment only.

II.5.1 Cultivation

The Santa Rosa Farm Group proposes to cultivate through the use of hydroponics and grow lights. Cultivation would occur completely within the main building, pursuant to standard industry protocols for production and quality assurance. Cannabis plants would be germinated on 8-inch by 8-inch by 8-inch wool cubes, grown in above ground pots and watered through a drip irrigation system. Run-off wastewater would be collected in trays and transferred to the onsite wastewater treatment system, discussed further above. Cultivation activities would focus on producing high-cannabinoid (CBD) strains of yield crops.

II.5.2 Manufacture and Extraction

Onsite manufacturing including extraction, in compliance with MAUCRSA Type 6 and Type 7 and City of Santa Rosa Comprehensive Cannabis Policy ordinance (SRCC, Chapter 20-46) regulations for volatile and nonvolatile manufacturing, would be conducted onsite. Extraction operations would be performed using volatile solvent extraction methods (e.g., butane) and non-volatile carbon dioxide, nitrogen and potentially other non-volatile compounds and extraction methods, as regulated and approved by the City. Permitted volatile solvents include ethanol, butane, and the solvents described in the California Health and Safety Code Section (HSC) Section 11362.3.

II.5.3 Inventory Management and Distribution

A 1,950-square-foot area within the main building would be used for distribution activities. Operations will include processing, packaging, sorting, and grading, as permitted in the IL zones. Inventory controls and loss documentation procedures would be implemented. A web-based inventory control system would be accessible upon demand to enable the City to implement a track-and-trace program. All cannabis products produced, manufactured, or distributed through the facility would be inventoried into the system along with the employee identification number, date and time, quantity, strain, and batch number. All employees would be trained to report loss or theft immediately. All products would be stored in a restricted-access area. The storage area is sufficient to maintain the quantities of cannabis proposed for this site.

II.5.4 Laboratory Testing

A small area within the main building would be used for performing laboratory tests on the interim work products and final product.

II.5.5 Support Operations

Ancillary and support operations would consist of office work and general maintenance of the facility/janitorial activities.

II.6 Project Construction

Project construction is anticipated to occur over an 11-month period. Construction hours would be from 7:00 am to 4:00 pm Monday through Friday, and 8:00 am to 4:00 pm on Saturday. Sunday and night work is not anticipated.

Construction of the Project would include the following phases:

- *Phase 1: Abatement and Demolition* – this phase would consist of demolishing the existing residence, ancillary buildings, and paved areas, and is expected to last 20 working days. The average daily worker trips (round-trip) will be 8 trips, and the average daily truck trips (round-trip) will be 2 trips.

- *Phase 2: Site Preparation* – This phase will consist of vegetation clearing and will last 15 days.

- *Phase 3A: Grading* – This phase would consist of mass grading (i.e., cutting and filling), and is expected to occur over 20 days.

- *Phase 3B: Fine Grading* – Once Phase 3A is complete, the Project site would be finely graded, which is expected to take 15 days.

- *Phase 4: Building Construction* – During this phase, the three-story, 120,000-square-foot main building, with concrete slab-on-grade foundation will be constructed as well as mechanical and utility systems. This phase is expected to take 105 days.

- *Phase 5: Architectural Finishes* – Following construction of the Project building, architectural exteriors and exterior finishes will be completed, taking 25 days.

- *Phase 6: Paving* – During this phase, a total of approximately 56,000 square feet will be paved, including 16,000 square feet in driveways and private roads; 29,000 square feet of parking lot area; and 11,000 square feet of paved yard areas. This phase is expected to take 25 days concurrent with Phase 5.

- *Phase 7: Landscaping* – the final construction phase will be landscaping limited areas of the western Project site exterior, taking 20 days.

II.7 Project Schedule

The Project sponsor submitted the Conditional Use Permit application to the City in November 2017. Hearings at the Planning Commission and the Design Review Board will likely occur during late 2020. If approved, construction activities will take place within an 11-month duration while the entitlements are valid and in accordance with all City of Santa Rosa construction regulations such as noise, daily start and end times, dust suppression, etc.

II.8 Required Approvals

The City of Santa Rosa is the lead agency for the Project and will consider the discretionary permits and approvals for the Project. These entitlements and approvals include, but may not be limited to, the following:

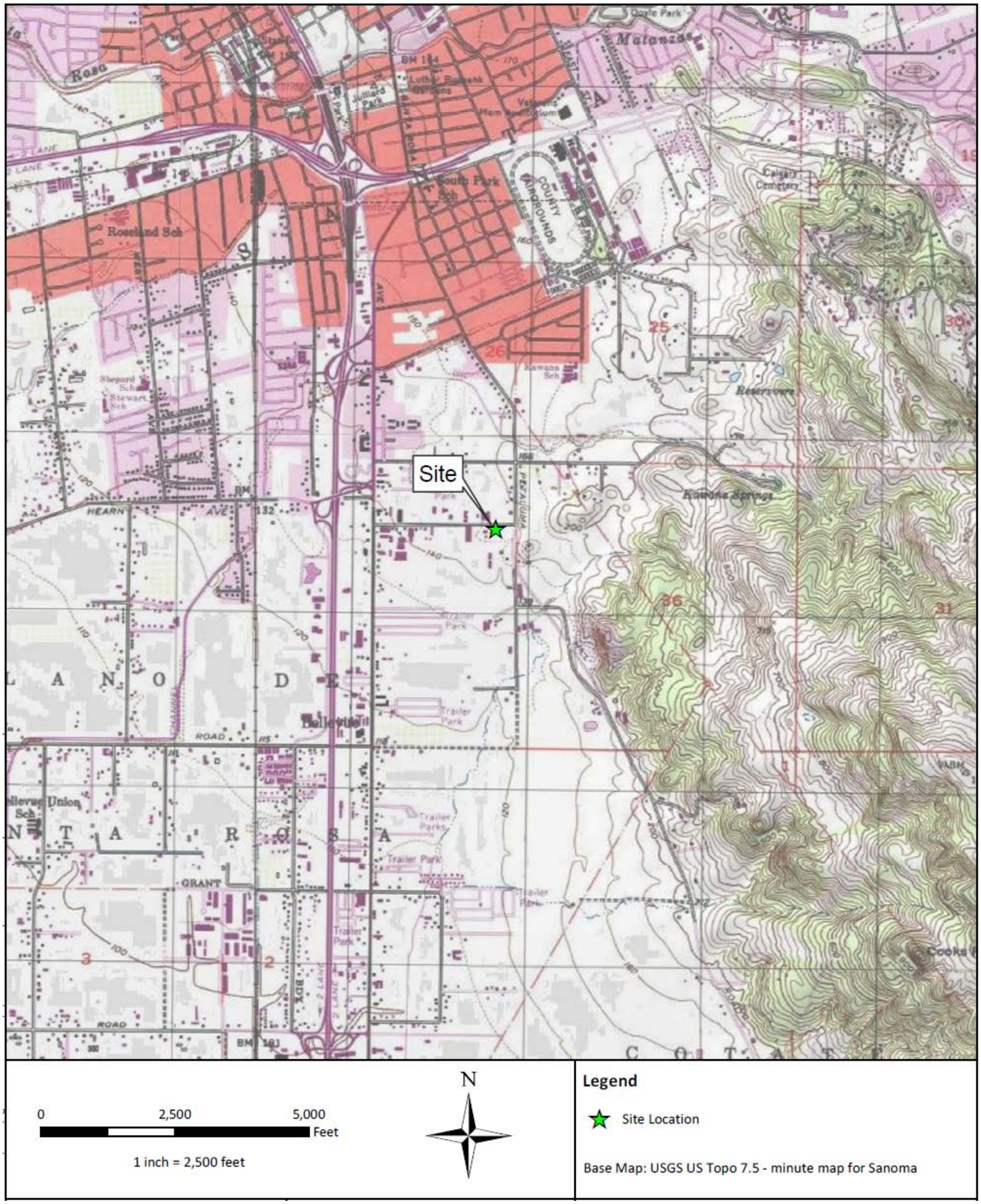
- Major Conditional Use Permit for cannabis cultivation;
- Minor Conditional Use Permits for cannabis support uses;

- Design review, grading, building, and all other permits required to construct and operate the facility.

Other state and local public agencies that may review the Project may include, but not be limited to, the following:

- California Department of Food and Agriculture—licenses for cannabis cultivation.
- Bureau of Cannabis Control – licenses for cannabis distribution.
- California Department of Public Health, Manufactured Cannabis Safety Branch – licenses for cannabis manufacturing (Type 7).
- State Water Resources Control Board and North Coast Regional Water Quality Control Board—water quality regulatory program for cannabis cultivators.
- Santa Rosa Fire Department would have authority regarding fire code enforcement.
- Sonoma County Department of Health Services may have authority over manufacturing activities.
- Bay Area Air Quality Management District – air permitting for cogenerator system.

Figure II.1 Site Location



THIS PAGE LEFT INTENTIONALLY BLANK

Figure II.2 Site Vicinity

Figure II.3 Existing Site Layout

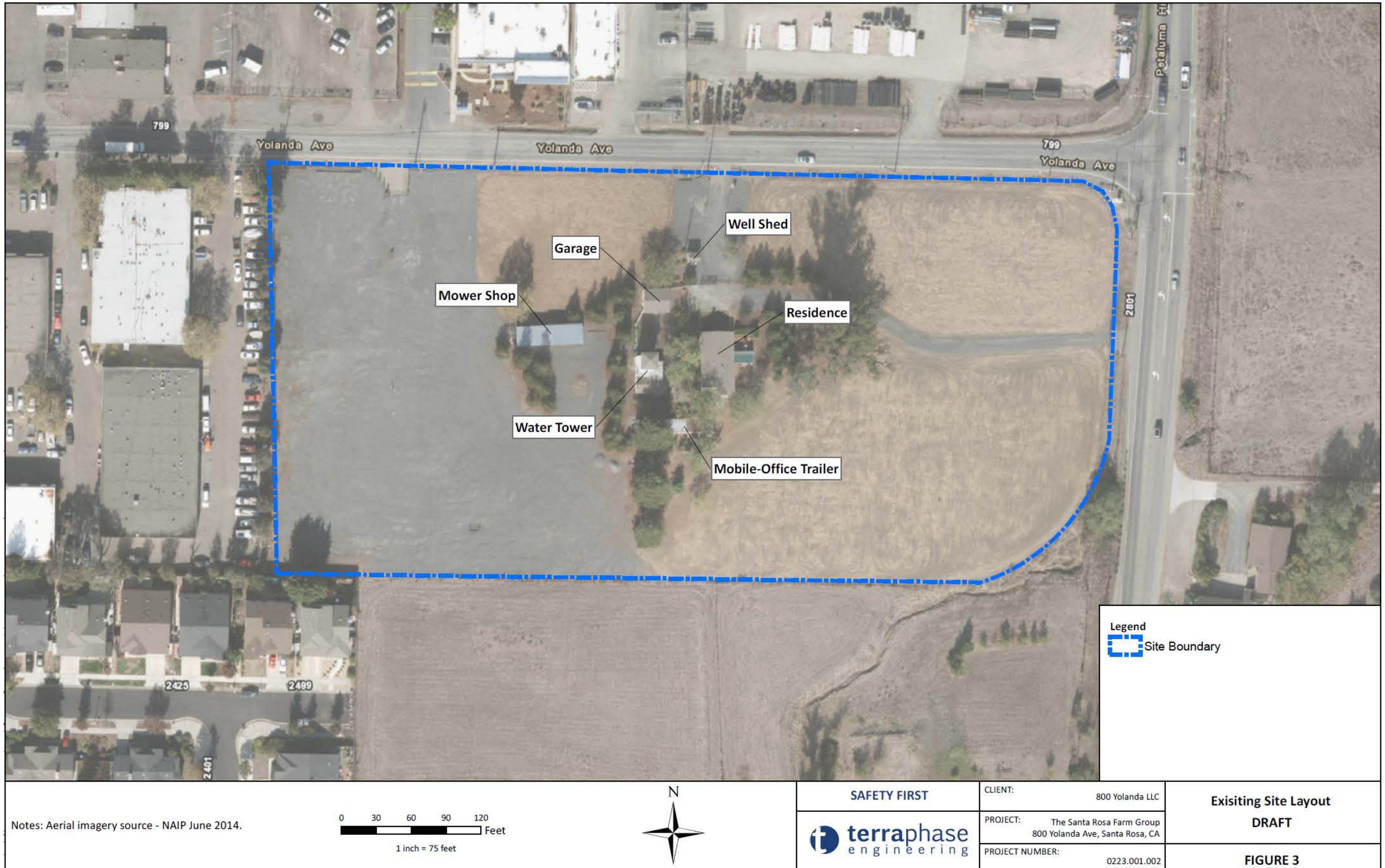
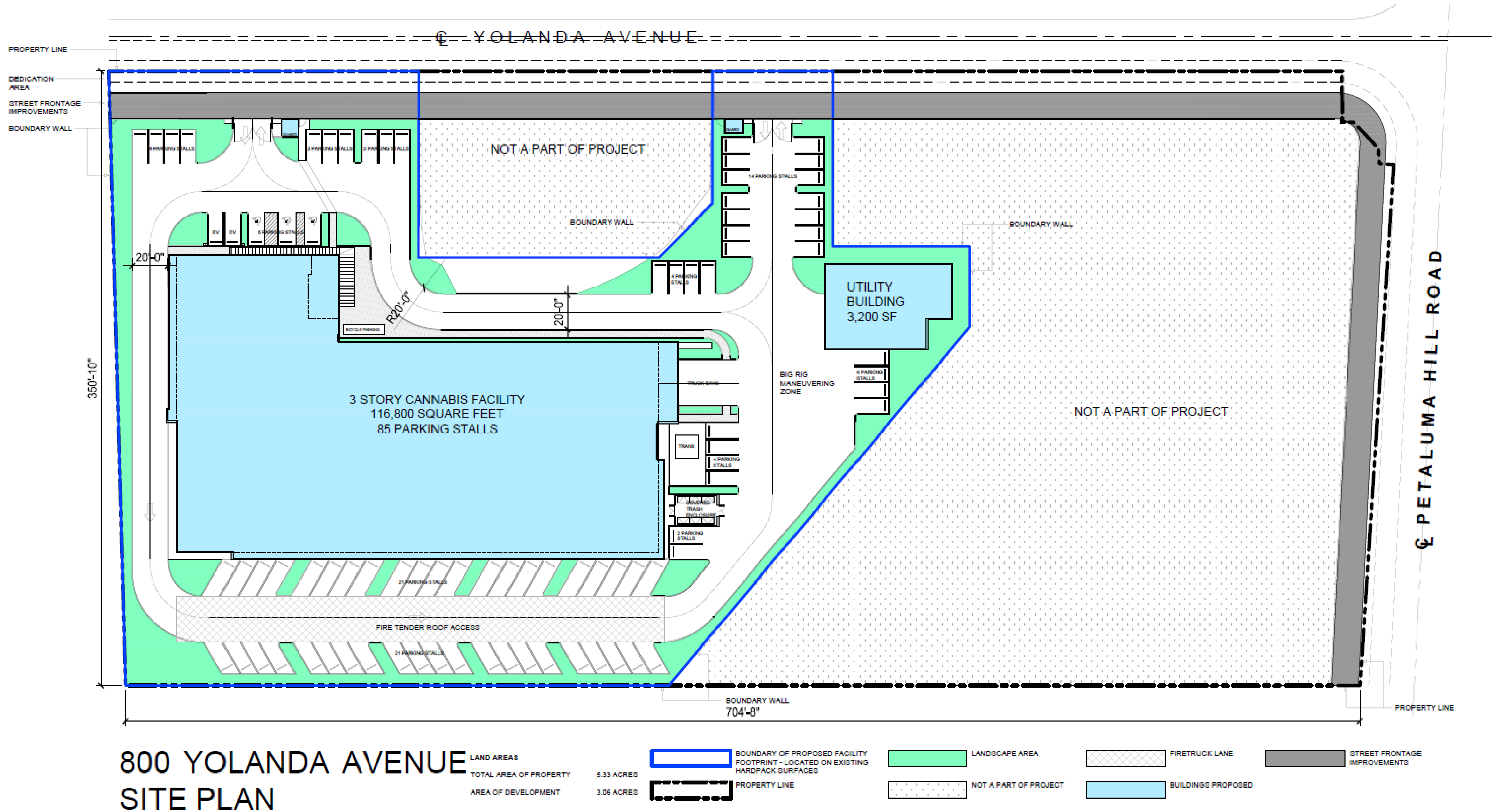


Figure II.4 Proposed Site Layout (Birdseye View)

Figure II.5 Site Plan



Source: Saga Architecture

Figure II.6 Proposed Site Rendering (Plan View)

Figure II.7 Perimeter Wall

Figure II.8 Lighting Design

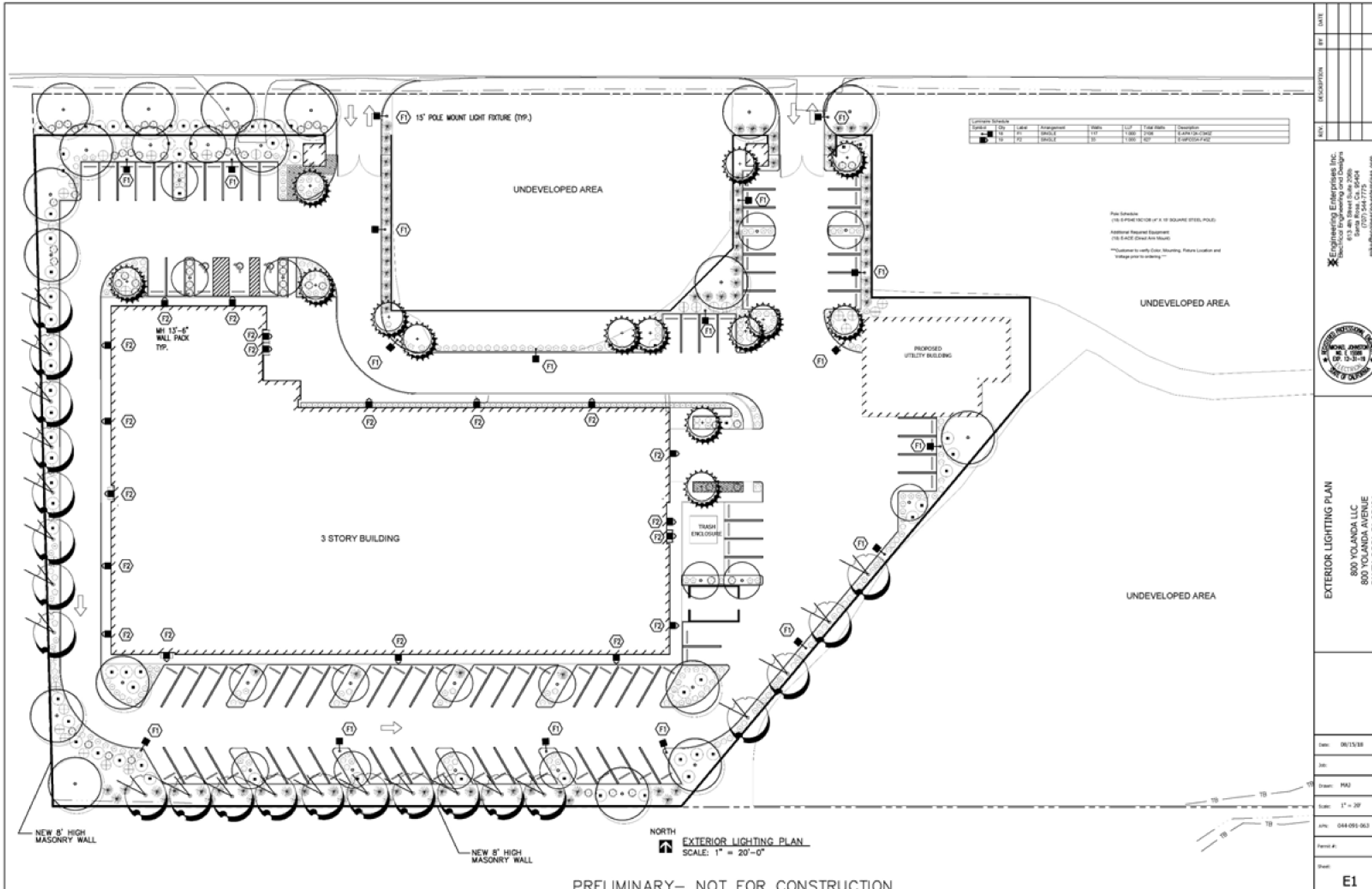
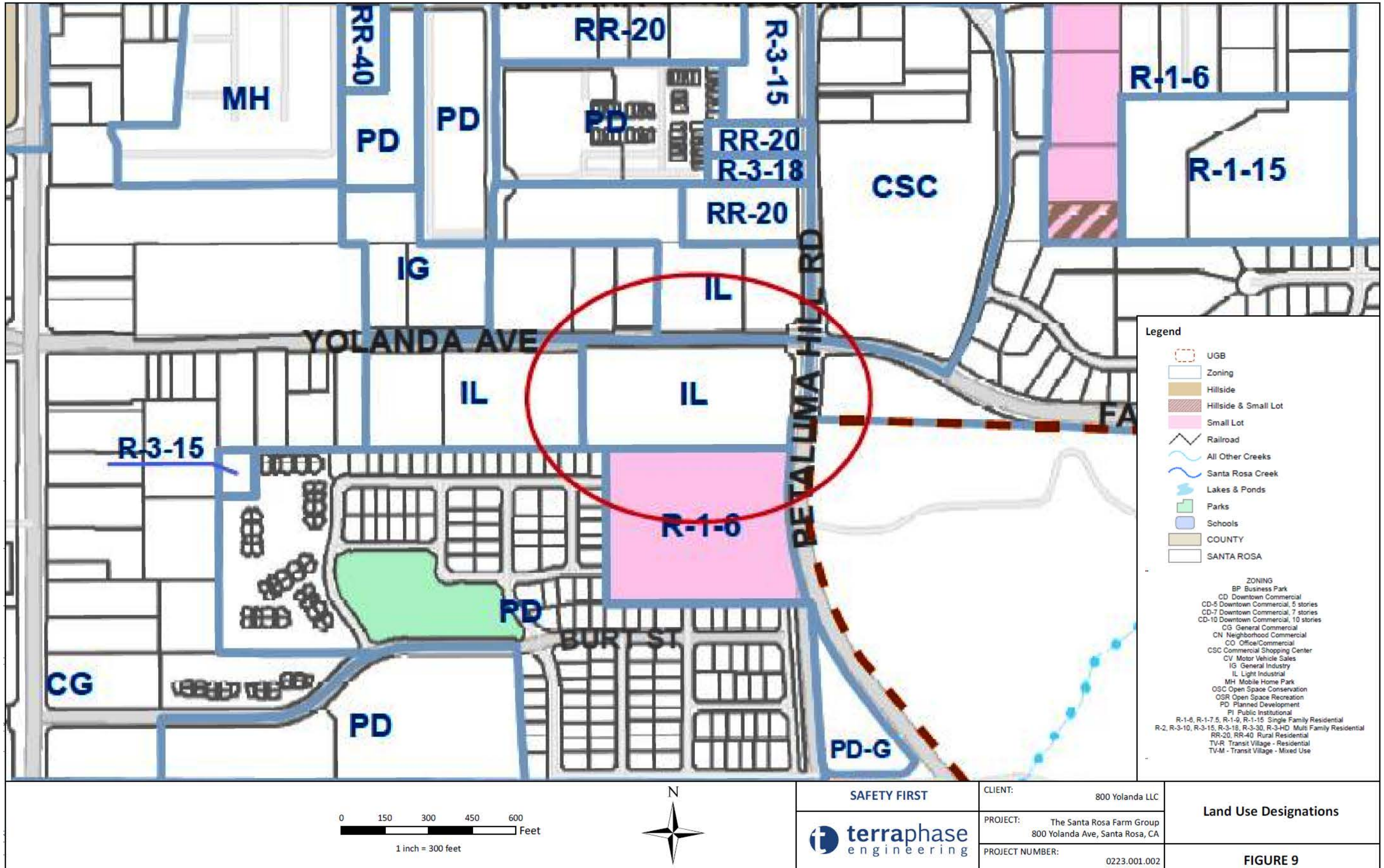


Figure II.9 Land Use Designations



III. REGULATORY SETTING

State, county, and local regulations and ordinances relevant to the Project are summarized below.

III.1 General Plan and Zoning Designations

The Santa Rosa General Plan and Zoning Map designate the Project site as Light Industrial. The City interprets medical cannabis cultivation uses and related support uses as consistent with this designation. Likewise, the City of Santa Rosa Comprehensive Cannabis Ordinance (ORD-2017-025) authorizes related cannabis support uses, including manufacturing, distribution, and laboratory testing, in the IL district with a major conditional use permit.

Permitted uses within the IL zone include the commercial cultivation of medicinal and recreational cannabis, as discussed further in Section III.4, below. Properties north and west of the Project site are also located in the IL Zone. To the east and southwest, properties are located in a planned development (PD) zone, and the southern adjoining properties are in a single-family residence (R-1-6) zone. The Project site is also located within the City's Urban Growth Boundary (UGB; City of Santa Rosa 2015). According to the City's Land Use and Livability (LUL) element, the Project site is located in the LUL-G-1 area, where the City will promote mixed use sites and centers, specifically, developing the area at Petaluma Hill Road at Yolanda Avenue (City of Santa Rosa 2015). Project site and vicinity land use designations are shown on **Figure II.9**. The setting of the proposed buildings meets local setback requirements.

III.2 State Regulations

The Project would be subject to the provisions of the following state regulations and guidelines:

- Compassionate Use Act of 1996 (CUA, "California Proposition 215") and Medical Marijuana Program Act, codified under HSC 11362.5 to 11362.83;
- California Attorney General's Guidelines for the Security and Non-Diversion of Marijuana Growth for Medical Use, issued in August 2008 ("2008 Attorney General Guidelines"); and
- State Assembly Bill 94, MAUCRSA.

On September 11, 2015, the Medical Cannabis Regulation and Safety Act (MCRSA; collectively, the State Assembly 243, State Assembly Bill 266, and Senate Bill 643) was enacted. However, on June 15, 2017, the California Legislature passed Senate Bill 94, effectively repealing MCRSA while incorporating certain provisions of the MCRSA in the licensing provisions of the Control, Regulate, and Tax Adult Use of Marijuana Act (AUMA, or Proposition 64). MAUCRSA integrates regulations for medicinal and recreational cannabis (previously covered under MCRSA) and adult-use cannabis (covered under AUMA).

CalCannabis Cultivation Licensing, under the CDFA, issues licenses for commercial medicinal and adult-use cannabis cultivation. The Bureau of Cannabis Control (BCC) within the Department of

Consumer Affairs (DCA) issues licenses for commercial medicinal and adult-use cannabis distributers, retailers, microbusinesses, testing laboratories and temporary cannabis events. The California Department of Public Health’s (CDPH’s) Manufactured Cannabis Safety Branch (MCSB) issues licenses for commercial medicinal and adult-use manufacturers.

In addition to the licensing authorities, other state agencies that will assist in implementation of MAUCRSA include the State Board of Forestry and Fire Protection, the California Department of Fish and Wildlife (CDFW), SWRCB, the California regional water quality control boards, and traditional state law enforcement agencies. Cannabis activities will be required to be in compliance with state and local laws related to land conversion, current building and fire standards, grading, electricity usage, water usage, water quality, woodland and riparian habitat protection, and agricultural discharges.

III.2.1 CalCannabis Cultivation Licensing

Currently, there are four types of cannabis cultivation licenses available for indoor cultivation using exclusively artificial lighting. The Santa Rose Farm Group would secure the necessary State licenses to operate the Project.

On January 16, 2019, the Office of Administration Law (OAL) approved the CDFA’s cannabis cultivation regulations and the regulations went into effect immediately (“the CDFA Cannabis Regulations”). Previously, in December 2017, the CDFA adopted Title 3 of the California Code of Regulations Division 8 Cannabis Cultivation, Chapter 1 Medical Cannabis Cultivation Program, sections 8000 to 8708, referred to as the Emergency Regulations for Cannabis Cultivation (“the Emergency Regulations”). The Emergency Regulations were readopted in June 2018 but are no longer in effect with the approval of the CDFA Cannabis Regulations by OAL. The CDFA Cannabis Regulations include requirements for permitting proposed cultivation facilities including application, licensing, site-specific requirements, records and track and trace, inspections, and enforcement. The regulations include the following applicable environmental requirements:

- Enrollment in an order or waiver of waste discharge requirements with State Water Resources Control Board (SWRCB) or the appropriate Regional Water Quality Control Board (3 CCR 8102(p)).
- A hazardous materials record search of the EnviroStor database for the proposed premises. If hazardous sites were encountered, the Project sponsor shall provide documentation of protocols implemented to protect employee health and safety (3 CCR 8102(q)).
- Compliance with Division 13 of the Public Resources Code: CEQA (3 CCR 8102(r)).
- Identification of all power sources for cultivation activities, including but not limited to, illumination, heating, cooling, and ventilation (3 CCR 8102(s)).
- Identification of water sources used for cultivation activities (3 CCR 8102(v) and 3 CCR 8107).

- A copy of any final lake or streambed alteration agreement issued by the CDFW or written verification from the CDFW that a lake and streambed alteration agreement is not required (3 CCR 8102(w)).

- Evidence that the Project is not located in whole or in part in a watershed or other geographic area that the SWRCB or CDFW has determined to be significantly adversely impacted by cannabis cultivation (3 CCR 8102(dd) and 3 CCR 8216).

- Preparation of a Cultivation Plan (3 CCR 8106) including requirements for:

  - A detailed premises diagram identifying the locations of material storage and operational areas,

  - A lighting diagram identifying the location of lights and types of lights in canopy areas,

  - A pest management plan identifying the products to be used and integrated pest management protocols, including an attestation that the Project sponsor will contact the appropriate County Agricultural Commissioner regarding requirements for legal use of pesticides on cannabis prior to using any of the materials included in the plan and will comply with all pesticide laws, and

  - A waste management plan identifying the management method for cannabis waste (as further discussed below).

- Outdoor lighting used for security purposes shall be shielded and downward facing (3 CCR 8304(c)).

- Renewable energy requirements (3 CCR 8305) to ensure that electrical power used for commercial cannabis activity meets the average electricity greenhouse gas emissions intensity required of their local utility provider pursuant to the California Renewables Portfolio Standard Program, division 1, part 1, chapter 2.3, article 16 (commencing with section 399.11) of the Public Utilities Code.

- Requirements for pesticide use, including compliance with pesticide laws and regulations enforced by the Department of Pesticide Regulation (DPR) and application and storage protocols (3 CCR 8307).

- Requirements for cannabis waste management including secured waste receptacles and composting requirements (3 CCR 8308).

The Project would seek licensure for medicinal and adult-use recreational cannabis cultivation activities, including Types 3a and 2a.

III.2.2 Bureau of Cannabis Control Licensing

The BCC is the lead agency in developing regulations for medicinal and adult-use cannabis licensing retailers, distributors, testing labs, and microbusinesses in California. Similar to the CDFA, in December 2017, BCC adopted emergency regulations providing licensing and enforcement criteria for the subject activities (16 CCR 5000 – 5814). These emergency regulations were readopted in June 2018. On January 16, 2019, OAL approved the BCC cannabis regulations. The regulations include the following applicable environmental requirements for distributors and testing laboratories[1]:

- Requirements for the preparation of the transportation procedure for cannabis goods (16 CCR 5002(c)(29)(A) and (E), 16 CCR 5311, 16 CCR 5709).
- Compliance with Division 13 of the Public Resources Code: CEQA (16 CCR 5002(c)(33) and 16 CCR 5010).
- Requirements for cannabis waste management (16 CCR 5054).

The Project would seek licensure for cannabis distribution activities, a Type 11 license. A tenant who will operate and occupy the testing laboratory as a separate premises would seek licensure as a testing laboratory.

III.2.3 Manufactured Cannabis Safety Branch Licensing

MCSB is responsible for regulation of all commercial cannabis manufacturing in California. As with the CDFA and BCC, in December 2017, the MCSB adopted emergency regulations that outline the statewide standards and licensing procedures for manufacturing of commercial cannabis products (17 CCR 40100 – 40601). These emergency regulations were readopted in June 2018. On January 16, 2019, OAL approved the MCSB cannabis regulations. The regulations include the following applicable environmental requirements for manufacturers:

- Requirements for the preparation of the transportation standard operating procedure (17 CCR 40131(j)(2)).
- Requirements for cannabis waste management and standard operating procedure (17 CCR 40290).
- Requirements regarding the extraction process, including safety elements (17 CCR 40220 - 40225).
- Requirements for validating all equipment and machinery (17 CCR 40260).

---

1 A tenant who will operate and occupy the testing laboratory as a separate premises would seek licensure as a testing laboratory.

- Requirements for preparation of written standard operating procedures, including emergency response procedures (17 CCR 40275).
- Compliance with Division 13 of the Public Resources Code: CEQA (3 CCR 8102(q)).

MCSB will offer four license types for cannabis manufacturers (17 CCR 40118):

- Type 7 – for extraction using a volatile solvent (ex: butane, propane and hexane)
- Type 6 – for extraction using a mechanical method or non-volatile solvent (ex: CO2, ethanol, water, or food-grade dry ice, cooking oils or butter)
- Type N – for cannabis products other than extracts or concentrates that are produced through extraction
- Type P – for packaging and labeling only

The Project would seek Type 7 licensure, which includes Types 6, N, and P tasks.

III.2.4 California Department of Fish and Wildlife

Pursuant to Business and Professions Code 26060.1(b)(3), every license for cultivation issued by the CDFA must comply with Section 1602 of the Fish and Game Code or receive written verification from the CDFW that a Lake or Streambed Alteration (LSA) Agreement is not required. Compliance with Section 1602 of the Fish and Game Code requires all prospective licensees to submit an LSA notification to the CDFW regional office serving the area where the activity will occur. Upon receipt of a complete LSA notification, CDFW will determine if an LSA Agreement is required.

III.2.5 State Water Resources Control Board

On October 17, 2017, the SWRCB adopted the Cannabis Cultivation Policy – Principles and Guidelines for Cannabis Cultivation (Cannabis Policy) and General Waste Discharge Requirements and Waiver of Waste Discharge Requirements for Discharges of Waste Associated with Cannabis Cultivation Activities (Cannabis General Order). The SWRCB established the program to address potential water quality and quantity issues related to cannabis cultivation and to meet the directives of Senate Bill (SB) 837 and the MAUCRSA. The OAL approved the Cannabis Policy on December 18, 2017. On February 5, 2019, the SWRCB adopted the proposed updates to the Cannabis Policy. As of April 16, 2019, the Office of Administrative Law approved the updates to the Cannabis Policy.

Commercial cannabis cultivation activities that occur within a structure with a permanent roof, a permanent relatively impermeable floor (e.g., concrete or asphalt paved), and that discharge all industrial wastewaters generated to a community sewer system consistent with the sewer system requirements, are classified as conditionally exempt in the Cannabis Policy. To obtain documentation of the conditionally exempt status to obtain a CDFA commercial cannabis cultivation license, conditionally exempt commercial cannabis cultivators are required to obtain coverage under the Waiver of Waste Discharge Requirements.

III.2.6 Consultation Under AB 52

In accordance with AB 52 (PRC Section 21084.2), lead agencies are required to consider Tribal Cultural Resources (TCR) including a site feature, place, cultural landscape, sacred place or object, of cultural value to the tribe and is listed on the California Register of Historic Resources (CRHR) or a local register, or the lead agency, at its discretion, chooses to treat resources as such. AB 52 mandates that a lead agency initiate consultation with a tribe with traditional and/or cultural affiliations in the geographic area where a subject project is located if a project may cause a substantial adverse change in the significance of a tribal cultural resource. Should the tribe respond requesting formal consultation, the lead agency must work with the tribe or representative thereof to determine the level of environmental review warranted, identify impacts, and recommend avoidance or mitigation measures to reduce any potential impacts.

In accordance with AB 52, notification of the Project was mailed by City of Santa Rosa Planning Department staff to the following local tribes on May 10, 2018:

- Lytton Rancheria of California
- Federated Indians of Graton Rancheria

None of the contacted tribes requested consultation under AB 52.

III.3 North Coast Regional Water Quality Control Board Regulatory Program

In order to provide a water quality regulatory structure to prevent and/or address poor water quality conditions and adverse impacts to water resources associated with cannabis cultivation on private land, the RWQCB established a water quality regulatory program (Order R1-2015-0023). Under this Order, any cultivators with 2,000 square feet or more of cannabis with any operations that result in a discharge of waste to an area that could affect waters of the State (including groundwater) will fall within one of three tiers depending on the nature of their operation and risk to water quality. For new cultivation facilities, such as this one, this program is superseded by the SWRCB Cannabis Policy.

III.4 City of Santa Rosa Comprehensive Cannabis Ordinance

On December 12, 2017, the Santa Rosa City Council approved a Comprehensive Cannabis Policy ordinance (Ordinance No. ORD-2017-025 and SRCC, Chapter 20-46). The ordinance establishes a uniform regulatory program for all cannabis uses in the City in accordance with state law.

Under the ordinance, cannabis facilities are subject to a Minor or Major Conditional Use Permit (depending on size and extraction method) in specific zoning districts. The specified zoning districts included Light Industrial (IL). Cultivation operations 5,001 square feet or greater in size will be allowed with a Major Conditional Use Permit. The ordinance additionally authorizes the use of volatile solvents in the cannabis manufacturing process in Industrial zones, with a major conditional use permit.

The City's Planning Commission will decide on issuance of a Conditional Use Permit. In order for a Conditional Use Permit to be approved, public notice and a public hearing are required. Additionally, the following conditions must be met:

1. The proposed use is allowed within the applicable zoning district and complies with all other applicable provisions of the Zoning Code and the City Code;
2. The proposed use is consistent with the General Plan and any applicable specific plan;
3. The design, location, size, and operating characteristics of the proposed activity would be compatible with the existing and future land uses in the vicinity;
4. The proposed site is physically suitable for the type, density, and intensity of use being proposed, including access, utilities, and the absence of physical constraints;
5. Granting the permit would not constitute a nuisance or be injurious or detrimental to the public interest, health, safety, convenience, or welfare, or materially injurious to persons, property, or improvements in the vicinity and zoning district in which the property is located; and
6. The proposed Project has been reviewed in compliance with CEQA.

III.5 City of Santa Rosa Bureau of Fire Prevention

In accordance with local permitting requirements (SRCC Section 18-44.105.6.50), cannabis cultivation, distribution, manufacturing, and testing labs are required to obtain operational permits from the City of Santa Rosa Bureau of Fire Prevention prior to operation.

III.6 Neighborhood Meeting and Community Outreach

Prior to approving a conditional use permit, the City Planning Commission will conduct a public hearing on an application for a Conditional Use Permit before reaching a decision on the application (in compliance with SRCC, Chapter 20-66 [Public Hearings]). Since the Project site is located within 300 feet of residential uses, the City sponsored a neighborhood meeting for the Project. On April 18, 2017, the City sent notification letters to owners and occupants of residences within a 300-foot radius of the Project site. On May 3, 2017, the neighborhood meeting was held, and several dozen neighbors attended. A second, catered community meeting was hosted at the site by The Santa Rosa Farm Group on August 16, 2017, to further discuss the Project, design revisions, and neighbor concerns.

IV. 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" as indicated by the checklist on the following pages.

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

DETERMINATION:

On the basis of this initial evaluation:

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

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the Project sponsor. 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 or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

June 29, 2020

Signature Date

IV.1 IS Sections

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

1.1 Environmental Setting

The Project site contains a residence, water tower, garage, sheds, mobile office trailer, and planted ornamental trees near the center of the property. The remainder of the Project site is largely vacant. The western portion of the Project site is covered with gravel. The eastern portion consists of an undeveloped, grass field with a gravel driveway accessing Petaluma Hill Road. The Project site is generally level with limited topographic relief, and grade is at approximately 155 feet above mean sea level.

The Project site fronts on Yolanda Avenue (to the north), which contains one-to-two-story retail and industrial buildings of indistinctive design, parking lots, and storage yards along its entire length; and Petaluma Hill Road (to the east) which contains agricultural lands, Zamaroni Quarry and a storage yard containing landscape and building materials within the immediate vicinity of the Project site. Properties along Yolanda Avenue have minimal to no landscaping. Petaluma Hill Road is designated in the Santa Rosa General Plan as a Scenic Road from Colgan Avenue to the Urban Growth Boundary (UGB; City of Santa Rosa 2009b), which includes the Project site area. The Project site is also within an area identified in the Santa Rosa General Plan as a City "Entry and Corridor" (City of Santa Rosa 2009d).

To the north of the Project site, across Yolanda Avenue, is Mario's RV Service parking lot, the one-to-two-story Goodwill building, and Wyatt Irrigation Services comprising several single-story buildings and construction materials storage areas. Adjacent to and west of the Project site is Yolanda Industrial Park comprising multiple single-story buildings surrounded by parking lots. Adjacent to and south of the Project site are two two-story residences (southwest corner of the Project site) and agricultural lands designated in the Santa Rosa General Plan for low-density residential use. East of the Project site across Petaluma Hill Road is Cunningham Dairy. Photographs are provided in Appendix A. The Site's location and vicinity is provided in Figure II.2.

Overall, the Project site and surrounding areas feature a mix of buildings, signage, and open lands.

1.2 Impact Analysis

This section analyzes the Project's potential aesthetic impacts, including impacts on scenic vistas, scenic resources, the visual character of the site and its surrounding, and light and glare. This analysis is based on an inspection of the existing conditions on the Project site and surrounding areas, the applicable scenic designations, the design and plans for the Project, and applicable City ordinances and design regulations.

The Project would construct a three-story building with a height of approximately 50 feet. This is 5 feet below the maximum height limit for the site under the applicable light industrial zoning. The building footprint would be 36,800 square feet on a site comprising 5.5 acres (Saga Architecture 2018). Building setbacks from the Project site's property lines would be between approximately 104 feet south of the northern property boundary along Yolanda Avenue, approximately 400 feet west of the eastern property boundary along Petaluma Hill Road, approximately 27 to 31 feet east of the western property boundary adjacent to light industrial land uses, and 70 feet north of the southern property boundary adjacent to residences. The Project is consistent with the Santa Rosa General Plan Urban Design policies.

A discussion of each environmental issue included under Section 1 is presented below.

a) Would the project have a substantial adverse effect on a scenic vista?

Less than Significant Impact. There is an existing scenic vista of agricultural lands, parklands, and rolling hills to the east of Petaluma Hill Road. Because the Project site is on the opposite side (i.e., the west) side of the road, it will not affect the scenic vista as seen from Petaluma Hill Road. Nor will the Project significantly affect the scenic vista as seen from Yolanda Avenue or other surrounding areas because of the building's limited footprint relative to the size of the site and the site's flat topography. Additionally, the proposed building will be setback approximately 100 feet at its closest point along Yolanda Avenue and approximately 400 feet along Petaluma Hill Road (Saga Architecture 2018). These building setback distances significantly exceed the minimum setbacks required by SRCC (SRCC Chapter 20-30). The oversized setbacks will further protect views of the scenic vista from the surrounding area. The setbacks and overall site design will also be compatible with the existing visual character of Petaluma Hill Road and the surrounding area. Thus, the Project will not result in a substantial adverse effect on a scenic vista. The Project's impacts will be less than significant.

b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Less than Significant Impact. The Project is not within a designated state scenic highway (City of Santa Rosa 2009b). There are no rock outcroppings on the Project site (Section 7, Geology and Soils), nor historic buildings (Section 5, Cultural Resources). The Project site is, however, located along the segment of Petaluma Hill Road, which is a City-designated Scenic Road (City of Santa Rosa 2009b), which is not the equivalent of a state scenic highway referenced in the threshold of significance here.

An arborist report and tree inventory was prepared for the Project site (Horticultural Associates 2017). The report identified 78 trees, the vast majority of which are planted ornamental trees located around the residence and ancillary buildings. Native trees on the Project site are limited to a single Valley Oak. The Project would require removal of 58 trees on the Project site, not including the native Valley Oak. These trees are not considered a scenic resource, given that they are planted ornamentals, non-native, and not visually distinctive. Moreover, the Project will be required to replace the 58 removed trees pursuant the City's Tree Preservation Ordinance (SRCC Chapter17-24). A total of 72 replacement trees will be planted as shown Preliminary Landscape Plan (**Appendix B**; BC Engineering Group, Inc. 2018) and will include Crape Myrtle, Red Maple, and Coast Live Oak. The planting requirement for the replacement trees must be documented on the final landscape plan for the Project. Mandatory compliance with these requirements will ensure that any aesthetic impacts related to tree removal will be less than significant. The Project site does not contain any historic resources.

Therefore, the Project will not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway. The Project's impacts will be less than significant.

c) In non-urbanized areas, would the project substantially degrade the existing visual character or quality of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

Less than Significant Impact. The site is zoned for industrial uses and there are numerous existing industrial uses that line Yolanda Avenue near the site. The existing visual character of the site is varied. The western portion of the site, which is proposed for development, consists of a three-acre gravel field with scattered weeds, an assortment of buildings constructed in the 1940s, including a single-family residence and various wood-framed outbuildings and sheds, and a mobile trailer, all surrounded by a wire fence. The Project will enhance the visual character of the western portion of the site by removing and replacing these features with a well-designed three-story-building and appropriate landscaping and tree replacement. In addition, the Project will maintain the undeveloped grassy island and the undeveloped, grassland on the eastern portion of the site, which will result in the visual appearance of these areas remaining unchanged. The character and quality around the site is also varied, although the predominant visual character is industrial because of the entire length of Yolanda Avenue from Santa Rosa Road to Petaluma Hill Road is lined with industrial operations. Thus, for purposes of this analysis, the area around the site is considered urban.

The Project will feature a high-quality and visually distinctive design and will be consistent with the land uses and building types in the surrounding area. The final landscape plan would soften the appearance of the Project and comply with the City's Tree Preservation Ordinance (SRCC Chapter 17-24). The design of the proposed 8-foot high perimeter wall would provide visual interest along the Yolanda Avenue street frontage. As part of the City' permit application review procedure, the City's Design Review Board would review the design aspects of the Project (e.g., building design, landscaping, site planning and development, and signs) for compliance with the City's Design Guidelines (SRCC Section 20-52.030). Therefore, the Project would not substantially degrade the existing visual character or quality of the site and its surroundings.

In addition, the Project is consistent with the industrial zoning that applies to the site and will also be consistent with applicable Santa Rosa General Plan Urban Design policies (City of Santa Rosa 2009d). These include:

- *UD-A-4: Require superior site and architectural design of new development projects to improve visual quality in the city.*

  The building and site design will be visually distinctive. The north elevation of the building will include setbacks to physically break up the building mass along the Yolanda Avenue frontage. The building exterior will be finished in metal panels ranging in colors of silver and gradations of light to dark gray in distinctive patterns to visually break-up the building mass. Metal panels will be treated with a matte finish to prevent glare.

  The landscape plan shows trees along the interior of the perimeter walls (**Appendix B**; BC Engineering Group, Inc. 2018b). Within five to six years, the trees will be at a height of about 20 feet and will screen the building from adjacent residences to the south. To the west, north, and east, the trees will provide greenery and visually provide an overall softening of the Project site. Existing healthy trees outside of the perimeter wall will be retained. Street trees will be planted along the Project's Yolanda Street frontage (Figure II.4 and Figure II.6) in compliance with City standards (SRCC Chapter 17-24).

  The proposed perimeter wall will be 7 feet tall (**Figure II.7**). The south, east, and west walls will be precast concrete panels with metal insert panels. The wall fronting on Yolanda Avenue (north wall) will be a combination of precast concrete panels, laser-cut metal panels, and metal tubes spaced to allow visual access into the landscaped grounds. The combination of materials providing smooth and rough surfaces and solid and permeable areas create visual interest particularly along the Yolanda Avenue frontage, which is closer to the street.

- *UD-C-1: Enhance the appearance of the city's major entries through special design criteria and streetscape improvements. City entries, which occur at the Urban Growth Boundary, are shown in Figure 3-1: City Entries and Corridors: Petaluma Hill Road.*

  The proposed building will be set back from Yolanda Avenue and Petaluma Hill Road to allow views of the rolling hills to the east consistent with the City's policy to maintain open space at City entries and corridors (City of Santa Rosa 2009d). Trees will be planted within the perimeter wall which will soften the appearance of the site. The setbacks and overall site design will also be compatible with the existing visual character of Petaluma Hill Road and the mixed industrial, residential and urban character of the surrounding area.

  Therefore, the project would not substantially degrade the existing visual character or quality of the site and its surroundings; and the project would not conflict with applicable zoning and other regulations governing scenic quality. The Project's impacts will be less than significant.

d) Would the project create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?

Less than Significant Impact. The area has existing lighting levels associated with the industrial and residential uses around the Project site. The new sources of light associated with the Project would be similar to the existing industrial uses nearby. The Project will introduce a new light source at the site, but all exterior lighting is designed to avoid or minimize light and glare. The Project will include lighting in the parking areas and wall-mounted light fixtures for safety and security along the building exterior which will increase the amount of night lighting at the Project site. Lighting installed in the parking areas would consist of poles a maximum of 15 feet in height and mounted light fixtures that will be hooded to minimize glare, in accordance with SRCC (SRCC Section 20-30.080). The light poles will be installed at the parking area perimeters. Wall-mounted hooded light fixtures will be mounted at a maximum of 13.5 feet along the building exterior (Engineering Enterprises, Inc. 2018). In accordance with the requirements of the CDFA Cannabis Regulations (3 CCR 8304(c)), all outdoor lighting used for security purposes shall be shielded and downward facing.

A photometric analysis of the proposed lighting plan was conducted and concluded that the Project will not result in light spillover along the south and west property lines (e-conolight 2018, attached as **Appendix C**). Thus, the lighting sources will not adversely affect the adjoining land use uses, including the residences located south of the Project site and the commercial/industrial uses to the west of the site (Johnston 2018).

Therefore, the Project will not create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area. The Project's impacts will be less than significant.

1.3 Mitigation Measures

No mitigation measures are required.

2. AGRICULTURAL AND FORESTRY RESOURCES	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
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 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

2.1 Environmental Setting

The Project site is approximately 5.53 acres and is zoned for Light Industrial (LI) use, per the current City of Santa Rosa Zoning Map, dated August 2015 (City of Santa Rosa 2015). The western portion of the Project site is currently improved with a residence and ancillary buildings, as well as approximately three acres of gravel cover. The eastern portion of the Project site includes undeveloped land, which is regularly disked, and a gravel access route from Petaluma Hill Road. Land uses surrounding the Project site include light industrial, residential, agricultural, and commercial.

Although the Project site is not in agricultural use, the eastern portion is designated Farmland of Local Importance by Sonoma County (California Department of Conservation 2016). No portion of the Project site has been actively farmed for many years. The Project does not include any development within the area designated as farmland; all proposed development is limited to the disturbed and developed areas on the western portion of the Project site.

The Project site does not contain any significant timber or forest resources. An arborist report and tree inventory was prepared for the Project site (Horticultural Associates 2017). The report identified 78 trees, most of which are planted ornamental trees located around the residence and ancillary buildings. The report found that the Project site included only very small quantities of native trees, consisting of Coast Live Oak and Valley Oak.

2.2 Regulatory Background

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

As stated in Public Resources Code Section 4526, “Timberland” means land, other than land owned by the federal government and land designated by the board as experimental forest land, which is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees. Commercial species shall be determined by the board on a district basis.

Under Government Code Section 51104(g), “Timberland production zone” or “TPZ” means an area which has been zoned pursuant to Section 51112 or 51113 and is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses, as defined in subdivision (h). With respect to the general plans of cities and counties, “timberland preserve zone” means “timberland production zone.”

As discussed in the CDFA Final Program Environmental Impact Report (PEIR; CDFA 2017), under HSC Section 11362.777(a), and Business and Professions Code Section 26067(a), respectively, medical and adult-use cannabis are agricultural products.

2.3 Impact Analysis

This section analyzes the Project's potential impacts to agricultural and forestry resources. This analysis is based on applicable farmland maps, the state Farmland Mapping and Monitoring Program, visual inspection of the Project site, and the arborist report and tree inventory prepared for the Project site.

The Project would not: convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance to nonagricultural use; convert Farmland of Local Importance or any other farmland to nonagricultural use; or conflict with existing zoning for forest land, timberland, or timberland zoned Timberland Production.

A discussion of each environmental issue included under Section 2 is presented below.

a) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No Impact. The Project site is not mapped as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance pursuant to the Farmland Mapping and Monitoring Program operated by the California Department of Conservation, Division of Land Resources Protection (California Department of Conservation 2016). Thus, the Project will not convert or have any other impact on Prime Farmland, Unique Farmland, or Farmland of Statewide Importance.

For informational purposes, it is noted that the eastern portion of the Project site is designated Farmland of Local Importance (California Department of Conservation 2016). Farmland of Local Importance is lower quality farmland as compared to Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and is distinguishable from the type of farmland listed in the applicable threshold of significance here. In addition, there is no active farming on any portion of the Project site. Moreover, the Project will avoid development on the eastern portion of the Project site, and thereby will not convert any Farmland of Local Importance to nonagricultural use. Thus, the Project will have no impact even with respect to the Farmland of Local Importance.

Therefore, the Project will not convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use. The Project will have no impact.

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The Project site is zoned Light Industrial (IL) (City of Santa Rosa 2015) and is designated as light industry in the Santa Rosa General Plan Land Use Diagram (City of Santa Rosa 2016). No part of the Project site is zoned for agriculture. There is no Williamson Act contract that affects the Project site according to the Preliminary Title Report included in the Phase I Environmental Site Assessment (EBA Engineering 2016). Therefore, the Project will not conflict with existing zoning for agricultural use or a Williamson Act contract. The Project will have no impact.

c) Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

No Impact. The Project site is zoned Light Industrial (IL) (City of Santa Rosa 2015) and is designated as light industry in the Santa Rosa General Plan Land Use Diagram (City of Santa Rosa 2016). No part of the Project site is zoned for forest land or timberland. In addition, the Project site does not contain any forest land, timberland, or timberland zoned Timberland Production, as defined in the Public Resources Code, nor will it cause rezoning of any such lands. Therefore, the Project will not conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production. The Project will have no impact.

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. The Project site does not contain forest land. Therefore, the Project will not result in the loss of forest land or the conversion of forest land to non-forest use. The Project will have no impact.

e) Would the project involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?

No Impact. See Subsections 2a through 2d above. The Project site does not contain agricultural or forest uses. Development on the Project site would not change or effect any agricultural or forest uses in the vicinity. Therefore, the Project will not involve changes in the existing environment, which, due to their location or nature, could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use. The Project will have no impact.

2.4 Mitigation Measures

No mitigation measures are required.

3. AIR QUALITY	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

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:

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

3.1 Environmental Setting

Information in this section is based on the "Santa Rosa Farm Group – Cannabis Cultivation Facility Project Air Quality and Greenhouse Gas Study" prepared by Rincon Consultants, Inc., in November 2019, included in **Appendix D**.

3.1.1 Air Quality Standards and Attainment

The Project site is in Santa Rosa in Sonoma County, which is located within the San Francisco Bay Area Air Basin (Basin), which is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (EPA) establish ambient air quality standards for major pollutants. Standards have been set at levels intended to be protective of public health. California standards are typically more restrictive than federal standards. Local air districts and CARB monitor ambient air quality to ensure that air quality standards are met, and if they are not met, develop strategies to meet the standards. Air quality monitoring stations measure pollutant ground-level concentrations (typically, ten feet above ground level). Depending on whether the standards are met or exceeded, the local air basin is classified as in "attainment" or "non-attainment." Some areas are unclassified, which means no monitoring data are available. Unclassified areas are considered to be in attainment.

The Pacific Ocean influences the moderate climate of Sonoma County. In summer, afternoon northwesterly winds blow contaminants south toward San Francisco. In winter, periods of stagnant air can occur, especially in periods between storms.

The Basin is in nonattainment for the federal standards for ozone and $PM_{2.5}$. The Basin is also in nonattainment for the State standard for ozone, PM_{10}, and $PM_{2.5}$. The representative annual air quality data for the Project site over the years 2014 to 2017 at the nearest monitoring station (the Sebastopol Monitoring Station) for all criteria pollutants, except PM_{10} and CO since they were unavailable at that station, are included in the Air Quality and Greenhouse Gas Study (Rincon Consultants 2019a). Data for PM_{10} was available from the Healdsburg-133 Matheson Street station approximately 17 miles north of the Project site, and there is not sufficient data available for CO in the past four years. As shown in Table 2 of the Air Quality Technical Report (Rincon Consultants 2019a), PM_{10} exceeded the state standard in 2015 and state and federal standards in 2017, and $PM_{2.5}$ exceeded the federal standard in 2017 (PM exceedances in 2017 were likely due to the local wildfire). The 8-hour average of ozone also exceed the state standard one time in 2017.

3.1.2 Air Quality Management Plan

The BAAQMD is primarily responsible for ensuring that the national and State ambient air quality standards are attained and maintained in the Bay Area. The BAAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, and conducting public education campaigns. The BAAQMD has jurisdiction over much of the nine-county Bay Area, including Sonoma County.

The BAAQMD, along with other regional agencies (such as the Association of Bay Area Governments [ABAG] and the Metropolitan Transportation Commission [MTC]), has prepared the Ozone Attainment Plan to guide the region’s air quality planning efforts and address the federal standard for ozone. The 2017 Clean Air Plan is the most recently approved regional Clean Air Plan, which was adopted in April 2017, as an update to the Bay Area 2005 Ozone Strategy and the 2010 Clean Air Plan. The 2017 Clean Air Plan provides an integrated, multi-pollutant strategy to improve air quality, protect public health, and protect the climate. The plan is designed to provide a control strategy to reduce ozone, particulate matter, air toxics, and greenhouse gases (GHG) in a single, integrated plan. The 2017 Clean Air Plan included Transportation Control Measures (TCMs) from the 2005 Ozone Strategy, measures that were modified and expanded based on new investment and policy decisions as well as public input. In particular, the TCMs have been updated to reflect the policy and investment decisions made in the Metropolitan Transportation Commission’s (MTC) regional transportation plan, Transportation 2035: Change in Motion. The 2017 Clean Air Plan is also based on population and employment forecasts from ABAG (BAAQMD 2017b).

3.1.3 Sensitive Receptors

Ambient air quality standards have been established to represent the levels of air quality considered sufficient, with an adequate margin of safety, to protect public health and welfare. They are designed to protect people most susceptible to respiratory distress, such as children under 14; persons over 65; persons engaged in strenuous work or exercise; and people with cardiovascular and chronic respiratory diseases. The majority of sensitive receptor locations are therefore residences, schools, and hospitals. The sensitive receptors nearest to the Project site are residences located directly adjacent to the southwest corner of the Project site.

3.1.4 Methodology and Significance Thresholds

This analysis uses the BAAQMD's May 2017 *CEQA Air Quality Guidelines*. The May 2017 CEQA Air Quality Guidelines include revisions made to the 2010 Guidelines, addressing the California Supreme Court's 2015 opinion in the *Cal. Bldg. Indus. Ass'n vs. Bay Area Air Quality Mgmt. Dist.,* 62 Cal. 4th 369 (BAAQMD 2017c). Therefore, the numeric thresholds in the May 2017 CEQA Air Quality Thresholds were used for this analysis to determine whether the impacts of the Project exceed the thresholds identified in Appendix G of the State CEQA Guidelines.

The BAAQMD's significance thresholds in the updated 2017 CEQA Air Quality Guidelines for project operations within the Basin are used to determine the air quality impacts of the Project. Table 3.1 shows the quantitative thresholds for air quality impact evaluation from the *2017 CEQA Air Quality Guidelines*. These represent the levels at which a project's individual emissions of criteria air pollutants or precursors would result in a cumulatively considerable contribution to the Basin's existing air quality conditions. As mentioned in the Air Quality and Greenhouse Gas Technical Study, per the *2017 CEQA Air Quality Guidelines*, if a project's contribution to the cumulative impact is considerable, then the project's impact on air quality would be considered significant.

Table 3.1 Air Quality Thresholds of Significance

Pollutant/Precursor	Construction	Operational	
	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (tpy)	Average Daily Emissions (lbs/day)
ROG	54	10	54
NO_X	54	10	54
PM_{10}	82 (exhaust)	15	82
$PM_{2.5}$	54 (exhaust)	10	54

Source: BAAQMD 2017c.
Notes: tpy = tons per year; lbs/day = pounds per day; NOX = oxides of nitrogen; PM2.5 = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM10 = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; tpy = tons per year.

The construction emissions associated with development of the Project were calculated using the California Emissions Estimator Model (CalEEMod), version 2016.3.1. Temporary emissions will result from three primary sources: operation of construction vehicles (e.g., scrapers, loaders, and excavators); ground disturbance during clearing and grading, which creates fugitive dust; and the application of asphalt, paint, or other oil-based substances. The extent of daily emissions, particularly reactive organic gases (ROGs) and nitrogen oxide (NO_X) emissions, generated by construction equipment would depend on the quantity of equipment used and the hours of operation for each project. The extent of fugitive dust ($PM_{2.5}$ and PM_{10}) emissions would depend upon the following factors: 1) the amount of disturbed soils; 2) the length of disturbance time; 3) whether existing structures are demolished; 4) whether excavation is involved; and 5) whether transporting excavated materials offsite is necessary. The amount of ROG emissions generated by paints and oil-based substances such as asphalt depends upon the type and amount of material utilized.

CalEEMod was used to estimate air pollutant emissions associated with Project construction, which was estimated to last approximately 11 months based on the Project sponsor’s preliminary construction schedule. Demolition of the existing single-family dwelling would occur first, followed by site preparation, grading, construction, paving, architectural coating, and landscaping.

Construction activities will result in temporary air quality impacts that may vary substantially from day to day, depending on the level of activity, the specific type of operation, and, for dust, the prevailing weather conditions.

CalEEMod was also used to estimate non-stationary source operational emissions. Operational emissions included mobile source emissions, area source emissions, and emissions from energy use. Mobile source emissions would be generated by the increase in motor vehicle trips to and from the Project site. This analysis used daily Project traffic generation rates from the Transportation Impact Analysis Report prepared by Fehr & Peers (Fehr & Peers 2019). Area source emissions are generated by landscape maintenance equipment, consumer products, and architectural coating. CalEEMod also estimates emissions from water demand and wastewater generation. As discussed in the Project Description, the Project would demand approximately 12,000 gallons of water per day and generate between 2,700 gallons and 4,100 gallons of sanitary wastewater per day; these assumptions were included in the CalEEMod analysis.

The Project proposes to use electricity entirely from a natural gas powered cogenerator system onsite. In the unlikely event that the cogenerator system fails, the Project would use electricity from PG&E. These events, by their nature, would be infrequent and temporary. Nonetheless, in order to provide a conservative, worst case analysis of air pollutant and GHG emissions, two electricity source scenarios were evaluated in this study:

- Scenario 1: Total Electrical Demand Supplied by Cogenerator System
- Scenario 2: Total Electrical Demand Supplied by Utilities

For Scenario 1, it was assumed that all electricity would be generated on site and no electricity demand was included in CalEEMod, as associated criteria pollutant emissions from the cogenerator system were calculated separately using manufacturer specific emission factors. For Scenario 2, it was assumed that all electricity would be supplied by PG&E and 21,900,000 kilowatt hours (kWh) annual electricity consumption was included in CalEEMod. The proposed chiller could run on exhaust heat from the cogenerator system, further reducing energy demand of the facility; however, this reduction in demand is not included in order to provide a conservative estimate of energy related emissions. In addition, CalEEMod calculates emissions from natural gas combustion onsite (California Air Pollution Control Officers Association [CAPCOA] 2017). Modeling assumptions for both scenarios included that the Project would demand approximately 331,870 therms per year to operate a proposed natural gas boiler. Emissions associated with combustion of natural gas by the cogenerator system were calculated separately using manufacturer specific emission factors.

Emissions from the cogenerator units, stationary sources, were estimated separately using emission factors provided by Western Energy Systems for the Avus 500 Plus NG/Agenitor 412, which is a generator unit likely to be used by the Project. Exact generator equipment has not been selected for the Project, as final selection will be made during the facility design phase; nonetheless, the emissions estimated in this study provide a reasonable estimate of emissions from similarly-sized cogenerator units that are likely to be used by the Project. As required by BAAQMD Rule 1, General Requirements, the Project sponsor would be required to obtain an Authority to Construct and Permit to Operate from the BAAQMD in order to operate the cogenerator system on the Project site. Pursuant to BAAQMD Rule 2, New Source Review, in order to receive an authority to construct and permit to operate, the proposed cogenerator system would be required to implement Best Available Control Technology (BACT) to control criteria pollutant emissions, if it would emit pollutants in an amount of 10 or more pounds per day (see Rule 2, Section 2-2-301). The proposed cogenerator system would emit more than 10 pounds per day each of NO_X, CO, and volatile organic compounds (VOCs); therefore, the Project is required to comply with BAAQMD Rule 2 by implementing BACT. The stationary source analysis takes into account this mandatory regulatory compliance measure and stationary emissions estimates are based on emission factors with BACT in place (selective catalytic reduction [SCR] or oxidation catalyst system). Post-catalyst emission factors and manufacturer emissions estimates are provided in Appendix B of the Air Quality and Greenhouse Gas Study (**Appendix D**; Rincon Consultants 2019a).

3.2 Impact Analysis

This section analyzes the Project's potential impacts to air quality. This analysis is based on applicable BAAQMD rules and regulations, the 2017 Clean Air Plan, and the Santa Rosa Farm Group – Cannabis Cultivation Facility Project Air Quality and Greenhouse Gas Study.

The Project is consistent with the 2017 Clean Air Plan. Estimated construction and operational emissions from the Project are below significance thresholds established by the BAAQMD. Project emissions will not expose sensitive receptors to substantial pollutant concentrations. There is a possibility that Project operations could generate objectionable odors. This is considered a potentially significant impact; however, with implementation of **Mitigation Measure AQ-1** it will be reduced to less than significant.

A discussion of each environmental issue included under Section 3 is presented below.

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

Less than Significant Impact.

According to the May 2017 *CEQA Air Quality Guidelines*, an air quality plan refers to clean air plans, state implementation plans (SIPS), ozone plans, and other potential air quality plans developed by the BAAQMD. To date, the BAAQMD's most current adopted air quality plan is the 2017 Clean Air Plan. The consistency analysis should evaluate whether the project is consistent with the applicable goals, control measures, and strategies outlined in the 2017 Clean Air Plan. If the project is consistent with these components, it would be considered consistent with the 2017 Clean Air Plan. Goals of the Clean Air Plan include attainment of air quality standards and reduction of population exposure and protecting public health in the Bay Area. The 2017 Clean Air Plan includes 85 individual control measures that describe specific actions to reduce emissions of air and climate pollutants from the full range of emission sources. The control measures are categorized based upon the economic sector framework used by the CARB for the AB 32 Scoping Plan Update. These sectors include: Stationary (Industrial) Sources, Transportation, Energy, Buildings, Agriculture, Natural and Working Lands, Waste Management, Water, and Super-GHG Pollutants (i.e., methane). The BAAQMD encourages project developers and lead agencies to incorporate these measures into project designs and plan elements. If approval of a project would not cause the disruption, delay, or otherwise hinder the implementation of any air quality plan control measure, it would be considered consistent with the 2017 Clean Air Plan.

The project would be consistent with a variety of applicable Clean Air Plan goals and control measures such as the overarching goal of protecting air quality and health at the regional and local scale because project-generated emissions do not exceed the applicable BAAQMD thresholds. Additionally, the project would be consistent with: Measure EN2, *Decrease Electricity Demand*, by utilizing an onsite cogenerator system, which would support local government's energy efficiency programs by providing electricity onsite; Measure TR14, *Cars and Light Trucks*, which encourages the use of purchase and lease of battery-electric and plug-in hybrid electric vehicles, which would be used onsite by the security guards; and Measure WR1, *Limiting GHGs from publicly owned treatment works (POTW)*, which aims to reduce the GHGs emitted directly within POTWs and would be achieved by using recycled water for cannabis cultivation. Additionally, the project would not result in operational or construction emissions that would exceed the BAAQMD's thresholds. Further, the project would not directly increase population, as it does not include a substantial increase in residential or employment, as only 105 employees are anticipated in the Transportation Impact Analysis Report (Fehr & Peers 2019). The project is anticipated to primarily draw employees from the surrounding area and would not result in population or employment growth that would exceed the population projections on which the 2017 Clean Air Plan is based. For these reasons, the project would not conflict with or obstruct continued implementation of the 2017 Clean Air Plan.

b) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard?

Less than Significant Impact.

Construction-Related Emissions

Table 3.2 summarizes the estimated maximum daily construction emissions from development of the Project. As shown therein, the maximum daily emissions will not exceed the BAAQMD Project-level thresholds for construction emissions. Therefore, the Project will not violate an air quality standard, contribute to an existing air quality violation, or result in a cumulatively considerable net increase of any criteria pollutant with respect to emissions during construction. This impact will be less than significant.

Table 3.2 Estimated Maximum Daily Construction Emissions

	Maximum Emissions (lbs/day)			
	ROG	NO_x	PM_{10} (Exhaust Only)	$PM_{2.5}$ (Exhaust Only)
Maximum (lbs/day)	26.2	40.5	8.5	4.7
BAAQMD Thresholds	54	54	82	54
Threshold Exceeded?	No	No	No	No

Notes: See **Appendix D**, "Appendix B: Scenario 2 – Total Electrical Demand Supplied by Utilities," Table 2.1, Overall Construction (Maximum Daily Emission - Unmitigated Construction for CalEEMod output. Numbers may not add up due to rounding. Winter emissions were used because they are generally higher than summer emission rates and provide a more conservative estimate of maximum daily emissions.

With regard to fugitive dust, the BAAQMD's May 2017 CEQA Air Quality Guidelines states that implementation of best construction management practices (further detailed below) would fully address impacts related to fugitive dust (PM2.5 and PM10 not emitted in exhaust) and does not provide construction or operational-related thresholds of significance for fugitive dust.

Although project-related construction emissions would not exceed BAAQMD thresholds, the BAAQMD recommends implementation of Basic Construction Mitigation Measures (BAAQMD 2017c) for all proposed projects to reduce emissions of air pollutants during construction activities.

These basic construction mitigation measures include the following:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.

- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

As discussed in the project description of the technical report, the applicant is proposing to implement best practices recommended by BAAQMD to limit emissions of air pollutants during construction. For informational purposes, the analysis below describes how the project's incremental (and less than significant) impacts relate to human health.

The difference between the tonnage of pollutants emitted and the localized concentrations of ozone, $PM_{2.5}$ and PM_{10} is important because it is not necessarily the tonnage of pollutants emitted that causes human health effects; rather, it is the concentrations of ozone and PM that cause these effects. In addition, it is not scientifically feasible to correlate an individual project's air quality emissions to specific health impacts. Therefore, a general description of the adverse health impacts resulting from the pollutants at issue is all that can be provided at this time. The incremental increase in ozone, $PM_{2.5}$ and PM_{10} concentrations in the basin as a result of project construction would contribute to adverse health impacts that are already occurring due to the region's nonattainment status for these pollutants. As discussed in subsection, Air Pollutants of Primary Concern, the health impacts of ozone include respiratory and eye irritation and possible changes in lung functions, and the health impacts of suspended particulates ($PM_{2.5}$ and PM_{10}) include respiratory irritation, reduced lung function, aggravation of cardiovascular disease, and cancer. However, because emissions of ROC, $PM_{2.5}$, PM_{10}, and NO_X during project construction would not exceed the BAAQMD's significance thresholds and the project would incorporate BAAQMD-recommended construction best management practices, the project's incremental contribution to these adverse health impacts would be less than significant.

<u>Operational Air Pollutant Emissions</u>

Tables 3.3 and 3.4 summarize the estimated emissions associated with operation of the Project under two scenarios: Scenario 1: Total Electrical Demand Supplied by Cogenerator System and Scenario 2: Total Electrical Demand Supplied by Utilities. As shown in Table 3.3, the Project will not exceed BAAQMD daily or annual operational thresholds even with inclusion of the cogenerator system, a stationary source (Scenario 1).

As noted under *Methodology* above, the Project sponsor will be required to obtain an Authority to Construct and Permit to Operate from the BAAQMD, in order to operate the cogenerator system on the Project site. As such, stationary source emissions estimates shown in Table 3.3 include adherence to applicable regulatory compliance measures, as required in BAAQMD Rule 2, New Source Review, Section 2-2-301, Best Available Control Technology Requirement. Adherence to existing regulations and permit requirements will ensure that the Project will not generate stationary source emissions in excess of BAAQMD's thresholds.

As shown in Table 3.4, in the unlikely event that the Project will rely on electricity entirely from PG&E (Scenario 2), the Project will not exceed BAAQMD daily or annual operational thresholds. Note there is no difference between energy-related criteria pollutant emissions between Scenario 1 and Scenario 2 because CalEEMod only calculates direct emissions of criteria pollutants from energy sources that combust onsite, such as natural gas used in a building

(CAPCOA 2017). CalEEMod does not calculate or attribute emissions of criteria pollutants from electricity generation to individual projects because fossil fuel power plants are existing stationary sources permitted by air districts and/or the U.S. EPA, and they are subject to local, state and federal control measures. Criteria pollutant emissions from power plants are associated with the power plants themselves, and not individual projects or electricity users. As discussed in the GHG analysis (Section 8), indirect emissions of GHGs due to electricity consumption are calculated in CalEEMod and attributed to individuals and consumers. Therefore, under either Scenario 1 or Scenario 2, the Project will not violate an air quality standard, contribute to an existing air quality violation, or result in a cumulatively considerable net increase of any criteria pollutant with respect to emissions during operations. Impacts will be less than significant.

Table 3.3 Estimated Operational Emissions: Scenario 1 – Total Electrical Demand Supplied by Cogenerator System

Emissions Source	Estimated Emissions (lbs/day)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Average Daily Emissions (lb/day)						
Area	2.8	<0.1	<0.1	<0.1	<0.1	<0.1
Energy	2.0	17.8	0.1	0.1	1.4	1.4
Mobile	0.6	3.4	<0.1	<0.1	1.8	0.5
Stationary	29.5	14.3	20.4	NA	NA	NA
Total	**34.9**	**35.5**	**20.5**	**0.1**	**3.2**	**1.9**
BAAQMD Thresholds	*54*	*54*	*NA*	*NA*	*82*	*54*
Threshold Exceeded?	No	No	NA	NA	No	No
Maximum Annual Emissions (tpy)						
Area	0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Energy	0.4	3.3	2.7	<0.1	0.2	0.2
Mobile	0.1	0.6	1.4	<0.1	0.3	0.1
Stationary	5.1	2.5	3.5	NA	NA	NA
Total	**6.1**	**6.4**	**7.6**	**<0.1**	**0.5**	**0.3**

Emissions Source	Estimated Emissions (lbs/day)					
	ROG	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
BAAQMD Thresholds	*10*	*10*	*NA*	*NA*	*15*	*10*
Threshold Exceeded?	No	No	NA	NA	No	No

Source: Rincon Consultants 2019a, see Appendix B of the Air Quality study (**Appendix D)** for modeling results for non-stationary sources, and post-catalyst emission factors and manufacturer emissions estimates for stationary equipment.

Notes: Stationary source emissions estimates include adherence to applicable regulatory compliance measures, as required in BAAQMD Rule 2, New Source Review, Section 2-2-301, Best Available Control Technology Requirement. Numbers may not add up due to rounding. Winter emissions were used for non-stationary sources because they are generally higher than summer emission rates and provide a more conservative estimate of maximum daily emissions.

NA = Not applicable

Table 3.4 Estimated Operational Emissions: Scenario 2 – Total Electrical Demand Supplied by Utilities

	Estimated Emissions (lbs/day)					
Emissions Source	**ROG**	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Average Daily Emissions (lb/day)						
Area	2.8	<0.1	<0.1	<0.1	<0.1	<0.1
Energy	2.0	17.8	0.1	0.1	1.4	1.4
Mobile	0.6	3.4	<0.1	<0.1	1.8	0.5
Stationary	0	0	0	NA	NA	NA
Total	**5.3**	**21.2**	**23.0**	**0.1**	**3.2**	**1.9**
BAAQMD Thresholds	*54*	*54*	*NA*	*NA*	*82*	*54*
Threshold Exceeded?	No	No	NA	NA	No	No
Maximum Annual Emissions (tpy)						
Area	0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Energy	0.4	3.3	2.7	<0.1	0.2	0.2
Mobile	0.1	0.6	1.4	<0.1	0.3	0.1
Stationary	0	0	0	NA	NA	NA
Total	**1.0**	**3.9**	**4.1**	**<0.1**	**0.6**	**0.3**
BAAQMD Thresholds	*10*	*10*	*NA*	*NA*	*15*	*10*

	Estimated Emissions (lbs/day)					
Emissions Source	**ROG**	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Threshold Exceeded?	No	No	NA	NA	No	No

Source: Rincon Consultants, 2019a, see **Appendix D** for modeling results for non-stationary sources, and post-catalyst emission factors and manufacturer emissions estimates for stationary equipment.

Notes: Numbers may not add up due to rounding. Winter emissions were used for non-stationary sources because they are generally higher than summer emission rates and provide a more conservative estimate of maximum daily emissions.

NA = Not applicable

As discussed under Methodology, the disconnect between the tonnage of pollutants emitted and the localized concentrations of ozone, $PM_{2.5}$ and PM_{10} is important because it is not necessarily the tonnage of pollutants emitted that causes human health effects; rather, it is the concentrations of ozone and PM that cause these effects. In addition, it is not scientifically feasible to correlate an individual project's air quality emissions to specific health impacts. Therefore, a general description of the adverse health impacts resulting from the pollutants at issue is all that can be provided at this time. The incremental increase in ozone, $PM_{2.5}$ and PM_{10} concentrations in the basin as a result of project construction would contribute to adverse health impacts that are already occurring due to the region's nonattainment status for these pollutants. As discussed in subsection, Air Pollutants of Primary Concern, the health impacts of ozone include respiratory and eye irritation and possible changes in lung functions, and the health impacts of suspended particulates ($PM_{2.5}$ and PM_{10}) include respiratory irritation, reduced lung function, aggravation of cardiovascular disease, and cancer. However, because emissions of ROC, $PM_{2.5}$, PM_{10}, and NO_X during project operation would not exceed the BAAQMD's significance thresholds and the project would adherence to applicable regulatory compliance measures, as required in BAAQMD Rule 2, New Source Review, Section 2-2-301, Best Available Control Technology Requirement, the project's incremental contribution to these adverse health impacts would be less than significant.

c) Would the project expose sensitive receptors to substantial pollutant concentrations?

Less than Significant Impact. The BAAQMD recommends CO "hotspot" analysis for a project if the addition of project traffic would increase traffic volumes at affected intersections to more than 44,000 vehicles per hour. According to the Transportation Impact Analysis Report prepared for the Project (Fehr & Peers 2019), no intersections will handle more than 44,000 vehicles per hour due to Project-related traffic. Therefore, the Project will not result in a CO "hotspot" and no intersection-specific CO modeling is required.

CARB's Air Quality and Land Use Handbook: A Community Health Perspective (2005) provides recommendations regarding the siting of new sensitive land uses near potential sources of air toxic emissions (e.g., freeways, distribution centers, rail yards, ports, refineries, chrome plating facilities, dry cleaners, and gasoline dispensing facilities). The Air Quality and Land Use Handbook does not provide guidance for facilities or stationary equipment that require a permit to operate from a local air district. Instead, toxic air contaminant (TAC) emissions from these sources are directly regulated through the air district rule and permit review process.

Nearby sensitive receptors include residences directly adjacent to the south and southwest of the project site boundary. Common stationary source types of TAC and $PM_{2.5}$ emissions include gasoline stations, dry cleaners, and diesel backup generators, which are subject to BAAQMD permit requirements (BAAQMD 2017c). The project would include a cogenerator system onsite, which is a natural gas combustion engine, and would be a stationary source of TACs. Regulation 2, Rule 5 of the BAAQMD specifies permit requirements for new or modified stationary sources of TAC. The Project Risk Requirement (2-5-302.1) states that the Air Pollution Control Officer shall deny an Authority to Construct or Permit to Operate for any new or modified source of TACs if the project cancer risk exceeds 10.0 in one million. The project applicant would be required to obtain an Authority to Construction and Permit to Operate from the BAAQMD in order to operate the cogenerator system on the project site; therefore, adherence to existing regulations and permit requirements would ensure that the project would not expose sensitive receptors to substantial pollutant concentrations.

d) Would the project result in other emissions (such as those leading to odors) affecting a substantial number of people?

Less than Significant Impact with Mitigation.

The May 2017 *CEQA Air Quality Guidelines* identify land uses considered by BAAQMD to have potential for offensive odors. The list includes wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. Although the BAAQMD does not explicitly list cannabis cultivation facilities, odor may present a potential concern to surrounding communities. Malodorous aromas could be emitted by varied strains and species during the growth cycle of cannabis plants. However, the project would include odor controls through various methods such as engineering controls, carbon filtration, neutralization, and oxidation. Specifically, the project would include hydroxyl generators which use water vapor in the atmosphere to create hydroxyl radicals. Once created, the hydroxyl radicals would be dispersed into the air where they would deodorize, oxidize, and deactivate airborne microbials.

Additionally, the project applicant would create an Odor Control Plan that would establish a protocol to continuously sample representative effluent air following the carbon absorption system during grow periods. If the carbon filtration system alone is not adequate in obtaining the control efficiency determined under the odor mitigation control plan, then odor control abatement will be enhanced through one of several means. Additional controls may include, but not be limited to, mist eliminators via spray application, oxidation using hydrogen peroxide or ozone and/or other neutralizing agents. All added controls and their guarantee efficiency would be backed by vendor suppliers.

Furthermore, as discussed in the CDFA CalCannabis Cultivation Licensing Program Environmental Impact Report (PEIR; CDFA 2017), odors are considered general nuisance concerns addressed by HSC Section 41700 or via established local air district rules usually for pollutants such as ammonia or hydrogen sulfide or other sulfonated compounds. Other local District's exempt agricultural operations from such rules; however, it is common for new source operations to take a proactive approach during the CEQA process to prevent the possibility of objectionable odors through Odor Control Plans. The CDFA PEIR discusses that local cannabis ordinances have been adopted stipulating that cultivation activities not adversely affect the environment or public, by filtration abatement or other means.

To prevent any possibility of objectionable odors, **Mitigation Measure AQ-1** will require the preparation and implementation of an Odor Control Plan. The Plan will require odor controls through various methods such as engineering controls, carbon filtration, neutralization, and oxidation. In particular, the Plan will require hydroxyl generators which use water vapor in the atmosphere to create hydroxyl radicals. Once created, the hydroxyl radicals would be dispersed into the air where they would deodorize, oxidize, and deactivate airborne microbials. Additionally, the Plan will establish a protocol to continuously sample representative effluent air following the carbon absorption system during grow periods. If the carbon filtration system alone is not adequate in obtaining the control efficiency determined under the Plan, then odor control abatement will be enhanced through one of several means. These may include, but not be limited to, mist eliminators via spray application, oxidation using hydrogen peroxide or ozone and/or other neutralizing agents. All added controls and their guarantee efficiency would be backed by vendor suppliers. Implementation of Mitigation Measure AQ-1 will reduce potential odor impacts to a less than significant level.

Also, the BAAQMD also regulates odor emissions through Regulation 7, Odorous Substances; this regulation places general limitations on odorous substances and specific emission limitations on certain odorous compounds. The Project will be required to comply with Regulation 7 and will be subject to BAAQMD enforcement, in the event of non-compliance. Mandatory compliance with BAAQMD regulations will further reduce potential odor impacts to a less than significant level.

Therefore, with implementation of Mitigation Measure AQ-1 and mandatory compliance with BAAQMD regulations, the Project will not result in emissions, including those leading to odors, which would adversely affect a substantial number of people. Impacts will be less than significant.

3.3 Mitigation Measure

Mitigation Measure AQ-1: Odor Control Plan

Prior to final certificate of occupancy, the Project sponsor shall prepare an Odor Control Plan and submit it to the City for review and approval. Implementation of the Plan shall ensure that Project operations will not expose a substantial number of people or neighboring properties to objectionable cannabis odors. The Plan shall include the following requirements:

- A schedule for implementation of the Plan including startup of selected carbon filtration and adsorption systems prior to the start of cultivation activities.
- The Project shall incorporate hydroxyl generators to deodorize, oxidize, and deactivate airborne microbials and odors.
- The Project shall incorporate a carbon filtration and absorption system to control odors.
- To ensure odor control meets the above performance standards, the Project operator shall implement a protocol to continuously sample representative effluent air following the carbon absorption system during grow periods. If the carbon filtration system alone is not adequate in obtaining the control efficiency determined under the Plan, then odor control must be enhanced through additional means. These additional means may include, but not be limited to, mist eliminators via spray application, oxidation using hydrogen peroxide or ozone and/or other neutralizing agents. All additional controls and their guaranteed efficiency must be backed by vendor suppliers and recorded by the applicant during testing to ensure satisfaction of the performance standards herein.
- The Project shall post a publicly visible sign with the telephone number and operations contact for odor complaints. This person shall respond and take corrective action within 48 hours. The Air District’s phone number shall also be visible to ensure compliance with applicable regulations.
- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust and/or odor complaints. This person shall respond and take corrective action within 48 hours. The Air District’s phone number shall also be visible to ensure compliance with applicable regulations.

4. BIOLOGICAL RESOURCES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
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?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	☐	☐	☒
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?	☐	☐	☐	☒
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?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒

4. BIOLOGICAL RESOURCES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
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?	☐	☐	☐	☒

4.1 Environmental Setting

The western portion of the Project site is covered with compacted gravel and was the location of a former landscape contractor's yard and vacant residence, which remain onsite with several ancillary buildings. The eastern portion of the Project site, covering approximately 2.4 acres, contains non-native grassland that has been annually disked and mowed in accordance with City of Santa Rosa Fire Department fire control requirements (Salix 2013). There is a small (approximately 104-foot long) drainage channel with a small area of riparian scrub habitat consisting mostly of non-native weeds and a single walnut tree at the southeastern corner of the Project site (Fawcett 2012). The drainage channel on the southeastern corner of the site originates from a culvert under Petaluma Hill Road and flows in a southerly direction (Wiemeyer 2018). The seasonal drainage channel ranges from 3 to 6 feet in width and 5 to 7 feet in depth. The bank full channel ranges from 10 to 16 feet in width. The drainage does not exhibit undercut banks or exposed roots and the channel bottom consists of soil with vegetation with small areas of gravel. The area of the drainage channel onsite below the ordinary high-water mark is approximately 416 square feet (Salix 2013).

Biological Assessments

Darren Wiemeyer of Wiemeyer Ecological Sciences (Wiemeyer) prepared a Biological Assessment for the Project site in March 2018 (Appendix D; Wiemeyer 2018). Wiemeyer performed site visits on January 23, 2017, and April 12, 2017, to map habitat types, perform special-status animal species habitat assessment, perform special-status plant species surveys, and compile a plant and animal species list. Wiemeyer also performed a special-status plant species survey on July 1, 2012 (Wiemeyer 2018). Additionally, SCS Engineers performed a biological assessment for the previous owner in 2010 (SCS Engineers 2010). SCS Engineers' observations and conclusions were consistent with Wiemeyer's. In addition, Monk & Associates Environmental Consultants prepared a California Tiger Salamander Impact Analysis in April 2020 ("the Monk & Associates CTS report") to analyze the potential impact of the Project.

Habitat types at the Project site consist of non-native annual grassland, ruderal (disturbed) habitat and landscaped areas around the residences and structures, and the small drainage channel with minimal riparian scrub habitat. There are several areas around the residence and ancillary buildings with planted coast redwood trees, walnut trees, and a large blue gum tree.

No special-status plant species were observed during the special-status plant species surveys (Wiemeyer 2018; SCS 2010). Non-native annual grassland was the dominant habitat within the Project site area. Dominant plant species consist of slender oats (*Avena barbarata*), perennial ryegrass (*Festuca perennis*), rip gut brome (*Bromus diandrus*), soft chess (*Bromus mollis*), field mustard (*Brassica rapa*), wild radish (*Raphanus sativa*), cutleaf geranium (*Geranium dissectum*), and spring vetch (*Vicia sativa*). The annual disking and mowing for fire control has resulted in a dominance of non-native grasses and forbs. Riparian scrub habitat occurs only at the far eastern end of the seasonal drainage. Dominant species consist of black walnut (*Juglans nigra*), arroyo willow (*Salix lasiolepis*) and Himalayan blackberry (*Rubus armeniacus*).

<u>California Tiger Salamander Assessments</u>

In March 2012, Dr. Michael Fawcett of Fawcett Environmental Consulting (Fawcett) performed an assessment for the California tiger salamander (CTS) at the Project site. The Project site is located within the potential geographic range of the Sonoma Distinct Population Segment of the CTS, which is listed as a federally-threatened species, as well as a California Species of Special Concern and a California candidate endangered species (Figure 3 of USFWS 2005). However, according to the 2012 CTS Assessment, the drainage channel was an ephemeral channel that “has no possibility of being a breeding site for CTS”. In addition, the records of breeding or individual CTS sightings were approximately 3.1 miles away from the Project site, and importantly, were noted west of U.S. Route 101 (US 101). Accordingly, Fawcett stated the sightings west of US 101 and Santa Rosa Avenue were not relevant to the site assessment because these roadways were considered to be “significant barriers to CTS migration.” The next nearest known breeding site or reported individual CTS (east of the US 101) was the Horn Bank, which is located approximately 1.8 miles south of Project site. Fawcett noted that urban development is located north, west, and south of the Project site, and that areas to the east were outside of the potential geographic range of CTS. Based on the Project site’s isolation from Horn Bank and distance from the nearest known CTS location, Fawcett concluded that the Project site was “highly unlikely” to be occupied by CTS and that development of the Project site was unlikely to contribute to the survival or recovery of CTS regardless of whether or not the Project site was developed (Fawcett 2012).

Moreover, according to a June 2017 memorandum, Wiemeyer also evaluated the Project site for CTS habitat and found that based on the distance from the nearest known CTS breeding site (i.e., 1.8 miles), annual mowing and disking of the unpaved portions of the project, the onsite structures, landscaping and hardscapes, and the development of the surrounding properties (i.e., roadways and residential and commercial buildings), the Project site does not provide a habitat for CTS, and there would be no impact to CTS as a result of the Project (Wiemeyer 2017).

Furthermore, in its March 2018 biological assessment, Wiemeyer expanded on their previous findings regarding the CTS. The Project is proposed to be developed on the compacted gravel (hardscape), ruderal (disturbed) habitats, and landscaped areas surrounding the residential buildings, which is not suitable habitat for CTS. Only the non-native annual grassland on the eastern portion, the drainage channel, and the riparian scrub habitat could be considered potentially suitable upland aestivation habitat for CTS, which would be avoided during development activities and would not be impacted as a result of the Project. Based on their evaluation, in addition to the detailed 2012 CTS Site Assessment by Fawcett, Wiemeyer determined that there would be no impact to CTS, or potentially suitable habitat, as a result of the Project.

In addition, the Monk & Associates CTS report concluded that development on the project site would not have significant impacts to CTS, or require CTS mitigation, for several reasons, as discussed below.

First, there is no known breeding habitat on or within 1.3 miles that is not separated from the project site by significant and impenetrable CTS migration barriers. While there are CTS California Natural Diversity Database records west of Highway 101 as close as approximately 1.3 miles [the known dispersal distance of the CTS (USFWS 2004)], Highway 101 is an impenetrable geographic barrier to CTS migration. Accordingly, CTSs west of Highway 101 would be unable to access the project site.

Second, the closest known CTS breeding site east of Highway 101 (the same side of Highway 101 as the project site) is located approximately 1.8 miles southeast of the project site at the Horn Banks. This record location exceeds the scientifically established dispersal distance for the CTS of 1.3 miles. Regardless, in much of the intervening areas between the extant record locations and the project site there is extensive development that also constitutes a significant geographic barrier to CTS movements from such record locations to the project site.

Third, the project site is barely within U.S. Fish and Wildlife Service (USFWS) mapped Critical Habitat and is a fringe parcel that is otherwise surrounded by development. The areas immediately north, west, and east of the project site are not mapped in critical habitat, and there is high density residential housing south of the project site, which constitutes a significant geographic barrier that would impede CTS access to the project site.

Fourth, the Monk & Associates CTS report confirmed through site-level surveys and analysis that the project site does not actually support CTS and there is no apparent breeding habitat located on the project site.

Fifth, the Conservation Strategy, including the Interim Mitigation Letter, does not impose mitigation requirements or other obligations on the Project, as more fully described in the technical report included in the appendix to this MND. Similarly, the Project does not require a discretionary federal permit from a nexus federal agency. Also, the USFWS/USACE 2007 Programmatic Biological Opinion indicates the project site and areas immediately to the north, west, and south are designated: “No Effect” on CTS.

Sixth, the footprint of the development facility would occur on existing hard-packed surfaces that under all circumstances would not be regarded as CTS habitat. And, with respect to potential roadway and street frontage improvements, the report concluded that even if non-native grassland areas on the project site were disturbed by frontage improvements or roadway widenings undertaken by the Applicant or the City of Santa Rosa, that would not trigger the mitigation requirements set forth in the

Conservation Strategy. Moreover, as noted in the Project Description section above, any such improvements shall be designed, installed, and dedicated in a manner consistent with the requirements and allowances set forth in the City of Santa Rosa's General Plan, Design and Construction Standards, and Chapter 18-12 of the Santa Rosa City Code. These standards have a variety of mechanisms to implement, waive implementation of, or modify improvement requirements based on the characteristics of the development site. Thus, in any case, any frontage improvements would be done in accordance with these standards and in light of potential impacts.

Seventh, the Monk & Associates CTS report concluded that there is no possibility of "take" (harm or mortality), or direct or indirect adverse impacts to the CTS from implementation of the Project. This conclusion corroborates similar conclusions made by M. Fawcett (Fawcett 2012), and D. Wiemeyer (Wiemeyer 2017 and 2018). Accordingly, the Project would not trigger any regulatory requirement for incidental take coverage under the California Endangered Species Act (CESA) or Federal Endangered Species Act (FESA), or any regulatory agency mandated mitigation requirements for the CTS or its habitat. Simply put, incidental take permits and mitigation are not required for the Project pursuant to the CESA or FESA. And, the Project would not result in any potentially significant or significant adverse impacts to the CTS.

<u>Wetland Delineation</u>

No federally-designated wetlands are located at the Project site.[2] A wetland delineation performed by SCS Engineers in 2009 found that the drainage channel did not include any of the three wetland characteristics (hydrophytic vegetation, hydric soils, or wetland hydrology), all three of which must be met for an area to be considered a jurisdictional wetland under Section 404 of the Clean Water Act.[3] The drainage channel was found not to be characterized as wetland, but was considered "other waters of the U.S." and part of the Colgan Creek (located approximately 3,000 feet north of the Project site at its nearest point) tributary system (SCS Engineers 2009). In correspondence dated September 24, 2009, the U.S. Army Corps of Engineers (USACE) indicated the drainage channel consisted of Section 404 waters and issued a preliminary jurisdiction determination (PJD) of the drainage channel. In correspondence dated September 17, 2013, USACE indicated concurrence with the 2009 PJD (USACE 2013). A determination as to whether or not state-designated wetlands are located at the Project site has not been conducted. The State's proposed wetland definition is defined as follows: *"An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation".* Dominance of hydrophytic vegetation and soil saturation and/or inundation was not observed at the site during the spring of 2012 and 2017 by Wiemeyer, which indicates that it is unlikely that State-designated wetlands occur at the site.

---

[2] U.S. Fish and Wildlife Wetlands Mapper, https://www.fws.gov/wetlands/data/mapper.html

[3] Section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1344 et seq.)

4.2 Impact Analysis

This section analyzes the Project's potential impacts on biological resources. Proposed development will be limited to the developed western portion of the Project site and will impact only the compacted gravel (hardscape) and ruderal (disturbed) habitats, as well as the landscaped areas surrounding the residences and ancillary buildings. The Project will not impact the non-native annual grassland, seasonal drainage, and riparian scrub habitat on the eastern portion of the project site. No impact to CTS will result from the Project. The Project will result in the loss of trees at the Project site. Tree removal and construction activities have the potential to impact native nesting birds if construction activities were initiated during bird nesting season (February 1 – August 31). Tree removal will have the potential to impact roosting bat species if tree removal is proposed during active bat roosting time periods. The potentially significant impacts to nesting birds and roosting bats will be reduced to less than significant with incorporation of **Mitigation Measures BIO-1** and **BIO-2**.

A discussion of each environmental issue included under Section 4 is presented below.

a) Would the project 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?

Less Than Significant with Mitigation Incorporated.

Special-Status Species

The project site does not contain any special-status species. This conclusion was verified by numerous technical studies of the project site. As noted in the project description, the facility development (and the related disturbance area) is limited to hardpack surfaces. Monk & Associates visited the project site on December 17, 2019, to examine hard-pack areas and surveyed these areas. Approximately 3.06 acres of the 5.53-acre project site are regarded as hardpack surfaces. The disturbances for development of the facility buildings, parking, and ingress and egress would occur on existing hard-packed surfaces that under all circumstances would not be regarded as CTS habitat. Accordingly, construction and operation of the development have no possible impact to the CTS. In addition, the City could require potential improvements along the parcel's Petaluma Hill Road and Yolanda Avenue frontages, as well as any associated right-of-way or easement dedications, to be designed, installed, and dedicated in a manner consistent with the requirements and allowances set forth in the City of Santa Rosa's General Plan, Design and Construction Standards, and Chapter 18-12 of the Santa Rosa City Code. These provisions allow the applicant to either build improvements or request waivers. The Monk & Associates CTS report concluded that if the project development activities were to extend beyond existing hardpacked surface (to implement frontage improvements) there would still be no mitigation required because several biological studies by recognized CTS experts determined that the project site would not support CTS. Similarly, the report concluded that even if non-native ruderal grassland areas on the project site were disturbed by frontage improvements, these activities do not trigger the CTS mitigation requirements as set forth in the Conservation Strategy.

As discussed above, no construction or operational activities associated with the Project would occur on any land that is considered habitat for the CTS. In addition, site-specific biological surveys have confirmed that the Project has no potential to affect CTS directly or through CTS habitat modification. Generally, CTS occurs in pastureland and vernal pool habitat in the Santa Rosa Plain. The Project site is technically within the potential range of CTS as mapped by the USFWS.

There are records of breeding or of individual CTS sightings west of US 101, but those sightings are approximately 3.1 miles from the Project site and there are intervening urban features (such as roads and development) that create major barriers CTS movement towards the site. Specifically, the US 101 Freeway and Santa Rosa Avenue are significant barriers to CTS migration (Fawcett 2012). The only known CTS locations within 3.1 miles of the project on the east side of the freeway are at the Horn Bank, which is located approximately 1.8 miles south of the project site. The project site is isolated from the Horn Bank (and all other lands that could be potentially occupied by CTS south of the project site, and neighboring property) by the presence of the dense residential subdivision extending west from Old Petaluma Hill Road, south of the neighboring property (Fawcett 2012).

The site is surrounded by urban development to the north, west, and south, i.e., south of the adjacent undeveloped parcel. To the east, beyond Petaluma Hill Road, lie pastureland and a dairy farm, all slated for future development, and outside the potential geographic range of CTS. Given the project site's isolation and distance from the nearest known CTS location (1.8 miles), the site, and the lack of any observed CTS on the site during several biological assessment site visits, the site is highly unlikely to be occupied by CTS and is unlikely to contribute to the survival or recovery of the species (Fawcett 2012). In any case, the Project construction and operation would completely avoid any areas that could contain CTS or be considered CTS habitat.

The drainage channel on the eastern portion of the site is ephemeral and, therefore, not a possible breeding site for CTS (Fawcett 2012). The non-native annual grassland habitat at the site provides potentially suitable aestivation habitat for this species. However, the Project footprint area will impact compacted gravel (hardscape) and ruderal (disturbed) habitats and landscaped areas surrounding the residences. (**Figure II.4**).

Therefore, for the several reasons explained above, and further supported by the biological reports in Appendix E, the Project will not have a substantial adverse effect, either directly or through habitat modifications, on CTS or potentially suitable habitat for CTS.

<u>Special-Status Plants</u>

No special-status plant species were observed during the special-status plant species surveys (Wiemeyer 2018; SCS 2009). Based on the assessments of habitat suitability and the locations of proposed development within compacted gravel, landscaped or ruderal (disturbed) areas on the western portion of the Project site, the Project will not impact special-status plant species.

Nesting Birds

The Project will result in the loss of several trees on the Project site. The majority of the trees on the Project site provide suitable bird nesting habitat and potentially suitable roosting bat habitat. Although no active bird nests were observed during field surveys conducted by Wiemeyer in January 2017 and April 2017, there is the potential for native birds, including raptors (birds of prey), to initiate nesting activities in the trees at the site (Wiemeyer 2018). Due to the potential for the presence of nesting activities, the tree removal will result in a potentially significant impact. Through implementation of **Mitigation Measure BIO-1**, which will require a survey by a qualified biologist prior to tree removal if occurring during the nesting season, the potential impacts will be less than significant.

Roosting Bats

Bats, including special-status bat species, have the potential to utilize several of the larger trees on the Project site as roosting habitat. Due to the potential for the presence of roosting bat activities, the tree removal will result in a potentially significant impact. Through implementation of **Mitigation Measure BIO-2**, which will require a survey by a qualified biologist prior to tree removal if occurring during the bat activity season, the potential impacts will be less than significant.

With implementation of Mitigation Measures BIO-1 and BIO-2, the Project will not 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. The Project's impacts will be less than significant.

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?

No Impact. As documented in the Biological Assessments, the only riparian or other sensitive habitat identified at the Project site is the small riparian area adjacent to the drainage channel in the southeastern corner of the site. The riparian scrub habitat consists of black walnut (*Juglans nigra*), arroyo willow (*Salix lasiolepis*) and Himalaya blackberry (*Rubus armeniacus*) and is a sensitive habitat type that falls within the jurisdiction of CDFW (CDFW; Wiemeyer 2018).

The Project will avoid this riparian habitat. Grading and other development activity would be concentrated on the previously developed western portion of the Project site. No Waters of the U.S. or State, riparian habitat, or other sensitive natural community occurs within or near the development footprint for the Project. Accordingly, the Project will avoid direct or indirect impacts to any of these resources.

As a result, the Project will not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service. The Project will have no impact.

c) Would the project 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?

No Impact. Based on the findings of the 2009 and 2013 wetland delineations and the USACE's 2009 and 2013 field reconnaissance (USACE 2009a, USACE 2013), no federally protected wetlands were identified at the Project site. The USACE issued a PJD of the drainage channel in the southeastern Site corner in 2009 and confirmed the PJD in 2013. However, no development on the eastern portion of the Project site designated as Not a Part on the site plan will occur and, therefore, a Section 404 of the Clean Water Act permit will not be required. Similarly, because dominance of hydrophytic vegetation and soil saturation and/or inundation was not observed at the site it is unlikely that state protected wetlands occur at the site.

The Project will avoid all direct and indirect impacts to state and federally protected wetlands (including, but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. The Project proposes developments on hardscape areas and landscaped areas on the western portion of the site. The Project will avoid impacting the open grassland areas at the site that are identified as Not a Part on the site plan, including any area that may qualify as wetlands under the state or federal definition of wetland. Furthermore, the Project will avoid indirect impacts to state or federal wetlands by not interrupting the hydrological functions of any federal wetland or potential state wetland.

d) Would the project 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?

No Impact. As documented in the Biological Assessments (Wiemeyer 2018, SCS 2010), the Project site does not contain any wildlife movement areas, wildlife corridors or wildlife nurseries, and the Project would not otherwise affect such features. The Project site does not contain any creeks or tributaries that could serve as movement corridors for wildlife. There are no native, resident, or migratory fish species on or near the site as there are no water features on the site that would support fish.

Accordingly, the Project will not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. The Project will have no impact.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No impact. The Project will not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

The only applicable local policy or ordinance protecting biological resources is the City of Santa Rosa Tree Preservation Ordinance (SRCC Chapter 17-24). The Tree Preservation Ordinance governs the alteration, removal, and relocation of trees, including heritage trees. "Heritage trees" are defined as trees of certain species native to Sonoma County with trunks exceeding specified diameters or circumferences. The Tree Preservation Ordinances requires a permit for the alteration, removal, or relocation of any trees, including heritage trees, on property proposed for development. The Tree Preservation Ordinance also requires the development project to replace trees, including heritage trees, in accordance with the following standards:

(1) For each six inches or fraction thereof of the diameter of a tree which was approved for removal, two trees of the same genus and species as the removed tree (or another species, if approved by the Director), each of a minimum 15-gallon container size, shall be planted on the project site, provided however, that an increased number of smaller size trees of the same genus and species may be planted if approved by the Director, or a fewer number of such trees of a larger size if approved by the Director.

(2) For each six inches or fraction thereof of the diameter of a tree which was not approved for removal, four trees of the same genus and species as the removed tree (or another species, if approved by the Director), each of a minimum 15-gallon container size, shall be planted on the project site, provided however, that an increased number of smaller size trees of the same genus and species may be planted if approved by the Director, or a fewer number of such trees of a larger size if approved by the Director.

(3) If the development site is inadequate in size to accommodate the replacement trees, the trees shall be planted on public property with the approval of the Director of the City's Recreation and Parks Department. Upon the request of the developer and the approval of the Director, the City may accept an in-lieu payment of $100.00 per 15-gallon replacement tree on condition that all such payments shall be used for tree-related educational projects and/or planting programs of the City.

An arborist report and tree inventory was prepared for the Project (Horticultural Associates 2017). The inventory includes 78 trees on the Project site (numbered 1 through 78), consisting of 65 coast redwood, six black walnut trees, and one each of almond, blue gum, crabapple, English walnut, evergreen ash, honey locust, and valley oak trees. Two of these species are potential heritage trees: coast redwood (where the diameter is 24 inches or greater) and valley oak (where the diameter is six inches or greater). Based on the criteria from the Tree Protection Ordinance, four of the 78 trees were determined to be heritage trees: three coast redwoods (tree numbers 39, 40, and 41 with diameters at breast height [dbh] of 30, 24, and 26 inches, respectively) and one valley oak (tree number 70 with a dbh of 17 inches). The arborist report recommends the removal of 58 trees due to development impacts, including the three coast redwoods identified as heritage trees. The valley oak heritage tree (tree number 70) would be one of the 20 existing trees that would be preserved. Consistent with the Tree Preservation Ordinance, heritage trees will be preserved to the greatest extent possible.

The Project will be required to remove and replace all 58 trees, including the three heritage trees, in compliance with the Tree Preservation Ordinance. Compliance with the Tree Preservation Ordinance is mandatory and is enforced through permitting requirements and the development plan approval process (SRCC Section 17-24.050). A total of 72 replacement trees will be planted as shown Preliminary Landscape Plan (Appendix B; BC Engineering Group, Inc. 2018) and will include Crape Myrtle, Red Maple, and Coast Live Oak. Prior to the removal of the trees, the final landscape plan (as part of the development plan) for the Project must be reviewed by the City's Design Board for compliance with the City's Design Guidelines (SRCC Section 20.52.030). The landscape plan must include, at minimum, the following elements: the location of the existing trees on the Project site, identification of trees to be removed, identification of trees to be preserved, and approximate location of new trees to be planted to replace removed trees (as discussed below). The final landscape plan must comply with the replacement and planting requirements of the Tree Preservation Ordinance and must be approved by the City. Issuance of a grading or building permit consistent with the plans will constitute a tree removal permit. All plantings would require moderate to very low water use in compliance with the City's Water Efficient Landscape Ordinance (SRCC Chapter 14-30).

Mandatory compliance with the Tree Preservation Ordinance and Design Guidelines will ensure that the Project will not conflict with the Tree Preservation Ordinance and will not have environmental impacts related to the alteration or removal of trees.

Accordingly, the Project will not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. The Project will have no impact.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No impact. Based on the CDFW's California Regional Conservation Plans Map, Sonoma County does not have a Natural Community Conservation Plan (per California Fish and Game Code Section 2800), Habitat Conservation Plan (per FESA Section 10), or other Regional Conservation Plan (CDFW 2017). Therefore, the Project will not conflict with any such plans.

The Project site is located within the Santa Rosa Plain Conservation Strategy Study Area. The USFWS Santa Rosa Plain Conservation Strategy Plan (Figure 3 of USFWS 2005) identifies that the Project site is located within an area designated as "potential for presence of CTS and listed plants." The Recovery Plan for the Santa Rosa Plain identifies that the Project site is located within the Sonoma County CTS Horn-Hunter Management Area boundaries (Figure 13 of USFWS

2016). The Sonoma County General Plan 2020 also identifies the Project site as within the "Potential Range of California Tiger Salamander" and a CTS "Critical Habitat" (Sonoma County 2016, Figure OSRC-5e). As discussed above in Section 4.2(a), however, the Project has no potential to impact CTS or CTS habitat (Wiemeyer 2018). The Monk & Associates CTS report contains a detailed analysis of the Conservation Strategy and concludes that no mitigation measures are required pursuant to it. The boundaries of the construction and operational activity for the are concentrated on land that is not, and could not be considered CTS habitat. Therefore, the Project will not conflict with plans related to CTS or the Santa Rosa Plain. In addition, the Project site is not identified as an area where sensitive species may be present in the Santa Rosa General Plan (City of Santa Rosa 2009b) or associate Draft Environmental Impact Report (City of Santa Rosa 2009a).

Accordingly, the Project will not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. The Project will have no impact.

4.3 Mitigation Measures

The Project will require implementation of Mitigation Measures BIO-1 and BIO-2.

Mitigation Measure BIO-1: Perform Pre-construction Survey for Nesting Birds

The Project sponsor shall retain a qualified biologist to perform a pre-construction survey for nesting birds within 14 days prior to ground-breaking at the Project site if construction activities will take place between February 1 and August 31. If nesting birds are found, the qualified biologist shall establish suitable buffers prior to ground-breaking activities. To prevent encroachment, the established buffer(s) shall be clearly marked by highly visibility material. The established buffer(s) shall remain in effect until the young have fledged or the nest has been abandoned as confirmed by the qualified biologist.

Mitigation Measure BIO-2: Avoid Roosting Bats

The Project sponsor shall implement the following measures to avoid roosting bats:

- The Project sponsor shall retain a qualified biologist to supervise any tree trimming or removal of suitable roosting trees;
- Tree removal shall only be conducted during seasonal periods of bat activity (August 31 through October 15, when young would be self-sufficiently volant and prior to hibernation and March 1 through April 15 to avoid hibernating bats and prior to formation of maternity colonies);
- Trees shall be trimmed and/or removed in a two-phased removal system conducted over two consecutive days. The first day (in the afternoon), limbs and branches shall be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices or deep bark fissures

shall be avoided, and only branches or limbs without those features shall be removed. On the second day, the entire tree shall be removed; and

- The Project sponsor shall include the foregoing measures in the contracts with the biologist and any contractors for tree trimming or removal.

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

5.1 Environmental Setting

Archaeologists believe that Native American habitation in the Santa Rosa region began approximately 7,000 years ago. At the time of European settlement, the Project area was included in the territory controlled by the Southern Pomo. Santa Rosa contains 190 recorded Native American resources (City of Santa Rosa 2009d). Remnants of Native American civilization have been discovered along Santa Rosa Creek and its tributaries, in the adjacent alluvial valleys and surrounding plains, in the hills, in the Annadel State Park area, in the Laguna de Santa Rosa, and in the Windsor area. The remains of settlements, including three former villages, have been found in northern Santa Rosa.

Santa Rosa has 21 designated historic landmarks and 8 designated historic preservation districts, established to officially recognize individual properties and whole neighborhoods as key components of the City's heritage (City of Santa Rosa 2009d).

Tom Origer & Associates ("Origer") prepared a Historical Resources Study for the Project site, dated September 6, 2017 (Origer 2017; **Appendix F**). The study included archival research at the Northwest Information Center, Sonoma State University (NWIC File No. 16-1687), archival research at the University of California Museum of Paleontology, examination of the library and files of Origer, outreach to Native American tribes, and a field inspection of the Project site, performed on May 5, 2017. No historical resources were found within the study area during the field inspection or through the record and archive review. No fossil localities are recorded near the study area. Documentation pertaining to this study is on file at the Origer offices (File No. 2017-048S).

5.2 Impact Analysis

This section analyzes the potential impacts of the Project on historical resources. An analysis of each threshold of significance in the CEQA Guidelines is presented below. This analysis is based on the

Historical Resources Study prepared by Origer, including the field study and record review as detailed above; the City's register of designated historic landmarks and districts; the Santa Rosa General Plan; and other records and materials.

Cultural resources are unlikely to be present on the Project site, and there is a low possibility that the Project construction activities could potentially disturb unknown historic and archaeological resources or human remains. Therefore, in an abundance of caution, the Project will comply with **Mitigation Measures CUL-1**, **CUL-2**, and **CUL-3** and any potential impacts will be reduced to less than significant.

Tribal cultural resources (TCRs) are sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe. TCRs are given special status under California law, so although TCRs may include some of the resource types discussed in this section, they are addressed more thoroughly in Section 18 (Tribal Cultural Resources).

A discussion of each environmental issue included under Section 5 is presented below.

a) Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

Less than Significant Impact with Mitigation Incorporated. The Historical Resources Study was designed to satisfy environmental issues specified in the CEQA and its guidelines (Title 14 CCR §15064.5), and included the following conclusions:

- No archaeological sites were observed during the course of the field survey. Fragments of ceramic were observed in a pile of rubble on the property, which may have been imported.
- The property appeared to be a rural residential complex with agricultural outbuildings. While the complex is associated with the theme of Sonoma County agriculture, the former orchard on the site no longer exists and several of the buildings have been repurposed and modified, and therefore would not be eligible for inclusion in the California Register.
- No historical resources were found within the Project site. Based on the landform age, distance to water, slope, and archaeological data, the probability of identifying a buried site is very low.

The Project site is not located within a designated historic district and does not contain any historically significant aboveground resources, nor does it constitute a historic site. The site-specific Historical Resources Study noted that two resources are recorded within ¼ mile of the Project site (Chattan 2003, 2009), which consisted of built environment resources (buildings). Of the two resources, the one nearest to the study area is about 330 meters (over 1000 feet) away. Because the resources are buildings, these resources do not have the potential to extend onto the Project site.

Given the absence of any historic resources within the Project site boundaries or immediate vicinity, the Project would not directly or indirectly affect the significance of a known historical resource. Nevertheless, there is a low possibility of discovery of an unknown historic resource during Project construction. In the event of discovery of a potential historic resource, **Mitigation Measure CUL-1** must be implemented. **Mitigation Measure CUL-1** requires that ground-disturbing activity immediately stop and that a qualified cultural resources consultant evaluate the resource and provide appropriate treatment.

With implementation of **Mitigation Measure CUL-1**, the Project will not cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5. Potential impacts will be reduced to less than significant.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Less than Significant Impact with Mitigation Incorporated. The Project site is currently developed with several structures, and the western portion of the property has been graded. As discussed in the Historic Resources Study, no archaeological resources were found within the Project site during the field survey. Based on the landform age, distance to water, slope, and archaeological data, Origer concluded the probability of identifying a buried site is very low.

Given this, the Project is not expected to directly or indirectly affect the significance of an archaeological resource. Nevertheless, there is a low possibility of discovery of an unknown archaeological resource during Project construction. In the event of accidental discovery of a potential archaeological resource, **Mitigation Measure CUL-2** must be implemented. **Mitigation Measure CUL-2** requires that ground-disturbing activity immediately stop and that a qualified archaeologist evaluate the resource and provide appropriate treatment.

With implementation of **Mitigation Measure CUL-2**, the Project will not cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5. Potential impacts will be reduced to less than significant.

c) Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Less than Significant Impact with Mitigation Incorporated. There are no known dedicated cemeteries or other burial sites on the Project site. Field inspections have not revealed gravestones or other indicators of human burial. In addition, ground-disturbing work will be limited to the western portion of the Project site, which is already developed and graded, making the discovery of human remains highly unlikely.

Nevertheless, there is a low potential for the discovery of unknown human remains during ground disturbing activities. In the event that human remains are unearthed on the Project site, **Mitigation Measure CUL-3** must be implemented. **Mitigation Measure CUL-3** requires that ground-disturbing activity immediately halt and that the Sonoma County Coroner be contacted to fulfill its statutory obligations with respect to the remains.

With implementation of **Mitigation Measure CUL-3**, the Project will not have significant impacts with respect to disturbing any human remains, including those interred outside of dedicated cemeteries. Potential impacts will be reduced to less than significant.

5.3 Mitigation Measures

Mitigation Measure CUL-1: If any potentially historic (older than 50 years old) subsurface remains are uncovered during grading or construction, all work shall be halted within 100 feet of the find, and the Project sponsor shall retain a qualified cultural resources consultant approved by the City to identify and investigate any subsurface historic remains, and define their physical extent and the nature of any built features or artifact-bearing deposits. Significant historic cultural materials may include finds from the late 19th and early 20th centuries including structural remains, trash pits, isolated artifacts, etc. The City's Community Development Department shall also be notified concurrently with notification of the cultural resources consultant.

The investigation shall proceed into formal evaluation to determine the eligibility of the find for the California Register of Historical Resources. This shall include additional exposure of the feature(s), photo documentation and recordation, and analysis of the artifact assemblage(s). If the evaluation determines that the features and artifacts do not have sufficient data potential to be eligible for the California Register, additional work shall not be required. However, if data potential exists – e.g., there is an intact feature with a large and varied artifact assemblage – further mitigation will be required. If avoidance is determined to be infeasible, pursuant to CEQA Guidelines Section 15126.4(b)(3)(C), a data recovery plan, which makes provisions for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken. Such studies shall be deposited with the California Historical Resources Regional Information Center. Archeological sites known to contain human remains shall be treated in accordance with the provisions of Section 7050.5 Health and Safety Code. If an artifact must be removed during Project excavation or testing, curation may be appropriate.

The language of this mitigation measure shall be included on any future grading plans, utility plans and/or other plans that involve soil disturbance on the Project site subject to approval by the City.

Mitigation Measure CUL-2: If any prehistoric artifacts or other indications of archaeological resources are found during grading and construction activities, all work within 100 feet of the find shall cease and the Project sponsor shall retain an archaeologist approved by the City to evaluate the find(s). The City's Community Development Department and any relevant Native American tribe shall also be notified concurrently with notification of the archaeologist.

The investigation shall proceed into formal evaluation to determine the eligibility of the find for the California Register of Historical Resources. This shall include additional exposure of the feature(s), photo documentation and recordation, and analysis of the artifact assemblage(s). If the evaluation determines that the features and artifacts do not have sufficient data potential to be eligible for the California Register, additional work shall not be required. However, if data potential exists – e.g., there is an intact feature with a large and varied artifact assemblage – further mitigation will be required. If avoidance is determined to be infeasible, pursuant to CEQA Guidelines Section 15126.4(b)(3)(C), a data recovery plan, which makes provisions for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken. Such studies shall be deposited with the California Historical Resources Regional Information Center. Archeological sites known to contain human remains shall be treated in accordance with the provisions of Section 7050.5 Health and Safety Code. If an artifact must be removed during Project excavation or testing, curation may be appropriate.

The language of this mitigation measure shall be included on any future grading plans, utility plans and/or other plans that involve soil disturbance on the Project site subject to approval by the City.

Mitigation Measure CUL-3: Procedures of conduct following the discovery of human remains are mandated by HSC Section 7050.5, Public Resources Code Section 5097.98 and CCR Section 15064.5(e) (CEQA). According to the provisions in CEQA, if human remains are encountered at the site, all work in the immediate vicinity of the discovery shall cease and necessary steps to ensure the integrity of the immediate area shall be taken. The Sonoma County Coroner shall be notified immediately. The Coroner shall then determine whether the remains are Native American. If the Coroner determines the remains are Native American, the Coroner shall notify the Native American Heritage Commission (NAHC) within 24 hours, who will, in turn, notify the person the NAHC identifies as the Most Likely Descendant (MLD) of any human remains. The landowner shall engage in consultations with the MLD. The MLD will make recommendations concerning the treatment of the remains within 48 hours, as provided in Public Resources Code 5097.98. If the MLD does not make recommendations within 48 hours, the owner shall, with appropriate dignity, reinter the remains in an area of the property secure from further disturbance. Alternatively, if the owner does not accept the MLD’s recommendations, the owner or the descendent may request mediation by the NAHC.

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

6.1 Environmental Setting

California is one of the lowest per capita energy users in the United States, ranked 48th in the nation, due to its energy efficiency programs and mild climate (U.S. Energy Information Administration [EIA] 2018). California consumed 292,039 gigawatt-hours (GWh) of electricity and 2,110,829 million cubic feet of natural gas in 2017 (California Energy Commission [CEC] 2019a, EIA 2018b). In addition, Californians consume approximately 18.7 billion gallons of motor vehicle fuels per year (Federal Transit Administration [FTA] 2017). The single largest end-use sector for energy consumption in California is transportation (39.8 percent), followed by industry (23.7 percent), commercial (18.9 percent), and residential (17.7 percent) (EIA 2018).

Most of California's electricity is generated in-state with approximately 30 percent imported from the Northwest and Southwest in 2017. In addition, approximately 30 percent of California's electricity supply comes from renewable energy sources, such as wind, solar photovoltaic (PV), geothermal, and biomass (CEC 2019b). Adopted on September 10, 2018, Senate Bill (SB) 100 accelerates the state's Renewable Portfolio Standards Program, codified in the Public Utilities Act, by requiring electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

To reduce statewide vehicle emissions, California requires that all motorists use California Reformulated Gasoline (CaRFG), which is sourced almost exclusively from in-state refineries. Gasoline is the most used transportation fuel in California with 15.1 billion gallons sold in 2015 and is used by light-duty cars, pickup trucks, and sport utility vehicles (CEC 2016a). Diesel is the second most used fuel in California with 4.2 billion gallons sold in 2015 and is used primarily by heavy duty-trucks, delivery vehicles, buses, trains, ships, boats and barges, farm equipment, and heavy-duty construction and military vehicles (CEC 2016b). Both gasoline and diesel are primarily petroleum-based, and their consumption releases greenhouse gas (GHG) emissions, including CO2 and NOX. The transportation sector is the single largest source of GHG emissions in California, accounting for 41 percent of all inventoried emissions in 2016 (CARB 2018a).

6.2 Impact Analysis

Information in this section is based on the "Santa Rosa Farm Group – Cannabis Cultivation Facility Project Air Quality, Greenhouse Gas, and Energy Study" prepared by Rincon Consultants, Inc. in November 2019, included in **Appendix D**.

While the Project will increase the amount of electricity and natural gas demand, the Project will not result in wasteful and inefficient use of non-renewable resources during construction and operation or conflict with the City of Santa Rosa's CAP.

A discussion of each environmental issue included under Section 6 is presented below.

a) Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Less than Significant Impact. The project will involve replacing an existing single-family residence and associated outbuildings with a three-story, approximately 120,000-square-foot industrial building. Implementation of the project will result in the commitment of additional energy resources, including consumption of energy during construction and operation. Energy use during the construction phase will be in the form of fuel consumption (e.g., gasoline and diesel fuel) to operate equipment and light-duty vehicles. Once completed, the increase in vehicle trips associated with the project will increase fuel consumption within the City. It is the goal of the project to use electricity entirely from a natural gas powered cogenerator system onsite. In the unlikely event that the cogenerator system fails, the project would use electricity from PG&E. These events, by their nature, will be infrequent and temporary. Natural gas and electrical services are available to the property by PG&E.

For construction, the Project would require energy resources primarily in the form of fuel consumption to operate heavy equipment, light-duty vehicles, machinery, and generators. Temporary grid power may also be provided to construction trailers or electric construction equipment. Table 1 in the technical report summarizes the anticipated energy consumption from construction equipment and vehicles, including construction worker trips to and from the project site.

Also, as shown in Table 8 of the technical report, construction of the Project would require approximately 5,042 gallons of gasoline and 40,995 gallons of diesel fuel. Energy use during construction would be temporary in nature, and construction equipment used would be typical of similar-sized construction projects in the region. Electrical power would be consumed to construct the Project, and the demand, to the extent required, would be supplied from existing electrical infrastructure in the area. Overall, demolition and construction activities would require minimal electricity consumption and would not have an adverse impact on available electricity supplies or infrastructure. In addition, per applicable regulatory requirements, the Project will comply with construction waste management practices to divert construction and demolition debris. These practices would result in efficient use of energy necessary to construct the project. Furthermore, in the interest of cost efficiency, construction contractors would not utilize fuel in a manner that is wasteful or unnecessary. Therefore, project construction would not result in potentially significant environmental effects due to the wasteful, inefficient, or unnecessary consumption of energy, and impacts would be less than significant.

For operations, there would be an increase in the amount of electricity and natural gas demand needed to serve the Project. In order to provide a conservative, analysis of energy demand, two electricity source scenarios were evaluated:

- Scenario 1: Total Electrical Demand Supplied by Cogenerator System
- Scenario 2: Total Electrical Demand Supplied by Utilities

The electrical power that will be required for the proposed cultivation and ancillary equipment, including lighting, and HVAC, is approximately 5,000 kilowatts (kW). Assuming the facility will be operational 24 hours a day, with the grow lights operational for approximately 12 hours per day, total annual electricity demand will be approximately 21,900,000 kilowatt-hours (kWh) per year. Assuming five generators operating regularly, the cogenerator system will require approximately 1,918,130 therms per year to operate and would generate approximately 22,825,000 kWh per year. The project will also include a natural gas boiler, which would demand approximately 331,870 therms per year. Therefore, total facility natural gas demand will be approximately 2,250,000 therms per year.

As shown in Table 6.1, under Scenario 1, the project's electricity consumption will represent approximately 0.008 percent of statewide annual demand, and project natural gas consumption would represent approximately 0.010 percent of statewide annual demand. It is important to note that under Scenario 1, the project will demand 21,900 megawatt hours of electricity; however, that electricity will be generated onsite and the project will not rely on electricity generated off-site and distributed by the grid.

Table 6.1 Project Energy Use Relative to Statewide Energy Use: Scenario 1 – Total Electrical Demand Supplied by Cogenerator System

Form of Energy	Units	Annual Project-Related Energy Use	Annual Statewide Energy Use	Project Percent of Statewide Energy Use
Electricity	Megawatt hours	21,900	292,039,000[2]	0.008%
Natural Gas	Million cubic feet	224.9[1]	2,110,829[3]	0.010%

[1] 1 Therm (US) = approximately 100 cubic feet of natural gas
[2] CEC 2019a
[3] EIA 2018b

As shown in Table 6.2, under Scenario 2, the project's electricity consumption will represent approximately 0.008 percent of statewide annual demand, and project natural gas consumption will represent approximately 0.001 percent of statewide annual demand. Natural gas demand for Scenario 2 is lower than Scenario 1 because it would only include natural gas demand needed to operate the proposed boiler.

Table 6.2 Project Energy Use Relative to Statewide Energy Use: Scenario 2 – Total Electrical Demand Supplied by Utilities

Form of Energy	Units	Annual Project-Related Energy Use	Annual Statewide Energy Use	Project Percent of Statewide Energy Use
Electricity	Megawatt hours	21,900	292,039,000[2]	0.008%
Natural Gas	Million cubic feet	33.2[1]	2,110,829[3]	0.001%

[1] 1 Therm (US) = approximately 100 Cubic Feet Of Natural gas
[2] CEC 2019a
[3] EIA 2018b

The project will be subject to energy conservation requirements in the California Energy Code (Title 24, Part 6, of the California Code of Regulations, California's Energy Efficiency Standards for Nonresidential Buildings) and CALGreen (Title 24, Part 11 of the California Code of Regulations), as embodied in enforceable conditions of approval. Further, California's use of non-renewable electricity and natural gas are expected to continue to decline as a proportion of overall energy demand due to stringent energy efficiency measures and a mandated increase in renewable energy use that will serve to offset any increase in non-renewable energy use resulting from the project.

Transportation related energy was also analyzed in the technical report. The increase in vehicle trips associated with the project would increase fuel consumption. Vehicle trips associated with the project would require approximately 34,428 gallons of gasoline and 11,664 gallons of diesel fuel, or 1,621 MMBtu annually. As a light industrial project, mobile fuel consumption would result from employee trips and commutes and per capita fuel consumption and would not be wasteful, inefficient, or unnecessary but would be standard for similar types of facilities.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Less than Significant Impact with Mitigation Incorporated. As demonstrated in Section 8, Greenhouse Gas Emissions, the Project is consistent with measures and actions from the City of Santa Rosa's CAP. Several measures in the City's CAP are intended to increase energy efficiency and conservation and expanding the use of renewable energy. The voluntary CAP measures applicable to the proposed project include Measure 1.1 (CalGreen Requirements for New Construction), Measure 1.3 (Smart Meter Utilization), Measure 1.5 (Cool Roofs and Pavements), 1.6 (Energy Efficient Appliances), 2.1 (Small-Scale Renewable Energy Installations), Measure 2.3 (Renewable Power Generation) and Measure 5.1 (Electric and Hybrid-Electric Vehicles). The project will comply with CalGreen Building Standards in building construction, and as noted in Section 1.2 *Project Summary* above, would install PG&E smart meters. It would use cool paving materials for increased solar reflectivity and water and energy efficient appliances, and it would include pre-wiring and plumbing for future solar thermal or photovoltaic systems. The project would also include electric vehicle charging stations. Therefore, the project would be consistent with the above CAP measures related to renewable energy and energy efficiency. Therefore, the project will be consistent with the Santa Rosa CAP and would not obstruct implementation of a local plan for renewable energy or energy efficiency such that a significant environmental impact would occur.

6.3 Mitigation Measures

No mitigation measures are required.

7. GEOLOGY AND SOILS	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Directly or indirectly 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 Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☒	☐	☐
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit of 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?	☐	☒	☐	☐
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?	☐	☒	☐	☐
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 wastewater?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

7.1 Environmental Setting

The Project site covers approximately 5.53 acres and is zoned for Light Industrial (LI) use (City of Santa Rosa 2015). The geologic environmental setting of the Project site is discussed below.

Native Geology

According to the National Resources Conservation Service (NRCS) Soil Survey, the Project site is primarily composed of basin alluvium derived from volcanic and sedimentary rock over fan alluvium derived from volcanic and sedimentary rock. Surface and near-surface soils consist of clays, loams, and gravels, though clays are primarily found in the western portion of the site. Bedrock is found as shallow as 20 inches below ground surface (bgs). It is possible that bedrock may be deeper than 7 feet bgs in the western portion of the Project site.

A report describing the geology and excavation activities performed at the site was prepared by SCS Engineers (SCS) in September 2005 (SCS 2005c). According to this report, examination of the drilling cores and samples from available monitoring wells and boring logs shows that the lithology at the Project site consists of gravel and silty-clay from the surface to approximately 5 feet bgs, underlain by approximately 1 to 2 feet of various gravel, sand, silt, and clay mixtures which most likely represents a surface weathering zone. Volcanic rocks of primarily andesite composition are then present to the maximum depth of each boring. SCS used the geotechnical consulting firm RGH Consultants Incorporated (RGH) to perform the compaction activities as detailed in Appendix B of the SCS report. According to observations from RGH onsite (SCS 2005c), excavations that exceeded 7 feet bgs exposed firm, undisturbed bedrock, which is likely the andesite mentioned by SCS.

Approved and Completed 2005 Soil Excavation Project

As discussed further in Section 9, Hazards and Hazardous Materials, SCS prepared a remediation work plan which was submitted to the SRFD and RWQCB (SCS 2005a) and resubmitted modified versions based on correspondence (SCS 2005b, 2005c). The work plan was approved by the SRFD on May 10, 2005, and the RWCQB on May 11, 2005 (RWCQB 2005). In July and August 2005, in accordance with approved plan, the impacted soils were excavated, with the exception of a small area left beneath the mower shop concrete floor due to inaccessibility (SCS Engineers 2005c).

Approximately 1,350 cubic yards of soil were excavated and removed from the Project site. These areas were excavated until samples taken from the bottom of the excavations were verified by laboratory testing to be non-detect for petroleum hydrocarbons and consistent with background levels of metals.

In correspondence dated October 25, 2005, the SRFD Senior Fire Inspector indicated the SRFD found that “No Further Action” was required at the Project site based on the confirmatory sampling results, which revealed non-detectable or background level detected concentrations for TPH-mo, VOCs, and metals. The RWQCB also issued a “No further action” determination on November 2, 2005 (EBA Engineering 2016).

All excavated areas were backfilled with base rock and compacted to at least 90% relative compaction. Where excavations exceeded 3.0 feet, backfill was compacted to 95% relative compaction up to the point where the backfill elevation reached that of the main excavation (SCS 2005c). Backfill of the excavations was completed by placing imported “¾-inch, minus” virgin, sub-base material in lifts and compacting under the direction of RGH. Based on RGH’s geotechnical assessment of the Project site, the fill currently present onsite consists of imported ¾-inch Aggregate Subbase/Trench Fill from Stony Point Quarry. All imported fill materials were analyzed before being delivered to the Project site to ensure the materials contained no detectable petroleum hydrocarbons and less than 25 milligrams per kilogram (mg/kg) of lead.

7.2 Impact Analysis

Similar to most areas in California that are subject to seismic activity, the Project will be subject to strong ground shaking during a seismic event. Construction of the Project will conform with current building standards that inherently reduce seismic activity risks. The Project does not require major grading, excavation, or shoring procedures. Project construction will include relatively minor earthwork to prepare the Project site for construction of the facility, which could expose soils to erosion. Construction activities will comply with the applicable stormwater pollution prevention measures to reduce potential impacts. Potential impacts associated with liquefaction and expansive soils, as analyzed below, will be reduced to less than significant through implementation of **Mitigation Measure GEO-1**. The Project will not use a septic tank or alternative disposal system.

A discussion of each environmental issue included under Section 7 is presented below.

a) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: i) fault rupture, ii) strong shaking, iii) seismic-related ground failure or iv) landslides.

i. **No Impact**. The Project site does not contain any faults and is not located within an Earthquake Fault Zone as mapped under the Alquist Priolo Earthquake Fault Zoning Act. The nearest fault has been identified by the California Division of Mines and Geology Fault Evaluation in 1982 as the Rodgers Creek fault(California Department of Conservation 1983). This fault’s closest point to the Project site is roughly 0.5 west of the site in Taylor Mountain Regional Park at its nearest point. The Seismic Map for this area shows that area of the fault is inferred or concealed by local geography as per the Division of Mines and Geology Special Publication 42. Subsequent mapping and seismicity have shown that the Rodgers Creek fault is a continuous active fault zone that extends from Santa Rosa southeast for 25 to 30 miles to the northern margin of San Pablo Bay (United States Geological Survey 2018). There has been historical seismicity associated with the fault, though evidence of historical surface rupture has not been observed. Because the fault does not cross the Project site, there would be no impact due to earthquake fault rupture on the Project site. Therefore, the Project will not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving fault rupture.

ii. **Less than Significant Impact**. The site vicinity is a tectonically active area, and the Project site could be subject to strong ground shaking during a seismic event. The Santa Rosa General Plan indicates that the Project site is in a zone of "Violent Groundshaking" that would occur during an event on the Rogers Creek fault (City of Santa Rosa 2009). Therefore, the Project site, as with all other land in the vicinity, would be exposed to potential adverse effects resulting from strong seismic ground shaking.

For newly constructed buildings potential impacts associated with a strong seismic event can be effectively mitigated through regulatory compliance and the application of standard geotechnical practices and seismic structural design. Mandatory compliance with the seismic standards is sufficient to reduce impacts even without additional mitigation measures. Construction of the Project would comply with the requirements set forth in the Building Code of Regulations, Title 24, Part 2 (the California Building Code 3.7-20 Chapter 3: Setting, Impacts, and Mitigation Measures [CBC]) and the California Public Resources Code, Division 2, Chapter 7.8 (the Seismic Hazards Mapping Act), which will thereby ensure that potential impacts from seismic shaking are less than significant levels. The Sonoma County Building Code (SCBC) references the California Building Code Title 24, part 2, for building standards related to structures in seismically sensitive areas; and will apply to construction of the Project. Accordingly, all new structures constructed on the Project site will be designed and built in accordance with the CBC and SCBC to withstand seismic activity in this geographic region. Therefore, the Project will not directly or indirectly cause significant adverse effects, including the risk of loss, injury, or death involving strong shaking. The impact of strong ground shaking will be less than significant.

iii. **Less than Significant Impact with Implementation of Mitigation**. Bedrock is very shallow at the Project site and the subsurface investigation indicate that groundwater is not present at shallow levels in the Project site overburden soils (SCS 2005a). Thus, there is a low potential for liquefaction to occur at the Project site. The Draft Santa Rosa General Plan Environmental Impact Report (EIR; Santa Rosa 2009b) identifies the soils in the vicinity that have a slight potential for liquefaction. Thus, in an abundance of caution, implementation of **Mitigation Measure GEO-1** would occur, and it requires preparation of a final Geotechnical Investigation and Design Report and implementation of recommendations. Therefore, the Project will not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure. Impacts will be less than significant with mitigation.

iv. **No Impact**. The Project site is not in a mapped landslide zone. According to the EZRIM map, the closest area of landslide is approximately three miles southeast of the Project site, within the Taylor Mountain Regional park (California Department of Conservation 1983). Land sliding will not occur on the Project site because it is essentially flat with a very gentle topography underlain with predominantly stiff soils and bedrock. Hence, there will be no impact from landslides on the Project site. Therefore, the Project will not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides.

b) Would the project result in substantial soil erosion or the loss of topsoil?

Less than Significant Impact. The Project site is flat with little topographic relief. Stormwater runoff will not be rapid or cause substantial erosion. Earthmoving across the Project site during construction will expose soils to potential erosion from heavy winds, rainfall, or runoff. In accordance with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ), construction sites disturbing 1 acre or more are required to comply with the CGP. As the construction will disturb more than 1 acre of land, the Project will be subject to the CGP.

The CGP requires the development and implementation of a site-specific Storm Water Pollution Prevention Plan (SWPPP), containing a site map which shows the construction site perimeter, existing and proposed buildings, lots, roadways, storm water collection and discharge points, general topography both before and after construction, and drainage patterns across the Project. The SWPPP must list the Best Management Practices (BMPs) that the Project contractor would use to protect storm water runoff from the Project site and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Prior to the start of construction activities, the Legally Responsible Person (LRP) must electronically submit the permit registration documents to the State Water Resources Control Board (SWRCB). The permit registration documents include a Notice of Intent, Risk Assessment, Post-Construction Calculations, a Site Map, the SWPPP, a signed certification statement by the LRP, and the first annual fee.

To comply with the CGP, the LRP must ensure that the requirements of the CGP are met, including the preparation and implementation of a SWPPP. The Project will prepare and implement the SWPPP. The potential for substantial soil erosion or loss of topsoil would be less than significant. Therefore, the Project will not result in substantial soil erosion or the loss of topsoil.

c) Would the project be located on a geologic unit of 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?

Less than Significant Impact with Implementation of Mitigation. The Project area has relatively flat topography, and, therefore, slope instability is not a significant issue. Because of the Project site's relatively gentle topography, soil lurching and lateral spreading are also not a significant issue. The Project site is underlain with bedrock and stable geologic units as assessed by the geologic report and subsurface borings. Hence, the geologic unit under the Project site is considered stable and not subject to substantial lateral spreading or subsidence or collapse. In addition, construction activities for the Project are relatively minor and do not require major excavation or geologic treatment. Thus, the otherwise stable geologic unit beneath the Project site will not because unstable as a result of the Project.

According to the Draft Santa Rosa General Plan EIR (2009b), the soils in the Project vicinity show a slight potential for liquefaction susceptibility. Although the actual likelihood of liquefaction at the site is low because bedrock is shallow, the potential for instability from liquefaction could occur during seismic events. Thus, in an abundance of caution, the Project would implement **Mitigation Measure GEO-1**, for the preparation of a Geotechnical Investigation and Design Report and implementation of recommendations. Accordingly, impacts will be less than significant. Therefore, the Project will not be located on a geologic unit of 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.

d) Would the project 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?

Less than Significant Impact with Implementation of Mitigation. Where compacted fill is not present at the Project site, it is underlain by gravel and silty-clay from the surface to approximately 5 feet bgs, and underlain by approximately 1 to 2 feet of various gravel, sand, silt, and clay mixtures, which likely represents a surface weathering zone, which is then underlain by volcanic rocks of primarily andesite composition. The NRCS reports that the Project site is underlain by Clear Lake Clays and Goulding-Toomes complex clay loams. These soils would likely be moderately expansive (United States Department of Agriculture 2019).

Table 18-1-B from the 1994 California Building Code is reproduced below. Soil samples collected during the geotechnical analysis will be tested to assess the expansion potential of site soils.

Table 7.1 Classification of Expansive Soil (Table 18-1-B from the 1994 California Building Code)

Expansion Index	Potential Expansion
0-20	Very low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very high

The Project will comply with regulatory standards to construct the facility and thereby reduce risks to life or property due to the potential presence of expansive soils. In addition, and in an abundance of caution, the Project would implement **Mitigation Measure GEO-1**, to prepare a Geotechnical Investigation and Design Report and implementation of recommendations. Accordingly, impacts will be less than significant. Therefore, the Project will not be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), that creates a substantial risks to life or property because the building methods will comply with applicable code and the design recommendations will be followed.

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 wastewater?

No Impact. The Project will be connected to the City sanitary sewer system. Therefore, the Project will not have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

f) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less than Significant Impact with Mitigation Incorporated. There are no known paleontological resources or sites or unique geologic features on the Project site. The Historical Resources Study included archival research and a paleontological records search, which indicated that there are no fossil localities recorded near the study area (Origer 2018). The Historical Resources Study also evaluated the geology of the Project site and did not identify any unique geologic features. Likewise, the Santa Rosa General Plan does not identify the presence of any paleontological resources or sites or unique geological features within the boundaries of the City's planning area. In addition, ground-disturbing work will be limited to the western portion of the Project site, which is already developed and graded, making the discovery of paleontological resources or sites or unique geological features highly unlikely.

Nevertheless, there is a low possibility of discovery of an unknown paleontological resource during Project construction. In the event of a discovery of a potential paleontological resource, **Mitigation Measure GEO-2** must be implemented. **Mitigation Measure GEO-2** requires that ground-disturbing activity immediately stop and that a qualified paleontologist evaluate the resource and provide appropriate treatment.

With implementation of **Mitigation Measure GEO-2**, the Project will not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. Potential impacts will be reduced to less than significant.

7.3 Mitigation Measures

Mitigation Measure GEO-1: Prepare a final design level Geotechnical Investigation and Design Report.

The Project sponsor shall retain a geotechnical engineer licensed in the State of California to prepare a site-specific Geotechnical Investigation and Design Report, which will include, at minimum, the following elements:

- Analysis of expected ground motions at the Project site from known active faults.
- Requirements for structural design that can accommodate ground accelerations expected from known active faults, in accordance with City ordinances and policies and consistent with the CBC.
- Identify and implement site specific engineering and construction methods for potential expansive and liquefiable soils in compliance with CGS Geology Guidelines specific to building designs.
- Determine final design parameters for the walls, foundations, foundation slabs, and surrounding related improvements (utilities, roadways, parking lots and sidewalks).

The Project sponsor shall retain a qualified civil engineer licensed in the State of California to prepare design specifications including, but not limited to grading, excavation, foundations systems, and compaction specification, based on recommendations provided in the Geotechnical Investigation and Design Report.

Issuance of building and grading permits by the City Engineer shall be contingent on incorporation of all recommendations set forth in the Geotechnical Investigation and Design Report in final grading plan, construction plans, and building plans.

Mitigation Measure GEO-2: If paleontological resources, including individual fossils or assemblages of fossils, or unique geological features are encountered during grading or construction activities, all work within 100 feet of the find shall cease and the Project sponsor shall retain a paleontologist approved by the City to evaluate the find(s) and make treatment recommendations, which the Project sponsor shall implement.

8. GREENHOUSE GAS EMISSIONS	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☒	☐	☐
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☒	☐	☐

The following analysis is based on the *Santa Rosa Farm Group – Cannabis Cultivation Facility Project Air Quality and Greenhouse Gas Study* prepared by Rincon Consultants, Inc., dated November 2019 (**Appendix D**).

8.1 Environmental Setting

8.1.1 Climate Change and Greenhouse Gases

Climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and storms) over an extended period of time. The term "climate change" is often used interchangeably with the term "global warming," but "climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures. The baseline against which these changes are measured originates in historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. The global climate is continuously changing, as evidenced by repeated episodes of substantial warming and cooling documented in the geologic record. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. However, scientists have observed acceleration in the rate of warming during the past 150 years. Per the United Nations Intergovernmental Panel on Climate Change (IPCC 2014), the understanding of anthropogenic warming and cooling influences on climate has led to a high confidence (95% or greater chance) that the global average net effect of human activities has been the dominant cause of warming since the mid-20th century.

Gases that absorb and re-emit infrared radiation in the atmosphere are called greenhouse gases (GHGs). The gases that are widely seen as the principal contributors to human-induced climate change include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), fluorinated gases such as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Water vapor is excluded from the list of GHGs because it is short-lived in the atmosphere, and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

GHGs are emitted by both natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices and landfills. Observations of CO_2 concentrations, globally averaged temperature, and sea level rise are generally well within the range of the extent of the earlier IPCC projections. The recently observed increases in CH_4 and N_2O concentrations are smaller than those assumed in the scenarios in the previous assessments. Each IPCC assessment has used new projections of future climate change that have become more detailed as the models have become more advanced.

Man-made GHGs, many of which have greater heat-absorption potential than CO_2, include fluorinated gases and SF_6 (CalEPA 2006). Different types of GHGs have varying global warming potentials (GWP). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally 100 years). Because GHGs absorb different amounts of heat, a common reference gas (CO_2) is used to relate the amount of heat absorbed to the amount of the gas emissions, referred to as “carbon dioxide equivalent” (CO_2e) and is the amount of a GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one. By contrast, methane CH_4 has a GWP of 25, meaning its global warming effect is 25 times greater than carbon dioxide on a molecule per molecule basis (IPCC 2007).

Based on the California Air Resources Board (CARB) California Greenhouse Gas Inventory for 2000-2014, California produced 440.4 million metric tons (MMT) CO_2e in 2015 (CARB 2017b). The largest single source of GHG in California is transportation, contributing 39 percent of the state’s total GHG emissions. Industrial sources are the second largest source of the state’s GHG emissions, contributing 23 percent of the state’s GHG emissions (CARB 2017b). California emissions are due in part to its large size and large population compared to other states. However, the state’s mild climate reduces California’s per capita fuel use and GHG emissions as compared to other states. CARB has projected statewide unregulated GHG emissions for the year 2020 will be 509.4 MMT CO_2e (CARB 2017c). These projections represent the emissions that would be expected to occur in the absence of any GHG reduction actions.

8.1.2 Regulatory Setting

The following regulations address both climate change and GHG emissions.

8.1.2.1. Federal Regulations

The U.S. Supreme Court in Massachusetts et al. v. Environmental Protection Agency et al. ([2007] 549 U.S. 05-1120) held that the U.S. EPA has the authority to regulate motor-vehicle GHG emissions under the federal Clean Air Act. The U.S. EPA issued a Final Rule for mandatory reporting of GHG emissions in October 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and vehicle engines, and it requires annual reporting of emissions. In 2012 the U.S. EPA issued a Final Rule that establishes the GHG permitting thresholds that determine when Clean Air Act permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

In 2014, the U.S. Supreme Court in Utility Air Regulatory Group v. EPA (134 S. Ct. 2427 [2014]) held that U.S. EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of Best Available Control Technology (BACT).

8.1.2.2. California Regulations

The State of California considers GHG emissions and the impacts of climate change to be a serious threat to the public health, environment, economic well-being, and natural resources of California and has taken an aggressive stance to mitigate the State's impact on climate change through the adoption of policies and legislation. The California Air Resources Board (CARB) is responsible for the coordination and oversight of State and local air pollution control programs in California. California has numerous regulations aimed at reducing the state's GHG emissions. These initiatives are summarized below.

Assembly Bill (AB) 1493 (2002), California's Advanced Clean Cars program (referred to as "Pavley"), requires CARB to develop and adopt regulations to achieve "the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." On June 30, 2009, U.S. EPA granted the waiver of Clean Air Act preemption to California for its GHG emission standards for motor vehicles beginning with the 2009 model year. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as "LEV (Low Emission Vehicle) III GHG," will cover 2017 to 2025. Fleet average emission standards would reach 22 percent reduction from 2009 levels by 2012 and 30 percent by 2016. The Advanced Clean Cars program coordinates the goals of the Low Emissions Vehicles (LEV), Zero Emissions Vehicles (ZEV), and Clean Fuels Outlet programs and would provide major reductions in GHG emissions. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions from their model year 2016 levels (CARB 2011b).

California's major initiative for reducing GHG emissions is outlined in Assembly Bill 32 (AB 32), the "California Global Warming Solutions Act of 2006," signed into law in 2006. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020, and it requires CARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions. Based on this guidance, CARB approved a 1990 statewide GHG level and 2020 limit of 427 MMT CO_2e. The Scoping Plan was approved by CARB on December 11, 2008, and it included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted since approval of the Scoping Plan.

In May 2014, CARB approved the first update to the AB 32 Scoping Plan. The 2013 Scoping Plan update defines CARB's climate change priorities for the next five years and sets the groundwork to reach post-2020 statewide goals. The update highlights California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluates how to align the

State's longer-term GHG reduction strategies with other State policy priorities, such as for water, waste, natural resources, clean energy and transportation, and land use (CARB 2014).

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an environmental issue that requires analysis in California Environmental Quality Act (CEQA) documents. In March 2010, the California Resources Agency adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts.

CARB Resolution 07-54 establishes 25,000 MT of GHG emissions as the threshold for identifying the largest stationary emission sources in California for purposes of requiring the annual reporting of emissions. This threshold is just over 0.005 percent of California's total inventory of GHG emissions for 2004.

Senate Bill (SB) 375, signed in August 2008, enhances the state's ability to reach AB 32 goals by directing ARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles for 2020 and 2035. In addition, SB 375 directs each of the state's 18 major Metropolitan Planning Organizations (MPO) to prepare a "sustainable communities strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the Regional Transportation Plan (RTP). The Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC) were assigned targets of a 7 percent reduction in GHGs from transportation sources by 2020 and a 15 percent reduction by 2035. ABAG and MTC adopted a RTP/SCS, called Plan Bay Area, which, when implemented, would meet the assigned targets by achieving a 10 percent per capita GHG emissions reduction in 2020 and a 16 percent reduction in 2035 (CARB 2014b).

In April 2011, the governor signed SB 2X requiring California to generate 33 percent of its electricity from renewable energy by 2020.

On September 8, 2016, the governor signed Senate Bill 32 (SB 32) into law, extending AB 32 by requiring the State to further reduce GHGs to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, as well as implementation of recently adopted policies and policies, such as SB 350 and SB 1383 (see below). The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally appropriate quantitative thresholds consistent with a statewide per capita goal of six metric tons (MT) CO_2e by 2030 and two MT CO_2e by 2050 (CARB 2017c). As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, subregional, or regional level), but not for specific individual projects because they include all emissions sectors in the state (CARB 2017).

Adopted on October 7, 2015, SB 350 supports the reduction of GHG emissions from the electricity sector through a number of measures, including requiring electricity providers to achieve a 50 percent renewables portfolio standard by 2030, a cumulative doubling of statewide energy efficiency savings in electricity and natural gas by retail customers by 2030.

Adopted in September 2016, SB 1383 requires the CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants. The bill requires the strategy to achieve the following reduction targets by 2030:

- Methane – 40 percent below 2013 levels
- Hydrofluorocarbons – 40 percent below 2013 levels
- Anthropogenic black carbon – 50 percent below 2013 levels

The bill also requires CalRecycle, in consultation with the State board, to adopt regulations that achieve specified targets for reducing organic waste in landfills.

In September 2018, the governor signed SB 100, which accelerates the state's Renewables Portfolio Standard Program, which was last updated by SB 350 in 2015, and commits to 100 percent clean energy in California by 2045. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 44 percent by 2024, 60 percent by 2030, and 100 percent by 2045.

On September 10, 2018, the governor issued Executive Order B-55-18, which established a new statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter. This goal is in addition to the existing statewide GHG reduction targets established by SB 375, SB 32, SB 1383, and SB 100. EO B-55-18 also tasks CARB with including a pathway toward the EO B-55-18 carbon neutrality goal in the next Scoping Plan update.

For more information on the Senate and Assembly Bills, Executive Orders, and reports discussed above, and to view reports and research referenced above, please refer to the following websites: www.climatechange.ca.gov and www.arb.ca.gov/cc/cc.htm.

8.1.2.3. California Environmental Quality Act

Pursuant to the requirements of SB 97, the Resources Agency has adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted CEQA Guidelines provide general regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, while giving lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts. To date, a variety of air districts have adopted quantitative significance thresholds for GHGs.

8.1.2.4. Local Regulations and Climate Action Plan

In June 2012, Santa Rosa adopted a Climate Action Plan (CAP) to assist the City's efforts to reduce GHG emissions with reduction measures that are consistent with AB 32. The CAP identified GHG emission reduction strategies, actions, and measures that would enable the City to meet its reduction target for 2020 and 2035. To achieve the established 2020 target of reducing GHG emissions by 15 percent below 2007 levels, the CAP proposes measures and recommends continuing to implement, monitor, and evaluate communitywide programs including the "smart" development patterns established in the 2010 General Plan, new Green Building Codes, and Complete Streets program. The CAP proposes quantifiable emissions reduction measures for the City focused on energy, solid waste, transportation, and land use, and the CAP includes measures specific to municipal operations as well as the whole community. The

City's progress will be monitored each year, while a full GHG inventory will be performed at least every five years.

The reduction measures included in the CAP are a diverse mix of regulatory and incentive-based programs for both new and existing development. The reduction measures also aim to reduce GHG emissions from each source to avoid reliance on any one strategy or sector to achieve the target. The CAP is being implemented through various departments at the City, which are the primary entities responsible for implementation. Thus, in many instances (even when a CAP measure) may apply to a singular new project) it is the City's obligation, through the implementing department, to ensure CAP compliance. And, in many instances, the GHG reduction strategies are city-based policy or ordinances that may apply to individual projects but are implemented ultimately by City actions. The City periodically provides summary reports to track implementation. The May 2018 Summary of Implementation Report is incorporated by reference herein.

The CAP clearly states that CAP compliance can be used to assess plan-level and project-level impacts and allow a lead agency to determine that a project's impact on GHG emissions is less than significant if it is in compliance. Appendix D of the CAP describes in detail how the City's Climate Action Plan satisfies the BAAQMD's requirements for a Qualified GHG Reduction Strategy and will allow future development projects to determine that a project has a less than significant impact on GHG emissions if it complies with the City's Climate Action Plan.

Furthermore, Appendix D to the CAP explains how the plan meets the criteria for a Qualified Greenhouse Gas Reduction Strategy under the CEQA Air Quality Guidelines adopted by the Bay Area Air Quality Management District (BAAQMD). As explained in Appendix D:

> *The purpose of the BAAQMD CEQA Air Quality Guidelines is to assist lead agencies in evaluating the air quality impacts of proposed projects and plans within the San Francisco Bay Area Air Basin. The guidelines were updated to establish thresholds of significance for impacts related to greenhouse gas (GHG) emissions to be consistent with the requirements of the California Environmental Quality Act. These thresholds can be used to assess plan-level and project-level impacts and allow a lead agency to determine that a project's impact on GHG emissions is less than significant if it is in compliance with a Qualified Greenhouse Gas Reduction Strategy.*
>
> *The City's Climate Action Plan follows both the State CEQA Guidelines and BAAQMD's guidelines by incorporating the standard elements of a Qualified GHG Reduction Strategy into the CAP. The standard elements of a Qualified GHG Reduction Strategy include the following steps:*
>
> 1. *Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic range.*
> 2. *Establish a level, based on substantial evidence below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable.*
> 3. *Identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area.*

4. *Specify measures or a group of measures, including performance standards that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level.*
5. *Monitor the plan's progress.*
6. *Adopt the greenhouse gas reduction strategy in a public process following environmental review.*

Appendix D then details how the City's CAP has been developed to satisfy the standard elements of a Qualified GHG Reduction Strategy and how it will allow future development projects to determine that a project has a less than significant impact on GHG emissions if it complies with the CAP. (See CAP, pp. D-1 to D-9.)

The CAP includes as Appendix E a "New Development Checklist." (See CAP, pp. E-1 to E-2.) Appendix E of the CAP states that, "to ensure new development projects are compliant with the City's Climate Action Plan, the following checklist has been developed. This checklist should be filled out for each new project, subject to discretionary review, to allow new development to find a less than significant impact for greenhouse gas emissions in the environmental review process." A footnote to the checklist states that "to be in compliance with the CAP, all measures denoted with an asterisk are required in all new development projects unless otherwise specified. If a project cannot meet one or more of the mandatory requirements, substitutions may be made from other measures listed at the discretion of the Community Development Director." As discussed above, demonstrating compliance with the CAP (on a project-specific basis using the checklist) results in a determination that a project has a less than significant impact on GHG emissions.

8.1.3 Methodology and Thresholds of Significance

Under Appendix G of the CEQA Guidelines, the Project would result in a significant impact if it would:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or

2. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The vast majority of individual projects do not generate sufficient GHG emissions to directly influence climate change. However, physical changes caused by a project can contribute incrementally to cumulative effects that are significant, even if individual changes resulting from a project are limited. The issue of climate change typically involves an analysis of whether a project's contribution towards an impact would be cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (CEQA Guidelines, Section 15064[h][1]).

According to CEQA Guidelines, projects can tier off of a qualified GHG reduction plan, which allows for project-level evaluation of GHG emissions through the comparison of the project's consistency with the GHG reduction policies included in a qualified GHG reduction plan. This approach is considered by the Association of Environmental Professionals (AEP) in their white paper, Beyond Newhall and 2020, to be the most defensible approach presently available under CEQA to determine the significance of a project's GHG emissions (2016). As mentioned above under Local Regulations, Santa Rosa adopted a qualified GHG reduction plan and has been implementing the requirements of its CAP for city-wide actions as well as individual projects, when applicable.

To evaluate whether a project may generate a quantity of GHG emissions that may have a significant impact on the environment, a number of operational bright-line significance thresholds have been developed by state agencies. Significance thresholds are numeric mass emissions thresholds which identify the level at which additional analysis of project GHG emissions is necessary. Projects that attain the significance target, with or without mitigation, would result in less than significant GHG emissions. Many significance thresholds have been developed to reflect a 90 percent capture rate tied to the 2020 reduction target established in AB 32. These targets have been identified by numerous lead agencies (including the City of Santa Rosa) as appropriate significance screening tools for residential, commercial, industrial, and public land uses and facilities projects with horizon years before 2020.

To evaluate the questions from Appendix G of the CEQA guidelines, the City applies the CEQA thresholds of significance developed by the Bay Area Air Quality Management District (BAAQMD) which has two distinct threshold pathways for operational-related GHG emissions – one for development projects and one for stationary-source projects. In the 2017 BAAQMD CEQA Air Quality Guidelines, the BAAQMD outlines an approach to determine the significance of projects. For residential, commercial, industrial, and public land use development projects, the potential thresholds of significance for GHG emissions includes compliance with a qualified GHG Reduction Strategy. Because Santa Rosa has a qualified GHG Reduction Strategy (i.e., the CAP), the compliance threshold applies best to the proposed project and is the chosen threshold of significance for this report. Appendix E of the CAP includes a checklist to determine whether a project is consistent with the identified measures and actions of the CAP and, therefore, complies with the CAP. If a project complies with the CAP, its GHG-related impacts are less than significant. This analysis evaluates the proposed project against the CAP consistency checklist to determine if it has significant GHG-related impacts (Table 8.1).

For stationary source emissions that would accommodate processes and equipment that emit GHG emissions and would require an Air District permit to operate, such as emissions from the cogenerator system, the recommended BAAQMD threshold is 10,000 MT per year.

The Association of Environmental Professionals' (AEP) white paper "Beyond Newhall and 2020" recommends that CEQA GHG analyses evaluate project emissions in light of the trajectory of state climate change legislation and assess their "substantial progress" toward achieving long-term reduction targets identified in available plans, legislation, or EOs. Consistent with the recommendations in this white paper, the project's GHG impacts are analyzed in terms of whether the project would impede "substantial progress" toward meeting the reduction goal identified in SB 32 and EO S-55-18. As SB 32 is considered an interim target toward meeting the 2045 state goal, consistency with SB 32 would be considered contributing substantial progress toward meeting the state's long-term 2045 goals. Avoiding interference with, and making substantial progress toward, these long-term state targets is important as these targets have been set at levels that reduce California's fair share of emissions toward international targets that will stabilize global climate change effects and avoid the adverse environmental consequences described herein. As mentioned above, under California Regulations, the 2017 Scoping Plan recommends that local governments target 6 MT of CO2e per capita per year in 2030 and 2 MT of CO2e per capita per year in 2050 in their long-range plans, such as CAPs. As shown in Figure D-5 (GHG Emissions Per Service Population) in Appendix D of the City's CAP, with CAP implementation, the projected GHG emissions per capita in Santa Rosa is estimated to be 2.4 MT of CO2e in 2035. Therefore, implementation of the City's CAPs makes substantial progress towards achieving the state's post-2020 targets.

8.2 Impact Analysis

Information in this section is based on the "Santa Rosa Farm Group – Cannabis Cultivation Facility Project Air Quality and Greenhouse Gas Study" prepared by Rincon Consultants, Inc. in March 2019, included in **Appendix D**.

While the Project will generate greenhouse gases, the Project meets the requirements of the City of Santa Rosa's CAP, and therefore, does not result in significant impacts.

A discussion of each environmental issue included under Section 8 is presented below.

a, b) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less than Significant. The City's CAP includes numerous measures that reduce GHG emissions. For a new development project, only certain measures apply from the CAP. Table 8.1 summarizes the project's consistency with applicable CAP measures. As summarized therein, the project would be consistent with the applicable measures of the City's CAP. Accordingly, the project would result in less than significant GHG emission impacts.

The City's CAP includes a New Development Checklist (Appendix E of the CAP) for use in evaluating whether new development projects comply with the CAP such that their GHG impacts will be less than significant. Table 8.1 summarizes the project's consistency with the mandatory items in the New Development Checklist, based on the Project description and incorporated sustainable design features. Each item is further analyzed in the narrative discussion following Table 8.1.

Table 8.1 CAP New Development Checklist

#	Description	Complies	Does not Comply	N/A
1.1.1	Comply with CALGreen Tier 1 standards*	X		
1.1.3	After 2020, all new development will utilize zero net electricity*			X
1.3.1	Install real-time energy monitors to track energy use*	X		
1.4.2	Comply with the City's tree preservation ordinance*	X		
1.4.3	Provide public and private trees in compliance with the Zoning Code*	X		
1.5	Install new sidewalks and paving with high solar reflectivity materials*			X
2.1.3	Pre-wire and pre-plumb for solar thermal or PV systems	X		

#	Description	Complies	Does not Comply	N/A
3.1.2	Support implementation of station plans and corridor plans	X		
3.2.1	Provide on-site services such as ATMS or dry cleaners to site users			X
3.2.2	Improve non-vehicular network to promote walking, biking	X		
3.2.3	Support mixed-use, higher-density development near services			X
3.3.1	Provide affordable housing near transit			X
3.5.1	Unbundle parking from property cost			X
3.6.1	Install calming features to improve ped/bike experience	X		
4.1.1	Implement the Bicycle and Pedestrian Master Plan	X		
4.1.2	Install bicycle parking consistent with regulations*	X		
4.1.3	Provide bicycle safety training to residents, employees, motorists			X
4.2.2	Provide safe spaces to wait for bus arrival			X
4.3.2	Work with large employers to provide rideshare programs			X
4.3.3	Consider expanding employee programs promoting transit use			X
4.3.4	Provide awards for employee use of alternative commute options			X
4.3.5	Encourage new employers of 50+ to provide subsidized transit passes*	X		
4.3.7	Provide space for additional park-and-ride lots			X
4.5.1	Include facilities for employees that promote telecommuting			X
5.1.2	Install electric vehicle charging equipment	X		
5.2.1	Provide alternative fuels at new refueling stations*			X
6.1.3	Increase diversion of construction waste*	X		
7.1.1	Reduce potable water use for outdoor landscaping*	X		
7.1.3	Use water meters which track real-time water use*	X		
7.3.2	Meet on-site meter separation requirements in locations with current or future recycled water capabilities*	X		
8.1.3	Establish community gardens and urban farms			X
9.1.2	Provide outdoor electrical outlets for charging lawn equipment	X		
9.1.3	Install low water use landscapes*	X		
9.2.1	Minimize construction idling time to five minutes or less*	X		
9.2.2	Maintain construction equipment per manufacturer's specs*	X		
9.2.3	Limit GHG construction equipment by using electrified equipment or alternative fuels*	X		

Source: Santa Rosa, City of. 2012. Climate Action Plan: City of Santa Rosa. Available at: http://www.ca-ilg.org/sites/main/files/file-attachments/santa_rosa-_climate_action_plan.pdf.

* To be in compliance with the CAP, all measures denoted with an asterisk are required in all new development projects unless otherwise specified. If a project cannot meet one or more of the mandatory requirements, substitutions may be made from other measures listed at the discretion of the Community Development Director.

***1.1.1 Comply with CALGreen Tier 1 standards.**

CALGreen (Title 24 Part 11, California Green Building Standards Code) applies to all new buildings and to additions and alterations of residential and nonresidential buildings. The City has incorporated the requirements of CALGreen into the Building Permit approval process. The 2018 Summary of Implementation report indicates that this item is complete and all new development starting in January 2017 will comply. The project will comply with all Tier 1 standards, pursuant to the 2016 CALGreen Tier 1 Checklist and intervening supplements. Thus, the project will comply with Item 1.1.1.

***1.1.3 After 2020, all new development will utilize zero net electricity.**

Unlike most new development projects, which require energy from the grid, the project would utilize a cogenerator system that results in virtually all electricity to be generated onsite and thus the project would not demand substantial amounts of electricity from the grid. This feature of the project makes it consistent with the City's effort to achieve a net zero electricity goal. Therefore, the project would comply with item 1.1.3. Note also that the 2018 Summary of Implementation reports that full achievement of 1.1.3 has no feasible path at the City level, and such achievement must be part of future policy development in connection with advancement in the California building code. Thus, the project complies with this item to the extent feasible.

***1.3.1 Install real-time energy monitors to track energy use.**

The proposed project includes installation of real-time energy monitors to track energy use. As stated in Section 1, *Project Description*, the project will incorporate PG&E's Smart Meter System for cost and energy savings. Thus, the project will comply with Item 1.3.1.

***1.4.2 Comply with the City's tree preservation ordinance and *1.4.3 Provide public & private trees in compliance with the Zoning Code.**

The action required under these two items is to: (1) implement the City's tree preservation ordinance; and (2) require new development to supply an adequate number of street and private trees. The project will comply with the City of Santa Rosa Tree Preservation Ordinance (Santa Rosa City Code Section 17-24). The Tree Preservation Ordinance governs the alteration, removal, and relocation of trees, including heritage trees. "Heritage trees" are defined as trees of certain species native to Sonoma County with trunks exceeding specified diameters or circumferences. The Tree Preservation Ordinances requires a permit for the alteration, removal, or relocation of any trees, including heritage trees, on property proposed for development.

An arborist report and tree inventory was prepared for the proposed project (Horticultural Associates 2017). The inventory includes 78 trees on the project site (numbered 1 through 78), consisting of 65 coast redwood, six black walnut trees, and one each of almond, blue gum, crabapple, English walnut, evergreen ash, honey locust, and valley oak trees.

The project will be required to remove and replace 58 trees, including the three heritage trees, in compliance with the Tree Preservation Ordinance. Compliance with the Tree Preservation Ordinance is mandatory and is enforced through permitting requirements and the development plan approval process (City Code Section 17-24.050). Prior to the removal of the trees, the final landscape plan (as part of the development plan) for the proposed project must be reviewed by the City's Design Board for compliance with the tree ordinance and zoning requirements in the City's Design Guidelines (City Code 20.52.030). The final landscape plan must comply with the replacement and planting requirements of the Tree Preservation Ordinance and must be approved by the City.

Therefore, mandatory compliance with the Tree Preservation Ordinance and Design Guidelines will ensure that the proposed project will not conflict with the Tree Preservation Ordinance and will not have environmental impacts related to the alteration or removal of trees. Thus, the project will comply with Items 1.4.2 and 1.4.3.

***1.5 Install new sidewalks and paving with high solar reflectivity materials.**

The City action to implement item 1.5 is adopt an ordinance that requires and specifies cool paving materials for new parking lots, sidewalks, roofs, and crosswalks and integrates Low Impact Development guidelines for new construction and Capital Improvement Projects. The 2018 Summary of Implementation indicates that the City is in the process of incorporating these types of requirements in the upcoming revision of the City street standards. Thus, this item is not applicable at this time. In addition, the proposed project will not involve the installation of new sidewalks, and instead will provide dedications to the City for the provision of new sidewalks if future roadway improvement programs are implemented. Also note that, as explained in Section 1, *Project Description*, the proposed project includes installation cool paving materials with high solar reflectivity materials, which help achieve this measure to the extent it could apply upon adoption of the city ordinance.

***4.1.2 Install bicycle parking consistent with regulations.**

The City action for this measure is to update bicycle parking regulations for multi-family homes and commercial businesses to increase bicycle parking citywide. The 2018 Summary of Implementation indicates that the City completed this measure. The City's Zoning Code requires the project to provide nine bicycle parking spaces. The project would include bicycle parking spaces as required by code, and therefore would comply with this item. The project will comply with Item 4.1.2.

***4.3.5 Encourage new employers of 50+ to provide subsidized transit passes.**

The City action for this item is to encourage new developments with more than 50 on-site employees to provide subsidized or free. The 2018 Summary of Implementation indicates that the City would implement this measure on a project-by-project basis. The context of this sub-measure is for the City to increase the number of shared trips and transit trips in the City and is included in Measure 4.3: Car Sharing and Transportation Demand Management (TDM) Programs. Thus, the City has the opportunity to encourage the project applicant include such subsidies in its TDM program during the entitlement and project approval phase of the project. The project it is anticipated have more than 50 new employees. Thus, the City may encourage transit subsidy as part of project approvals in connection with other TDM, if necessary, to achieve TDM goals in the industrial area of the project site. Thus, the project will comply with Item 4.3.5.

***5.2.1 Provide alternative fuels at new refueling stations.**

The City action for this item is to require new refueling stations to provide biodiesel fuel, compressed natural gas, liquefied natural gas, electric vehicle charging stations, or other alternative fuels. This measure does not apply because the proposed project does not include a new refueling station.

***6.1.3 Increase diversion of construction waste.**

Project construction and demolition would be conducted in accordance with the CALGreen Construction Waste Management Requirements (24 CCR 5.408). CALGreen requires that owners of new construction and demolition projects divert 65 percent of non-hazardous construction and demolition waste. The project sponsor will be required to meet the requirements of 24 CCR 5.408 through one of the following methods:

- Develop and submit a waste management plan prior to the start of construction to the City which identifies materials and facilities to be used and document diversion,

- Use a waste management company, approved by the City, that can document 65 percent diversion, or
- Use the disposal reduction alternative, as appropriate for the type of project.

Project construction and demolition activities would generate approximately 500 to 1,000 cubic yards (approximately 200 to 400 tons) of non-hazardous waste. Through implementation of the required CALGreen diversion methods, approximately 325 to 650 cubic yards of demolition waste would be diverted for recycling or reuse, and approximately 175 to 350 cubic yards of demolition waste would be managed for disposal. Thus, the project will comply with Item 6.1.3.

***7.1.1 Reduce potable water use for outdoor landscaping.**

The project will reduce onsite water demand through efficient irrigation of landscaping, use of water-efficient fixtures, and particularly by use of the water reclamation and biowaste recycling system. This system would enable approximately 70 percent to 90 percent of wastewater from cannabis cultivation operations to be reclaimed and reused onsite, thereby reducing water and wastewater demand. In addition, all landscaping plantings would require moderate to very low water use in compliance with the City's Water Efficient Landscape Ordinance (City of Santa Rosa 2007). Thus, the project will comply with Item 7.1.1.

***7.1.3 Use water meters which track real-time water use.**

As explained in Section 1, *Project Description*, the project will include installation of real-time water monitors to track water use. In addition, the project will utilize PG&E's Smart Meter System for cost and energy savings. Thus, the project will comply with Item 7.1.3.

***7.3.2 Meet on-site meter separation requirements in locations with current or future recycled water capabilities.**

The project meets onsite meter separation requirements in locations with current/future recycled water capabilities. Thus, the project will comply with Item 7.3.2.

***9.1.3 Install low water use landscapes.**

The project will be required to install low water use landscaping in compliance with the City's Water Efficient Landscape Ordinance (City of Santa Rosa 2007). Thus, the project will comply with Item 9.1.3.

***9.2.1 Minimize construction equipment idling time to 5 minutes or less.**

As explained in Section 1, *Project Description*, the project applicant will implement construction best practices such that that idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). In addition, clear signage shall be provided for construction workers at all access points. Thus, the project will comply with Item 9.2.1.

***9.2.2 Maintain construction equipment per manufacturer's specs.**

As explained in Section 1, *Project Description*, the project applicant will implement construction best practices such that all construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications. In addition, all equipment will be checked by a certified visible emissions evaluator. Thus, the project will comply with Item 9.2.2.

***9.2.3 Limit GHG construction equipment emissions by using electrified equipment or alternative fuels.**

The City action for item 9.2.3 is to work with project applicants to limit GHG emissions from construction equipment by selecting one of the following measures, at a minimum, as appropriate to the construction project: (a) substitute electrified equipment for diesel- and gasoline-powered equipment where practical; (b) use alternative fuels for construction equipment on-site, where feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel; of (c) avoid the use of on-site generators by connecting to grid electricity or utilizing solar-powered equipment. Here, the project will limit GHG construction equipment emissions by using electric or alternative fuel as available, and work with the City through the approval process to implement the options provided above. Thus, the project will comply with Item 9.2.3.

As shown in Table 8.1 and in the narrative explanation above, the project would comply with the applicable CAP measures for new development. The project would be consistent with the Santa Rosa CAP and would thereby results in a determination that the project has a less than significant impact on GHG emissions.

Stationary Source Emissions

GHG emissions from the cogenerator units, which are stationary sources, were estimated using emission factors provided by Western Energy Systems for the Avus 500 Plus NG/Agenitor 412, which is a generator unit likely to be used by the project (see **Appendix D** for emission factors and manufacturer emissions estimates). Exact generator equipment has not been selected for the project, as final selection will be made during the facility design phase; nonetheless, the emissions estimated in this study provide a reasonable estimate of emissions from similarly sized cogenerator units that are likely to be used by the project.

The proposed stationary source would generate an estimated 5,045 MT of CO_2e per year. Therefore, the cogenerator system GHG emissions would not exceed BAAQMD's threshold of 10,000 MT CO_2e per year.

Cumulative Impacts

GHG and climate change are by definition cumulative impacts, as they affect the accumulation of greenhouse gases in the atmosphere. As discussed above, the Project will not generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; and the Project will not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases. Therefore, the project's GHG emissions will not be cumulatively considerable. Impacts will be less than significant.

8.3 Mitigation Measures

The Project is consistent with the Santa Rosa CAP and the CAP checklist for new development; thus, no mitigation measures are required.

9. HAZARDS AND HAZARDOUS MATERIALS	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?	☐	☒	☐	☐
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?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
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?	☐	☐	☒	☐
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?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g) Expose people or structures, either directly or indirectly, to significant risk of loss, injury or death involving wildland fires?	☐	☒	☐	☐

9.1 Environmental Setting

The Project is located in a light industrial, residential, and commercial area, with Yolanda Avenue and commercial properties to the north, Petaluma Hill Road and undeveloped property to the east, residential properties to the south and southwest, and commercial properties to the west. The Project site is currently unoccupied but is improved with the residential buildings and ancillary structures (e.g., garage, shed, mower shop, well house, and mobile office trailer) generally located on the central portion.

Hazardous materials, as discussed in this section, includes both hazardous substances and wastes which appear on a federal, state, and/or or local regulatory agency's list of hazardous materials, or if it has characteristics defined as hazardous by such an agency.

According to a site-specific Phase I Environmental Site Assessment (ESA) report, prepared in November 2016, the Project site was identified in regulatory agency files and databases as a closed Spills, Leaks, Investigation, and Cleanup (SLIC) case with potential petroleum, fuels, oil and solvent concentrations on the property (EBA Engineering 2016).

From approximately 1975 through 2001, the Project site was used for the storage and maintenance of commercial landscaping equipment, as well as fueling vehicles and storing pesticides. During this time, spills, overflows, and other incidental releases of PHCs and fuel-related VOCs to the surface soils and shallow soils occurred in several areas of the Project site. These releases and the associated soil impacts were the subject of a voluntary characterization and cleanup of the Project site, with regulatory oversight from SRFD and RWQCB. The PHC and VOC impacts were investigated and delineated in 2001, 2002, and 2003. Groundwater was also investigated, but no VOC or PHC contamination to groundwater was identified.

During correspondence in 2002, the SRFD indicated that a small area of impacted soil not accessible due to a physical constraint, such as the presence of the mower shop building, would fall under the 'extent feasible' portion of the SRFD cleanup standard, that a "no further action" letter could be issued, and that soil remediation would not be required until the building was removed (SRFD 2002; Davidson 2002). In correspondence from the SRFD, dated December 17, 2002, the Hazardous Material Program Manager indicated that once the mower shop was razed and the soils beneath were accessible, excavation/remediation of petroleum-impacted soils would be required (EBA Engineering 2016).

SCS Engineers prepared a remediation work plan which was submitted to the SRFD and RWQCB (SCS 2005a) and resubmitted modified versions based on correspondence (SCS 2005b, 2005c). The work plan was approved by the SRFD on May 10, 2005 (SRFD 2005a, 2005b) and the NCRWCQB on May 11, 2005 (NCRWCQB 2005). In July and August 2005, in accordance with the approved work plan, the impacted soils were excavated, with the exception of a small area left beneath the mower shop concrete floor due to inaccessibility (SCS Engineers 2005c).

The mower shop is located to the west of the other structures in the central section of the project Site. The work plan called for excavating soil in this area to a depth of one foot based on the maximum detected Total Recoverable Petroleum Hydrocarbon concentration in of 41 mg/kg. Based on the relatively low concentrations in impacted soil under this building, the small size of the building (approximately 15 by 25 feet), relatively shallow depth of impact (less than one foot below ground surface), and the continued utility of the mower shop in 2005, the property owner elected not to destroy the building at the time.

In correspondence dated October 25, 2005, the Senior Fire Inspector for SRFD indicated the SRFD found that "No Further Action" was required at the Project site based on the confirmatory sampling results, which revealed non-detectable or background level detected concentrations for TPH-mo, VOCs, and metals. The RWQCB also issued a "No further action" determination on November 2, 2005.

As discussed in the Phase I ESA, the structures at the Project site were constructed in the 1940s, and, based on their age, asbestos-containing materials (ACMs) and lead-based paint (LBP) may be present in the structures (EBA Engineering 2016).

9.2 Impact Analysis

This section analyzes the Project's potential impacts with respect to hazards and hazardous materials. This analysis is based on the Phase I ESA prepared for the Project site, results of environmental testing and structure analysis on the Project site, a review of regulatory agency files and databases, the remediation work plan for the Project site, the results of clean up actions on the Project site, the No Further Action letters for the Project site, fire and hazard maps prepared by government agencies, and other relevant materials described below.

With implementation of best management practices during construction, mandatory compliance with hazardous materials storage and use regulations, mandatory compliance with building codes, and implementation of **Mitigation Measure HAZ-1**, impacts associated with an upset or accident involving hazardous materials will be less than significant. There will be no impacts associated with school sites within a ¼-mile radius, airport land use, or air strips. The Project site is listed in the SLIC database; however, based on the planned cleanup activities, impacts will be less than significant. The Project will not significantly interfere with emergency response. Implementation of **Mitigation Measure HAZ-2** will reduce the risk associated with wildland fires to less than significant.

A discussion of each environmental issue included under Section 9 is presented below.

a) Would the project create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials, or

b) …through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less Than Significant Impact with Mitigation Incorporated. The Project will result in the development of a cannabis cultivation, manufacturing, distribution, and laboratory testing facility. Proposed operations will largely consist of cultivation of cannabis, manufacture of cannabis products, including extraction of cannabis concentrates or extracts, distribution and packaging of cannabis, and laboratory testing of cannabis. The following subsections discuss the potential Project impacts associated with hazardous materials.

General Construction

The Project will involve construction activities, which may result in the temporary presence of potentially hazardous materials onsite including, but not limited to fuels and lubricants, paints, solvents, insulation, electrical wiring, ACMs, LBP, and other construction related materials. The use and handling of hazardous materials during the construction and operation of the proposed facility will be required to comply with the applicable federal, state, and local laws including California Occupational Health and Safety Administration (CalOSHA) requirements.

The Project sponsor will also be required to comply with all existing federal, state and local safety regulations governing the transportation, use, handling, storage and disposal of potentially hazardous materials. The Project sponsor will be required to prepare a Storm Water Pollution Prevention Plan (SWPPP) that includes Best Management Practices (BMPs) prior to the commencement of site preparation and to implement the SWPPP during all construction activities, as detailed in Section 10 (Hydrology and Water Quality). In the event that construction activities involve the onsite storage of potentially hazardous materials, the Project sponsor will be required to file a declaration form with the Fire Marshal’s office and to obtain a hazardous materials storage permit. Mandatory compliance with the laws and regulations governing hazardous materials will ensure that during construction potential hazards to the public or the environment through the routine transport, use, or disposal of hazardous materials will be less than significant.

Petroleum Hydrocarbon Impacted Soil Excavation

The Project site is included in the SLIC database, which was compiled pursuant to Government Code Section 65962.3. Former operations at the Project site resulted in a small area of PHC-impacted soils beneath the eastern portion of the mower shop concrete floor which were left in place at the time of the 2005 site remediation activities due to inaccessibility. The former mower shop would be razed and the concrete floor removed as part of the site preparation prior to redeveloping the project Site. According to the Grading and Drainage Plan (BC Engineering Group 2018), at least 1 foot (at the western end of the mower shop) to 3 feet (at the eastern end of the mower shop) of surface and shallow soils would be excavated as part of the final grading plan. The PHC-impacted soils were identified at depths of 0.5 foot to 1.5 feet bgs.

The PHC-impacted soils will be excavated during grading activities and properly disposed of off-site pursuant to mandatory laws and regulations (HSC 17362.1 through 17362.3; CCR § 17362.1 through § 17362.3). During excavation of the PHC-impacted soil, there is potential for impacted dust or vapors to reach nearby receptors. The potential impacts will be reduced to a less than significant level through compliance with mandatory regulations requiring the contractor to identify and implement BMPs in the SWPPP to control dust during excavation. Thus, compliance with mandatory laws and regulations will ensure that impacts related to the PHC-impacted soils will be less than significant.

Demolition of Hazardous Building Components

Construction of the Project will include demolition of the existing structures on the Project site. Based on the age of the buildings to be demolished, they may contain hazardous building materials, including, but not limited to, ACMs, LBP on the interior and exterior of the buildings, and equipment that could contain polychlorinated biphenyls (PCBs) or bis(2-ethylhexyl) phthalate (DEHP). If present, such materials could present a public health risk if released during construction, resulting in a potentially significant impact.

Implementation of **Mitigation Measure HAZ-1** will reduce potential impacts from hazardous building materials by requiring pre-construction hazardous materials surveys and appropriate abatement and disposal practices prior to demolition. With implementation of the mitigation measure, the impact will be less than significant.

Extraction Process

Extraction operations will be performed using volatile solvent extraction methods (e.g., butane) and non-volatile carbon dioxide, nitrogen and potentially other non-volatile compounds and extraction methods, as regulated and approved by the City. Permitted volatile solvents include ethanol, butane, and all solvents described in HSC Section 11362.3 (i.e., a solvent that is or produces a flammable gas or vapor that, when present in the air in sufficient quantities, will create explosive or ignitable mixture). The extraction operations will include a closed-loop system meeting the federal Food, Drug, and Cosmetic Act, including use of authorized solvents only, the prevention of off-gassing, and certification by a California licensed engineer. In accordance with the City of Sana Rosa Cannabis Ordinance, the extraction equipment will be inspected annually and recertified by a California licensed engineer. Waste generated from solvent extraction will be managed in accordance with California hazardous waste regulations (22 CCR). Therefore, mandatory compliance with local and state building codes and hazardous waste laws and regulations will ensure that potential impacts related to extraction operations are less than significant.

Hazardous Materials Storage

In addition to extraction solvents, cleaning products, fertilizers, high-powered lights, and pesticides may be used onsite for routine cleaning and cultivation. In accordance with the California Health and Safety Code provisions and the CalARP program, the Project will prepare a Hazardous Materials Business Plan (HMBP) and/or Risk Management Plan (RMP) if the facility will store more than the threshold quantity of a regulated substance. These plans will include emergency response procedures to coordinate response in the event of a release and chemical accident prevention measures. In addition, in accordance with CDFA, BCC, and MCSB license requirements, the Project will comply with all pesticide label directions, store chemicals in a secure building or shed to prevent access, and contain any chemical leaks and immediately clean up any spills. The Project will be overseen by CDFA, BCC, and MCSB which ensures compliance with regulations through inspection and enforcement methods. With adherence to existing hazardous materials laws and the requirements of the CDFA licensing program, the risk of accidental releases of hazardous materials from Project activities that could cause substantial hazards is considered low. Therefore, mandatory compliance with state and local laws and regulatory programs will ensure that potential impacts related to hazardous materials storage are less than significant.

Overall Impact Conclusion

The Project will not create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials, or though reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. With implementation of **Mitigation Measure HAZ-1**, impacts will be less than significant.

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

No Impact. There are no schools within ¼ mile of the Project site. The nearest school to the Project site is Kawana Elementary School, located approximately 0.8 mile north. Therefore, the Project has no potential to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. There will be no impact.

d) Would the project 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?

Less Than Significant Impact. The provisions in Government Code Section 65962.5 are commonly referred to as the "Cortese List" (California Environmental Protection Agency [CalEPA] 2019a). CalEPA identifies the following data resources that provide information regarding the facilities or sites identified as meeting the "Cortese List" requirements pursuant to Government Code Section 65962.5:

- List of Hazardous Waste and Substances sites from Department of Toxic Substances Control (DTSC) EnviroStor database.
- List of Leaking Underground Storage Tank Sites by County and Fiscal Year from Water Board GeoTracker database.
- List of solid waste disposal sites identified by Water Board with waste constituents above hazardous waste levels outside the waste management unit.

- List of “active” Cease and Desist Orders (CDOs) and Cleanup and Abatement Orders (CAOs) from the Regional Water Boards.
- List of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code, identified by DTSC.

The Project site is located in the SLIC database (cleanup program sites), which is included in the GeoTracker database (State Water Quality Control Board 2019); however, SLIC sites are not a result of leaking underground storage tanks. The Project site is not listed in the Leaking Underground Storage Tank (LUST) database, which was compiled pursuant to Government Code Section 65962.5. As discussed above, former operations at the Project site resulted in a small area of PHC-impacted soils left in place beneath the mower shop concrete floor due to inaccessibility. The former mower shop will be razed and the concrete floor removed as part of the site preparation for redevelopment. The PHC-impacted soils will be excavated during grading activities and properly disposed of off-site pursuant to mandatory laws and regulations (HSC 17362.1 through 17362.3; CCR § 17362.1 through § 17362.3).

The Project site is not listed on the Envirostor database (DTSC 2019), the list of solid waste disposal sites (CalEPA 2016), the active CDO and CAO list (CalEPA 2019b), or a list of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code, identified by DTSC (CalEPA 2019c).

Therefore, although the Project will be located on a site which is included on a list of hazardous materials sites, it is not on a list compiled pursuant to Government Code Section 65962.5. In addition, the removal of the soils that may contain hazardous materials with comply with all regulatory requirements, and as a result, would not create a significant impact. Therefore, the Project will have no impact with respect to creating a significant hazard to the public or the environment as a result of being located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

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 for people residing or working in the project area?

No Impact. The Project site is not located within an airport land use plan, and there are no public airports or public use airports within 2 miles of the Project site, and no private airstrips in the vicinity of the Project site. The closest airports to the Project site are (1) Sonoma County airport, which is located approximately 8.5 miles northwest; and (2) Graywood Ranch Airport-CA39 on Gray Road in Santa Rosa, which is approximately 7.8 miles east. The Project site is not located within the boundaries of the land use compatibility plan for either airport.

According, the Project is not located within an airport land use plan, or within two miles of a public airport or public use airport, or within the vicinity of a private airstrip. Therefore, the Project will not result in an aviation-related safety hazard or excessive noise for people residing in or working in the Project area. There will be no impact.

f) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact. As discussed in Section 17 (Transportation), the Project will not significantly alter the existing circulation pattern in the Project area or adversely impact emergency response or emergency evacuation plans. Main access to the facility will be located off of Yolanda Avenue with a guardhouse station to monitor all of the incoming and outgoing staff employees, supply materials, green waste, and product shipments. The relatively volume of vehicle trips, appropriate site plan, and guardhouse controls will ensure that the Project will not impair or interfere with vehicles traveling along Yolanda Avenue in an emergency.

With a few exceptions for minor projects that are not applicable here, the City requires design review approval for all projects requiring a Building Permit and all exterior physical changes to existing structures that may or may not require a Building Permit (SRCC Chapter 20-50 and 20-52). Proposed parking and circulation plans will be reviewed by the City as part of the building permit process to ensure that the Project's ingress/egress driveways and roads for adequate for accommodating emergency vehicles. The Project sponsor will submit a construction plan to the City for review prior to development. Issuance of permits would be contingent on confirmation by the City that the Project does not interfere with emergency access during development in accordance with the City of Santa Rosa Local Hazard Mitigation Plan Mitigation Action 2.5 (Michael Baker International 2016). Compliance with mandatory design review requirements would further ensure that the Project will not interfere with an adopted emergency response plan or emergency evaluation plan.

Accordingly, the Project will not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Impacts will be less than significant.

g) Would the project expose people or structures, either directly or indirectly, to significant risk of loss, injury or death involving wildland fires?

Less Than Significant Impact with Mitigation Incorporated. California Department of Forestry and Fire Protection (CalFire) identifies the Project area as being located in a Non-Very High Fire Hazard Severity Zone within the Local Responsibility Area (LRA; CalFire 2008). The area across Petaluma Hill Road to the southeast of the Project site is identified as a Moderate Fire Hazard Severity Zone in the State Responsibility Area (SRA) in the CalFire Fire Hazard Severity Zone Viewer (CalFire 2018). Per the City of Santa Rosa Wildland-Urban Interface Map, the Project is not located within the Wildland-Urban Interface (WUI) fire threat (City of Santa Rosa 2009a, Michael Baker International 2016). However, CalFire Fire and Resource Assessment Program Wildland Urban Interface identifies the Project as being within the WUI (CalFire 2003). Given the discrepancy in data, and the recent wildfires in Santa Rosa, it is conservatively assumed that the Project site is located within the WUI.

Wildland fires are of high concern in the vicinity of the City, particularly given the 2017 fire season, and especially in expansive areas of native vegetation of brush, woodland, and grassland. Because the Project includes over 0.5 acre of undeveloped land, and because the area to the east of Petaluma Hill Road is largely undeveloped, there is the potential for a significant impact related to the exposure of people or structures to wildland fires.

The Project will be required to comply with mandatory state and local laws related to fire standards, which will reduce the potential impacts related to wildland fires. On September 20, 2007, the Building Standards Commission approved the Office of the State Fire Marshal's emergency regulations amending the California Code of Regulations (CCR), Title 24, Part 2, known as the California Building Code (CBC). The broad objective of the Wildland-Urban Interface Fire Area Building Standards is to establish minimum standards for materials and material assemblies and provide a reasonable level of exterior wildfire exposure protection for buildings in Wildland-Urban Interface Fire Areas. The Project will be required to comply with the requirements of the current version of the CBC at the time of project construction, which generally requires flammable materials be removed from around a building and buildings be constructed of fire-resistant material. Similarly, SRCC Section 18-44.4906.2 requires that structures located in SRAs, Very-high Fire Severity Zones in LRAs, and WUIs maintain the required hazardous vegetation and fuel management. SRCC Section 18-44.4907.1 requires that structures within the WUI of an LRA must maintain defensible space as outlined in Government Code Sections 51175 through 51189. In addition, as required under the CDFA Cannabis Regulations, the local fire department will be notified of the cultivation site if the Project sponsor entity is an indoor license type (per 3 CCR 8102(aa)). The project sponsor will also be responsible for compliance with the City of Santa Rosa Weed Abatement requirements, which include annual disking of the undeveloped portion of the property and the removal of dead vegetation and rubbish.

In addition, the Project will be required to implement **Mitigation Measure HAZ-2**, which requires the preparation and implementation of a Vegetation Maintenance Program, including an onsite fire hazard assessment consultation with a representative of the Santa Rosa Fire Department, identification of defensible space zone boundaries developed in accordance with the requirements of Government Code Section 51182, the maintenance measures to be taken within each zone (e.g., removal of dead material, maintaining "fuel breaks" such as the eastern driveway), and the frequency at which the maintenance measures will be performed (i.e., annually or less); and the performance of the maintenance measures at regular intervals. **Mitigation Measure HAZ-2** will thereby reduce the potentially significant impacts related to the exposure of people or structures to a significant risk of loss, injury or death involving wildland fires to less than significant.

Accordingly, the Project will not expose people or structures, either directly or indirectly, to significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. With mandatory compliance with state and local laws related to fire standards and implementation of **Mitigation Measure HAZ-2**, impacts would be less than significant.

9.3 Mitigation Measures

Mitigation Measure HAZ-1: Handling and Disposal of Hazardous Building Materials

Prior to issuance of grading and demolition permits, the Project sponsor shall retain a registered environmental assessor or a professional engineer to perform a hazardous building materials survey and shall submit the survey to the City for review and approval. The survey shall be designed to identify ACMs, LBP, electrical equipment containing PCBs, fluorescent lights containing mercury, or fluorescent light ballasts containing PCBs or DEHP. If any ACMs, lead-containing materials, or other hazardous components of building materials are identified, the Project sponsor shall be required to implement adequate abatement practices, such as containment and/or removal, in accordance with applicable regulations for the handling and removal of these materials, prior to demolition. Any PCB-containing equipment or fluorescent lights containing mercury vapors shall also be removed and disposed of in accordance with applicable regulations.

A written plan or notification of intent to demolish buildings shall be provided to the BAAQMD at least ten working days prior to commencement of demolition, even if no ACMs were identified during the hazardous building materials survey. If ACMs are identified, the demolition and removal of asbestos-containing building materials shall be subject to applicable California Occupational Safety and Health Administration (Cal/OSHA) and BAAQMD regulations (Regulation 11, Rule 2). If LBP is identified, then federal and state construction worker health and safety regulations shall be followed during demolition activities, including Title 17 of the CCR, Sections 35001 through 36000. If loose or peeling LBP is identified, it shall be removed by a qualified lead abatement contractor and disposed of in accordance with existing hazardous waste regulations.

Mitigation Measure HAZ-2: Prepare and Maintain Vegetation Maintenance Program

Prior to issuance of construction permits, the Project sponsor shall prepare and submit to the City for review and approval a site-specific vegetation maintenance program. The vegetation maintenance program shall include the following elements:

- an onsite fire hazard assessment consultation with a representative of the Santa Rosa Fire Department or similar;
- identification of defensible space zone boundaries, the maintenance measures to be taken within each zone (e.g., removal of dead material, maintaining “fuel breaks” such as the eastern driveway), and the frequency at which the maintenance measures will be performed (i.e., annually or less);
- and performance of the maintenance measures at applicable frequencies.

10. HYDROLOGY AND WATER QUALITY	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	☐	☒	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
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:				
i) Result in substantial erosion or siltation on- or off-site;	☐	☒	☐	☐
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; or	☐	☒	☐	☐
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?	☐	☒	☐	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☒	☐	☐

10.1 Existing Conditions

The Project site is located at 800 Yolanda Avenue in Santa Rosa, California. The existing parcel is 5.53 acres in size and consists of a primary single-family residence, two secondary single-family residences, a barn, a storage shed and landscaped areas. The western portion of the Project site (3.13 acres) is entirely compacted gravel and was the location of a former landscape contractor's yard. The eastern portion of the Project site contains pastureland that has been annually disked and mowed and also includes a gravel driveway.

There is a small unnamed seasonal drainage at the far southeast corner of the Project site. This seasonal ephemeral drainage originates from a culvert under Petaluma Hill Road and flows in a southerly direction. The ephemeral drainage channel is not mapped as "Waters of the U.S.", but is considered "other Waters of the U.S." and part of the Colgan Creek tributary system (SCS Engineers 2009). The site is located within the North Coast Hydrologic Region, Russian River Hydrologic Unit, Middle Russian River Hydrologic Area, Santa Rosa Hydrologic Sub-Area, Laguna Super Planning Watershed and Laguna de Santa Rosa Planning Watershed. Surface water runoff from the site flows in a southerly direction and appears to sheet flow into the drainage channel at the southeast end of the site. Portions of the site along the northern site boundary flow north into the roadside drainage ditch along Yolanda Avenue. Storm drain inlets are located in the gravel area on the western portion of the site that connect to the roadside drainage ditch along Yolanda Avenue. Colgan Creek is located approximately 3,000 feet north of the Project site.

10.2 Regulatory Background

The Clean Water Act (CWA) of 1977, as administered by the USEPA, seeks to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The CWA authorizes the USEPA to implement water-quality regulations. The National Pollutant Discharge Elimination System (NPDES) permit program under Section 402(p) of the CWA controls water pollution by regulating stormwater discharges into the waters of the United States. California has an approved State NPDES program. The USEPA has delegated authority for water permitting to the State Water Resources Control Board (SWRCB) and the North Coast Regional Water Quality Control Board (RWQCB). The RWQCB has established a Water Quality Control Plan for the North Coast Region (Basin Plan) that describes regional water quality and quantity problems and presents applicable beneficial uses and water quality objectives for surface waters and groundwater. The Basin Plan includes specific prohibitions, action plans, and policies which form the basis for the control of water quality for the region. The SWRCB administers the NPDES permit program which includes the General Permit for Storm Water Discharges Associated with Construction Activities and municipal permits which cover new development projects within the City of Santa Rosa.

The NPDES permit program regulates municipal and industrial discharges to surface waters of the United States from their municipal separate storm sewer systems (MS4s). Under the NPDES program, all facilities that discharge pollutants into Waters of the United States are required to obtain a NPDES permit. Requirements for stormwater discharges are also regulated under this program.

The RWQCB has issued a NPDES Storm Water Permit jointly to the City of Santa Rosa, County of Sonoma and the Sonoma County Water Agency (SCWA). The Project is subject to the Waste Discharge Requirements (WDR) of the Municipal Regional Permit (MRP) Order Number R1-2015-0030 and NPDES Permit Number CA0025054, issued on November 19, 2015. The MRP is effective as of January 6, 2016, and expires on January 5, 2021. The permit governs a variety of activities in the City of Santa Rosa such as industrial and commercial businesses, new and redevelopment projects, construction sites, storm drain operation and maintenance, creek monitoring, pesticide applications, and illegal dumping of water and other pollution in the City's storm drain.

Effective in 2015, the Sustainable Groundwater Management Act (SGMA) requires local regions to create groundwater sustainability agencies (GSAs) and to adopt groundwater management plans. The SGMA identifies 43 groundwater basins as high-priority and 84 as medium-priority statewide. These 127 basins must adopt groundwater management plans by 2020 or 2022, depending upon whether the basin is in critical overdraft. GSAs will have until 2040 or 2042 to achieve groundwater sustainability. The Sonoma Valley GSAs are required by the SGMA to develop and implement Groundwater Sustainability Plans (GSPs). The newly-formed GSAs in Sonoma County – Petaluma Valley, Santa Rosa Plain, and Sonoma Valley – are required to develop GSPs by 2022. The GSPs are 20-year plans to ensure the sustainable use of groundwater within these respective groundwater basins (these three basins are classified as medium-priority groundwater basins). SGMA defines “sustainable groundwater management” as the “management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results. “Undesirable result” means any of the following effects caused by groundwater conditions occurring throughout the basin: chronic lowering of groundwater levels, but excluding reductions in groundwater levels during a drought if they are offset by increases in groundwater levels during other periods; significant and unreasonable reductions in groundwater storage; significant and unreasonable seawater intrusion; significant and unreasonable degradation of water quality; significant and unreasonable land subsidence; and/or surface water depletions that have significant and unreasonable adverse impacts on beneficial uses.

On October 17, 2017, the SWRCB adopted the Cannabis Cultivation Policy – Principles and Guidelines for Cannabis Cultivation (Cannabis Policy) and General Waste Discharge Requirements and Waiver of Waste Discharge Requirements for Discharges of Waste Associated with Cannabis Cultivation Activities (Cannabis General Order). The SWRCB established the program to address potential water quality and quantity issues related to cannabis cultivation and to meet the directives of Senate Bill (SB) 837 and the MAUCRSA. For new cultivation facilities, the SWRCB program supersedes the previously established NCRWQCB water quality regulatory program for cannabis cultivators with 2,000 square feet or more of cannabis operations.

Local Regulations

The Santa Rosa Area Standard Urban Storm Water Mitigation Plan (SUSMP) requirements were adopted by the North Coast Regional Water Quality Control Board in June 2013. The SUSMP requirements are part of the Storm Water Management Plan that has become an enforceable part of the reissued municipal storm water National Pollutant Discharge Elimination System (NPDES) permit for the City of Santa Rosa, the County of Sonoma, and the Sonoma County Water Agency (EOA 2005). The SUSMP applies to projects that require a discretionary permit (such as a conditional use permit) and create 1 acre or more of new impervious surface.

The Santa Rosa General Plan includes the following water quality and hydrology policies applicable to the Project:

- PSF-I: Manage, maintain, and improve stormwater drainage and capacity.
- PSF-I-1: Require dedication, improvement, and maintenance of stormwater flow and retention areas as a condition of approval.
- PSF-I-2: Require developers to cover the costs of drainage facilities needed for surface runoff generated as a result of new development.
- PSF-I-3: Require erosion and sedimentation control measures to maintain an operational drainage system, preserve drainage capacity, and protect water quality.
- PSF-I-6: Require implementation of Best Management Practices to reduce drainage system discharge of non-point source pollutants originating from streets, parking lots, residential areas, businesses, industrial operations, and those open space areas involved with pesticide application.

10.3 Impact Analysis

This section analyzes the Project’s potential impacts on hydrology and water quality. The Project will be subject to: the California Construction General Permit, which requires the preparation of a Stormwater Pollution Prevention Plan that identifies potential pollutants, routes of exposure, and Best Management Practices (BMPs) to minimize the discharge of sediment laden stormwater and other pollutants; the Low Impact Development standards established by the City of Santa Rosa to reduce stormwater pollutant loading and increase groundwater recharge through incorporation of design features and landscaping that treat and retain and/or detain stormwater onsite prior to discharge; and the State’s Cannabis Policy for wastewater discharge. The increase in impervious surfaces associated with the Project has the potential to increase the stormwater runoff from the property compared to pre-project conditions. The Project is consistent with the Santa Rosa General Plan; therefore, the City has adequate existing water and wastewater capacity to serve the Project. The potentially significant impacts associated with the increase in impervious area will would be reduced to less than significant with incorporation of **Mitigation Measure HYD-1**.

A discussion of each environmental issue included under Section 10 is presented below.

a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

Less Than Significant Impact with Mitigation Incorporated.

Stormwater: During construction (grading and construction of facilities/buildings), the Project footprint on the western portion of the site will be grubbed (vegetation removed) and graded, infrastructure will be installed, and the cannabis cultivation building and utility building will be constructed. The construction will remove existing vegetation and compacted soils and will disturb soils on the western portion. Soil disturbance could result in either potential soil erosion or sedimentation if the construction occurs during the rainy season, or erosion as a result of dust and wind-blow aerial deposition of dirt offsite that could eventually be discharged to nearby waterways during storm events. The Project will be required to comply with the California Construction General Permit (CGP Water Quality Order 99-08-DWQ; "CGP") since the western portion (i.e., the area to be disturbed) is greater than 1 acre in size. The CGP requires preparation and implementation of a Stormwater Pollution Prevention Plan that identifies potential pollutants, routes of exposure, and Best Management Practices (BMPs) to minimize the discharge of sediment laden stormwater and other pollutants. The CGP may also require stormwater sampling to determine the effectiveness of the BMPs, implementation of corrective actions, and reporting. In addition, the Project will be required to comply with the City's grading permit, MRP new development stormwater management requirements, and associated erosion and sediment control requirements. Compliance with these mandatory state and city construction stormwater requirements will ensure that construction activities will not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality. Construction impacts will be less than significant.

Project operations will involve new impervious surfaces, including the building roof top, hardscape, and parking areas. This increase in impervious surfaces has the potential to increase the stormwater runoff from the property compared to pre-project conditions. Increased stormwater runoff may include an increase in both the volume of runoff and the rate of runoff into the nearby creek, which in turn has the potential to increase sediment loading and in-channel scouring/erosion.

The MRP and the City's stormwater ordinance require the Project to comply with the City's 2017 Low Impact Development (LID) design standards. The LID standards are designed to reduce stormwater pollutant loading and increase groundwater recharge through incorporation of design features and landscaping that treat and retain and/or detain stormwater onsite prior to discharge. The LID standards include the following:

- The Project must capture (through infiltration and/or reuse) 100% of the volume of runoff generated by a 1.0 inch 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method.
- The Project must achieve a Treatment Requirement of 100% of the flow calculated using the modified Rational Method and a known intensity of 0.20 inches per hour.

The proposed stormwater drainage features for the Project must be designed to meet the LID standards in accordance with the MRP and the City's 2017 stormwater ordinance. Compliance with these LID standards will reduce the Project's long-term operational stormwater impacts to a less than significant level.

Mitigation Measure HYD-1 will require the Project sponsor to submit documentation of compliance with LID standards for City review and approval prior to start of construction. With compliance with the LID standards and implementation of **Mitigation Measure HYD-1**, project operations will not violate any water quality standards or waste discharge requirements. Operational impacts will therefore be less than significant.

Wastewater: The Project includes a water reclamation system for cultivation operations to recapture and reconstitute usable water. The system will reclaim 70% to 90% of the water used.

The cannabis cultivation operation proposes to grow plants in containers and water plants using a drip irrigation system. Irrigation runoff will be collected in trays and transferred to the onsite reclamation system. Wastewater generated during cannabis cultivation or processing activities will pass through a multi-media filter to prevent the discharge of contaminants, residue, sediment, or nutrients from cannabis production or processing activities to the City's wastewater system. Depending on the efficiency of the wastewater reclamation system, between 2,700 gpd and 4,100 gpd of wastewater will be discharged to the City's sanitary sewerage system (Terraphase 2019a; Attachment 1). The City operates a 6-inch-diameter sewer line along Yolanda Avenue, adjacent to the Project site (City of Santa Rosa 2018b). The wastewater will be transported via sanitary sewer to the Laguna Sub-Regional Wastewater Treatment Plant (LWTP) for treatment and disposal. No new wells or additional water or sewer infrastructure will be required beyond the onsite sewer connections.

All Project discharges will be required to comply with the State's recently issued Cannabis Policy and Cannabis General Order. Under the Cannabis Policy, commercial cannabis cultivation activities that occur within a structure with a permanent roof, a permanent relatively impermeable floor (e.g., concrete or asphalt paved), and that discharge all industrial wastewaters generated to a community sewer system consistent with the sewer system requirements, are classified as conditionally exempt, meaning that wastewater impacts will be less than significant. The Project will be required to obtain documentation of its conditionally exempt status prior to obtaining a CDFA commercial cannabis cultivation license. In addition, based on the volume of wastewater that will be discharged to the City's sanitary sewerage, the wastewater will have to meet water quality criteria imposed by LWTP prior to discharge into the sanitary system. Mandatory compliance with these regulatory requirements will ensure that Project wastewater does not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.

With mandatory regulatory compliance and implementation of **Mitigation Measure HYD-1**, the Project will not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality. Impacts will be less than significant with mitigation.

b) Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Less Than Significant Impact. The Project will obtain water from the City. The City can receive up to 56.6 million gallons of water per day from the Sonoma County Water Agency. Water used in cultivation operations and for sanitary purposes and incidental usage (e.g., cleaning, ancillary operations, landscape irrigation, etc.) will increase the total water usage on the Project site to approximately 12,000 gpd (Terraphase, 2019a). However, depending on the efficiency of the wastewater reclamation system, the Project would only require an additional 5,300 to 6,800 gpd (Id.). This water will be provided by the existing connection to the City's public water supply via connection to the existing 12-inch main on Yolanda Avenue. The Project would not directly use groundwater supply. Nor would the Project interfere substantially with groundwater recharge because a substantial portion of the area on the site will remain impervious.

The City has confirmed that water and wastewater service is available for new development projects that are consistent with the Santa Rosa General Plan (City of Santa Rosa Water Department 2018a, 2018b). As discussed in Section 11 (Land Use) and throughout this document generally, the Project is consistent with the Santa Rosa General Plan and the zoning for the site. Therefore, the adopted planning documents of the City ensure that there is adequate existing water and wastewater capacity to serve the Project. Hence, the City will be able to meet the Project's water demands without the need for installation of new wells, securing new water sources or entitlements, or increased groundwater pumping rates. In addition, based on the relatively small scale of the project development footprint, compared to the remaining open/impervious portions of the site, it will not significantly affect groundwater recharge.

The Sonoma Valley GSAs are required by state law, the SGMA, to develop and implement GSPs. The newly-formed GSAs in Sonoma County – Petaluma Valley, Santa Rosa Plain, and Sonoma Valley – are required to develop GSPs by 2022. The GSPs are 20-year plans to ensure the sustainable use of groundwater within these respective groundwater basins (the three basins are classified as medium-priority groundwater basins). The goal of the GSPs are to establish standards for "sustainability" of groundwater management and use, and to determine how each basin will achieve these standards. As discussed above, implementation of the Project is not anticipated to significantly contribute to depletion of groundwater resources and will not impact the development and implementation of the local GSP.

Accordingly, the Project will not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin. Project impacts will be less than significant.

c) Would the project 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:

i) result in substantial erosion or siltation on- or off-site?

Less than Significant Impact with Mitigation Incorporated. The Project will not substantially alter the existing drainage pattern of the site or area. In particular, the Project will not alter the course of any stream or river. The only water feature on the site is the ephemeral drainage channel that feeds into Colgan Creek. As discussed in Section 4 (Biology), the Project will avoid impacts to this feature. In addition, the Project has no potential to directly or indirectly affect other Waters of the United States or Waters of the State through direct removal, filling, hydrological interruption, or other means.

Nevertheless, as discussed under impact (a), Project construction and operations will involve the creation of new impervious surfaces, including the building of roof top, hardscape, and parking areas. This increase in impervious surfaces has the potential to increase stormwater runoff into Colgan Creek, which in turn has the potential to increase sediment loading and in-channel scouring/erosion.

Implementation of **Mitigation Measure HYD-1** will require the Project sponsor to submit documentation of compliance with LID standards for City review and approval prior to start of construction. Compliance with LID standards will limit erosion or siltation on- or off-site and reduce this impact to a less than significant level. In addition, construction work will be required to comply with the State General Construction Stormwater Permit and the City's Municipal Separate Storm Sewer System (MS4) permit requirements (i.e., erosion/sediment control and post-construction stormwater requirements).

With implementation of **Mitigation Measure HYD-1** and compliance with mandatory regulations, the Project will not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner, which would result in substantial erosion or siltation on- or off-site. Impacts will be less than significant with mitigation.

ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?

Less Than Significant Impact with Mitigation Incorporated. As discussed under impact (c)(i), the Project will not substantially alter the existing drainage of the site area and will not alter the course of any stream or river. In addition, the Project site and surrounding are not at significant risk of flooding. The current Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) show that the Project site is far removed from any high risk (Flood Zone AE) flood zone (FEMA 2012). The nearest Zone AE is located over 1,600 feet northeast of the Project site. The site is mapped as a Zone X (low risk for flooding).

Nevertheless, the Project has the potential to increase the stormwater discharge rate from the site under the 10-, 25-, and 100-year rain event conditions by 125% over pre-project conditions (Terraphase, 2019b).

Implementation of **Mitigation Measure HYD-1** will require the Project sponsor to submit documentation of compliance with LID standards for City review and approval prior to start of construction. Compliance with LID standards will reduce this impact to a less than significant level by retaining/detaining stormwater onsite, and thereby reducing stormwater discharge and preventing flooding on-site or off-site.

Therefore, with implementation of **Mitigation Measure HYD-1**, the Project will not substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite. Impacts will be less than significant with mitigation.

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?

Less Than Significant Impact with Mitigation Incorporated. As discussed above, the Project increase runoff by approximately 125% must comply with LID standards and not result in a substantial increase in runoff in the post-project condition compared to pre-project conditions. Thus, the Project would not create an increase in runoff water that has the potential to exceed the capacity of the City's existing stormwater drainage system. Similarly, the Project must comply with LID, SWPPP, BMP, and discharges requirements that minimize the potential to increase pollutants in runoff from newly created or replaced impervious surfaces or contribute to exceedances of water quality objectives in receiving waters.

Specifically, implementation of **Mitigation Measure HYD-1** will require the Project sponsor to submit documentation of compliance with stormwater LID standards for City review and approval prior to start of construction. Compliance with LID standards will ensure that Project runoff does not exceed the capacity of the City's existing drainage systems. LID design aims to mimic pre-project site hydrology as well as protect water quality. Runoff from roofs and impervious areas is dispersed to landscaped areas or routed to LID/bioretention facilities on the site which will attenuate stormwater peak flows and reduce the volume of off-site discharges. LID facilities infiltrate some runoff and also typically feature underdrains to convey treated stormwater. LID practices provide effective stormwater treatment by filtering pollutants and sequestering them within soils. The implementation of techniques and criteria in accordance with the LID standards will minimize increases in site runoff and address the potential long-term operational impacts on stormwater quality.

With implementation of **Mitigation Measure HYD-1**, the Project will not 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. Impacts will be less than significant with mitigation.

d) Would the project 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 in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

No Impact. As discussed above, the Project site is within a low risk flood zone (Flood Zone X) and is far removed from any high-risk flood zone (Flood Zone AE). The nearest area mapped as Flood Zone AE is located over 1,600 feet northeast of the Project site (FEMA 2012). In addition, the Project site is not located within a dam failure or inundation zone as mapped by Sonoma County (Sonoma County Hazard Mitigation Plan, Dam Failure Inundation Map). The Project will not expose people or structures to a significant flood risk, including flooding as a result of the failure of a levee or dam.

Additionally, the Project site is located inland from Pacific Ocean and is not located near any water bodies that could generate seiche, tsunami, or mudflow.

Accordingly, the Project will not 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 in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation. There will be no impact.

e) Would the project 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 conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Less Than Significant Impact with Mitigation Incorporated. As discussed above, with mitigation, the Project does not have the potential to substantially increase runoff by compared to pre-project conditions. Accordingly, the potential to increase pollutants in runoff from newly created or replaced impervious surfaces which could cause or contribute to exceedances of water quality objectives in receiving waters is not substantial.

The local Water Quality Control Plan for the North Coast Region (Basin Plan) describes regional water quality and quantity problems and presents applicable beneficial uses and water quality objectives for surface waters and groundwater within the Region. The water quality objectives contained in the Basin Plan are prescribed for the purposes of protecting the beneficial uses. The Basin Plan describes implementation measures, which include specific prohibitions, action plans, and policies which form the basis for the control of water quality for the region. Implementation of the Project will include best management practices and LID facilities as described below to address potential water quality concerns. The Project, with mitigation, is not expected to conflict with or obstruct implementation of the Basin Plan.

Sonoma Valley GSAs are required by the SGMA, to develop and implement GSPs. Implementation of the Project and its associated impervious surfaces is not expected to significantly impact local groundwater recharge rates or contribute to depletion of groundwater resources and should not impact the development and implementation of the local GSP.

Implementation of **Mitigation Measure HYD-1** will require the Project sponsor to submit documentation of compliance with LID standards (discussed above) for City review and approval prior to start of construction. Compliance with LID standards will ensure that Project runoff does not substantially degrade water quality. The implementation of techniques and criteria in accordance with the LID standards will mitigate increases in site runoff and address the project's potential long-term operational impacts on water quality.

With implementation of **Mitigation Measure HYD-1**, the Project would not create or contribute runoff water which would substantially degrade water quality or conflict with or obstruct implementation of the Basin Plan or the local GSP. Impacts will be less than significant with mitigation.

10.4 Mitigation Measures

Mitigation Measure HYD-1: Compliance with City's LID Requirements

Prior to issuance of the City Building Permit, the Project sponsor shall submit documentation for the City Engineer's review and approval, demonstrating the Project's compliance with the City of Santa Rosa LID stormwater BMP system design requirements. The Project sponsor's documentation shall include a technical demonstration showing how the Project drainage BMPs satisfy the City's program technical design and sizing requirements. Without limitation, the Project sponsor shall demonstrate compliance with the following key LID requirements:

- Achievement of a retention requirement (hydromodification control) of 100% Volume Capture: The project must capture (through infiltration and/or reuse) 100% of the volume of runoff generated by a one-inch 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method.
- Achievement of a Treatment Requirement of 100% of the flow calculated using the modified Rational Method and a known intensity of 0.20 inch per hour.

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

11.1 Environmental Setting

The Project site is currently unoccupied. The western portion of the Project site is covered with compacted gravel and was the location of a former landscape contractor’s yard and vacant residence, which remain onsite with several ancillary buildings. The eastern portion of the Project site, covering approximately 2.4 acres, contains non-native grassland. The site is zoned Light Industrial (City of Santa Rosa 2015), is designated light industry under the Santa Rosa General Plan, and is eligible for development with a medicinal cannabis business. The Project site is located at the southern Urban Growth Boundary (UGB) in an area recognized in the Santa Rosa General Plan as a City “Entry and Corridor” (City of Santa Rosa 2009d).

Adjacent and nearby properties are zoned Light Industrial to the north across Yolanda Avenue, Light Industrial and General Industrial to the west, Planned Development and Single-Family Residential (this property currently contains a residence and farmland) to the south, and Community Shopping Center to the east across Petaluma Hill Road, which allows a mix of commercial/retail and residential uses although this property currently contains the Cunningham Dairy. The eastern segment of Yolanda Avenue (which includes the Project site) contains predominantly industrial uses of a moderate-to-low intensity, while the west segment of Yolanda Avenue contains predominantly retail uses of a high intensity.

11.2 Impact Analysis

This section analyzes the Project’s potential land use and planning impacts under the thresholds from Appendix G of the CEQA Guidelines. This analysis is based on the Santa Rosa General Plan, Santa Rosa Municipal Code (including the Zoning Ordinance and Comprehensive Cannabis Policy Ordinance), zoning and land use maps, and other applicable land use and planning materials.

The Project will not divide an established community, and is consistent with the City of Santa Rosa Zoning, Santa Rosa General Plan, CDFA's Land Use Regulations, and Habitat Conservation Plans and Natural Community Conservation Plans.

A discussion of each environmental issue included under Section 11 is presented below.

a) Would the project physically divide an established community?

No Impact. The Project site is located at the edge of the UGB in an area of the City identified as an entry point. As illustrated in Figure 11.2 – Site Vicinity, in the project description, the site is on mostly vacant land, is bounded by a major roadway to the west (followed by more open land) and industrial uses to the north and west. One corner of the site abuts a residential use, but in no way is the project capable of physically dividing that residential community. As a result, Project site itself has no potential to physically divide an established community. In addition, the Project's proposed cannabis cultivation use is consistent with the Light Industrial zoning and will be complement and integrate to the surrounding areas, including the existing industrial uses located west and north of the Project site along Yolanda Avenue. Moreover, the Project's building footprint will be small relative to the 5.53-acre site, and as discussed in the Project Description, no development is proposed for the eastern portion of the site. For all of these reasons, the Project has no potential to physically divide an established community. The Project will have no impacts.

b) Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

Less than Significant Impact.

City of Santa Rosa Zoning: The Project is consistent with the City's Zoning Ordinance. The Project Site is zoned Light Industrial (IL). This zoning district "is applied to areas appropriate for some light industrial uses, as well as commercial service uses and activities that may be incompatible with residential, retail, and/or office uses. Residential uses may also be accommodated as part of work/live projects." (SRCC Section 20-24.020(B).3) The IL zoning district permits or conditionally permits a variety of manufacturing, processing, storage, and warehouse, wholesaling and distribution uses, along with accessory office uses (SRCC Section 20-24.030; Table 2-10). Under the Santa Rosa Comprehensive Cannabis Policy Ordinance (SRCC Chapter 20-46), cannabis uses are permitted in the Light Industrial (IL) zoning district, subject to a Minor or Major Conditional Use Permit (depending on size and extraction method). As detailed in Section III.4, the Project would be required to meet the following conditions for project approval under the Comprehensive Cannabis Policy Ordinance:

1. The proposed use would be allowed within the applicable zoning district and would comply with all other applicable provisions of the Zoning Code and the City Code. *As discussed above, the Project site is zoned IL, which permits or conditionally permits a*

variety of manufacturing, processing, storage, and warehouse, wholesaling and distribution uses, along with accessory office uses (SRCC Section 20-24.030; Table 2-10).

2. The proposed use would be consistent with the Santa Rosa General Plan and any applicable specific plan. *The discussion in following section "City of Santa Rosa General Plan" addresses project conformance with the General Plan*.

3. The design, location, size, and operating characteristics of the proposed activity would be compatible with the existing and future land uses in the vicinity. *As discussed in Section 1 (Aesthetics) and in following section "City of Santa Rosa General Plan", the Project design, location, size, and operating characteristics are compatible with the existing and future land uses in the vicinity.*

4. The proposed site would be physically suitable for the type, density, and intensity of use being proposed, including access, utilities, and the absence of physical constraints*. The Project site is served by the City of Santa Rosa water and sewer service, as discussed in Section 19 (Utilities and Service Systems). The transportation impacts of the Project are found to be less than significant, as discussed in Section 17 (Transportation).*

5. Granting the permit would not constitute a nuisance or be injurious or detrimental to the public interest, health, safety, convenience, or welfare, or materially injurious to persons, property, or improvements in the vicinity and zoning district in which the property is located. *As discussed in the Project Description, a security plan would be implemented and would consist of a monitored security system, access control, surveillance cameras, and security patrols to secure the property. The proposed Project would utilize the services of a minimum of three security guards, who will monitor and patrol the Project site continuously.* ***Mitigation Measure AQ-1*** *requires the preparation and implementation of an Odor Control Plan in order to ensure that Project operations would not expose neighboring properties to objectionable cannabis odors.*

6. The proposed Project has been reviewed in compliance with CEQA. *This document and the associated review and decision making are/will be in accordance with CEQA*.

City of Santa Rosa General Plan: The Project is also consistent with the Santa Rosa General Plan 2035. The Project is located within the UGB, thereby preventing urban sprawl, in accordance with Goal GM-A. The Santa Rosa General Plan designates the project site for "Light Industry" (City of Sant Rosa 2016). This designation "accommodates light industrial, warehousing and heavy commercial uses" (City of Santa Rosa 2009d). Appropriate uses include "auto repair, bulk or warehoused goods, general warehousing, manufacturing/assembly with minor nuisances, home improvement retail, landscape materials retail, freight or bus terminals, research oriented industrial, accessory offices, and employee serving commercial uses, and services with large space needs, such as health clubs." (Id.) Consistent with the Santa Rosa Comprehensive Cannabis Policy Ordinance, the City finds cannabis uses consistent with the "Light Industry" land use designation. The Project is also consistent with the applicable goals and policies of the Santa Rosa General Plan. These include without limitation the following:

- *LUL-K: Protect industrial land supply and ensure compatibility between industrial development and surrounding neighborhoods.*

  The Project will protect industrial land supply by locating an industrial use on an industrial zoned site. The Project will also be compatible with the surrounding neighborhood as detailed below in LUL-K-1 and LUL-K-2.

- *LUL-K-1: Require industrial development adjacent to residential areas to provide buffers, and institute setback, landscaping, and screening requirements intended to minimize noise, light, and glare and other impacts.*

  The Project will provide adequate buffers, setbacks, landscaping, and screening, as required by code, to minimize noise, light, glare and other impacts on nearby residential areas. The building will be set back 70 feet along the southern property line (rear), which abuts residences, and 27 feet along the western property line (side), which abuts light industrial uses. The Light Industrial Zoning District requires a rear minimum 10-foot setback when adjacent to a residential zone and no side minimum setback is required for non-residential uses. The front of the building will be set back 104 feet from the property line along Yolanda Avenue. The zoning code has no front setback minimum setback requirement[4] (City of Santa Rosa 2019). An 8-foot tall perimeter wall will screen the facilities from adjacent properties in accordance with SRCC Section 20-30.060(H). Additionally, trees will be planted along the interior of the perimeter walls that at maturity would screen the upper portion of the building from adjacent residences and light industrial uses. Exterior lighting is designed to not spill over onto the adjacent residential and light industrial properties.

- *LUL-K-2: Require that outdoor storage areas be screened from any public-right-of way.*

  The Project parking areas, loading dock facilities, utilities and storage areas will be screened by an 8-foot tall perimeter wall. The wall will be constructed of precast concrete panels with metal insert panels to provide visual interest.

- *PSF-F: Ensure that an adequate supply of water is available to serve existing and future needs of the city.*

- *PSF-G: Ensure that adequate sewer capacity is available to serve existing and future needs of the city.*

[4] The Design Review process may require larger setbacks.

- *PSF-H: Meet the city's solid waste disposal needs, while maximizing opportunities for waste reduction and recycling.*

  As detailed in Section 19 (Utilities and Service Systems), the existing water supplies, facilities and infrastructure are sufficient to meet the demands of the project. The Project will not require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities. The Project will be served by Redwood Landfill and Recycling Center in Marin County or Potrero Hills Landfill in Solano County, which both have sufficient permitted capacity to accommodate the project's solid waste disposal needs for all phases and aspects of the project, including construction, demolition, and operations.

- *NS-B: Maintain an acceptable community noise level to protect the health and comfort of people living, working and/or visiting in Santa Rosa, while maintaining a visually appealing community.*

  Santa Rosa General Plan policies relating to noise, and which are applicable to the Project, are discussed in Section 13 (Noise). Impacts will be less than significant.

- *NS-C: Prohibit development in high-risk geologic and seismic hazard areas to avoid exposure to seismic and geologic hazards.*

  Impacts from strong seismic ground shaking and seismic-related ground failure will be less than significant and less than significant with mitigation measure incorporated, as discussed in Section 7 (Geology and Soils).

- *NS-F: Minimize dangers from hazardous materials.*

- *NS-G: Minimize the potential for wildland fires.*

  As detailed in Section 9 (Hazards and Hazardous Materials), with implementation of best management practices during construction, mandatory compliance with hazardous materials storage and use regulations, mandatory compliance with building codes, and implementation of **Mitigation Measure HAZ-1**, impacts associated with an upset or accident involving hazardous materials will be less than significant. Implementation of **Mitigation Measure HAZ-2** will reduce the risk associated with wildland fires to less than significant.

- *UD-A: Preserve and enhance Santa Rosa's scenic character, including its natural waterways, hillsides, and distinctive districts.*

  As detailed in Section 1 (Aesthetics), the Project is designed to avoid impacts to scenic vistas or scenic resources. The Project would not disturb any natural waterways, scenic resources, or hillsides; and it is generally consistent with the scenic character of the other industrial uses in the vicinity.

- *T-B Provide a safe, efficient, free-flowing circulation system*.

- *T-D Maintain acceptable motor vehicle traffic flows.*

  As detailed in Section 17 (Transportation), the Project would not result in significant traffic impacts as proven by a detailed traffic impact report.

- *T-D-3 Require traffic studies for development projects that may have a substantial impact on the circulation system.*

  As detailed in Section 17 (Transportation), the Project has prepared a traffic study.

- *T-G Identify, preserve, and enhance scenic roads throughout Santa Rosa in both rural and developed areas.*

- *T-G-6 Provide large setbacks from scenic roads, as possible, to avoid encroachment of buildings on the view of the roadway.*

  As detailed in Section 1 (Aesthetics), the Project is designed so that construction occurs on the portion of the site that is not adjacent to Petaluma Hill Road, a City-designated Scenic Road. The Project also includes large setbacks, a perimeter wall and landscaping. The building is placed on the site to avoid encroachments, as possible, on the view of the roadway.

- *OSC-D Conserve wetlands, vernal pools, wildlife ecosystems, rare plant habitats, and waterways.*

  As detailed in Section 4 (Biology), the Project will avoid the jurisdictional drainage channel on the site and will avoid impacts to sensitive species.

CDFA's Land Use Regulations: The Project is also consistent with the CDFA's regulations governing cannabis uses, which include requirements for permitting proposed cultivation facilities including application, licensing, site-specific requirements, records & track and trace, inspections, and enforcement. The CDFA regulations include the following applicable environmental requirements:

- Enrollment in an order or waiver of waste discharge requirements with State Water Resources Control Board (SWRCB) or the appropriate Regional Water Quality Control Board (3 CCR 8102(p)).

- A hazardous materials record search of the EnviroStor database for the proposed premises. If hazardous sites were encountered, the Project sponsor shall provide documentation of protocols implemented to protect employee health and safety (3 CCR 8102(q)).

- Compliance with Division 13 of the Public Resources Code: CEQA (3 CCR 8102(r)).

- Identification of all power sources for cultivation activities, including but not limited to, illumination, heating, cooling, and ventilation (3 CCR 8102(s)).

- Identification of water sources used for cultivation activities (3 CCR 8102(v) and 3 CCR 8107).
- A copy of any final lake or streambed alteration agreement issued by the CDFW or written verification from the CDFW that a lake and streambed alteration agreement is not required (3 CCR 8102(w)).
- An attestation that the proposed location is at least a six-hundred (600) foot radius from a school providing instruction in kindergarten or any grades one (1) through twelve (12), or a day care center or youth center, or that the premises complies with a local ordinance specifying a different radius (3 CCR 8102(x)).
- An attestation that the local fire department has been notified of the cultivation site if the Project sponsor entity is an indoor license type (3 CCR 8102(aa)).
- Preparation of a Cultivation Plan (3 CCR 8106) including requirements for:
    - A detailed premises diagram identifying the locations of material storage and operational areas,
    - A lighting diagram identifying the location of lights and types of lights in canopy areas,
    - A pest management plan identifying the products to be used and integrated pest management protocols, including an attestation that the Project sponsor will contact the appropriate County Agricultural Commissioner regarding requirements for legal use of pesticides on cannabis prior to using any of the materials included in the plan and will comply with all pesticide laws, and
    - A waste management plan identifying the management method for cannabis waste (as further discussed below).
- Outdoor lighting used for security purposes shall be shielded and downward facing (3 CCR 8304(c)).
- Renewable energy requirements (3 CCR 8305) to ensure that electrical power used for commercial cannabis activity meets the average electricity greenhouse gas emissions intensity required of their local utility provider pursuant to the California Renewables Portfolio Standard Program, division 1, part 1, chapter 2.3, article 16 (commencing with section 399.11) of the Public Utilities Code.
- Requirements for pesticide use, including compliance with pesticide laws and regulations enforced by the Department of Pesticide Regulation (DPR) and application and storage protocols (3 CCR 8307).

- Requirements for cannabis waste management including secured waste receptacles and composting requirements (3 CCR 8308).

The Project will comply with these requirements as part of it permitting and licensing process prior to operations.

Habitat Conservation Plans and Natural Community Conservation Plans: As discussed in Section 4.2(f) (Biological Resources), based on the CDFW's California Regional Conservation Plans Map, Sonoma County does not have a Natural Community Conservation Plan (per California Fish and Game Code Section 2800), Habitat Conservation Plan (per Federal Endangered Species Act Section 10), or other Regional Conservation Plan (CDFW 2017). Therefore, the Project would not conflict with any such plans.

The Project site is located within the Santa Rosa Plain Conservation Strategy Study Area. The USFWS Santa Rosa Plain Conservation Strategy Plan (Figure 3 of USFWS 2005) identifies that the Project site is located within an area designated as "potential for presence of CTS and listed plants." The Recovery Plan for the Santa Rosa Plain identifies that the Project site is located within the Sonoma County CTS Horn-Hunter Management Area boundaries (Figure 13 of USFWS 2016). The Sonoma County General Plan 2020 also identifies the Project site as within the "Potential Range of California Tiger Salamander" and a CTS "Critical Habitat" (Sonoma County 2016, Figure OSRC-5e). As discussed above in Section 4.2(a), however, the Project has no potential to impact CTS or CTS habitat (Wiemeyer 2018). Therefore, the Project will not conflict with plans related to CTS or the Santa Rosa Plain. In addition, the Project site is not identified as an area where sensitive species may be present in the Santa Rosa General Plan (City of Santa Rosa 2009b) or associated Draft Environmental Impact Report (City of Santa Rosa 2009a).

Accordingly, the Project will not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. Impacts will be less than significant with implementation of **Mitigation Measures HAZ-1 and HAZ-2**.

11.3 Mitigation Measures

No mitigation measures are required, with the exception of **Mitigation Measure HAZ-1** and **HAZ-2** (discussed in Section 9).

12. MINERAL RESOURCES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
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?	☐	☐	☐	☒
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?	☐	☐	☐	☒

12.1 Impact Analysis

This section analyzes potential impacts to mineral resources. For the purposes of this analysis, mineral resources include oil, natural gas, and metallic and nonmetallic deposits, including construction aggregates. The analysis is based on applicable maps, interpretation of aerial photographs, and the application of relevant mineral resources plans and documents.

A discussion of each environmental issue included under Section 12 is presented below.

a, b) Would the project 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? Would the Project 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?

No Impact. The Santa Rosa General Plan does not identify mineral resources on the Project Site or in the Project area (City of Santa Rosa 2009d). The Project site is located outside of the Surface Mining and Reclamation Act (SMARA) Mineral Resource mapping area (California Department of Conservation 1987). In addition, the land directly west of the Project site is classified as MRZ-1, which is associated with "areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence".

Based on the geology and excavation activities performed at the Project site by SCS Engineers (SCS) in September 2005 (SCS 2005c), lithology at the Project site consists of gravel and silty-clay from the surface to approximately 5 feet bgs, underlain by approximately 1 to 2 feet of various gravel, sand, silt, and clay mixtures which most likely represents a surface weathering zone overlying volcanic rock of primarily andesite composition. This mixture of silt and clay with sand would not be used as a resource for aggregate and has not been identified as such.

The geologic map applicable to the Project site (Graymer et al. 2007) identifies the surficial materials as Holocene alluvium. The adjacent bedrock is mapped as Andesite to basalt lava flows, which is consistent with the bedrock encountered by SCS during subsurface explorations.

The California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) is responsible for tracking oil and natural gas wells in California. No known oil, gas, or geothermal resources are located in or adjacent to the Project site. The nearest gas field, the abandoned Cotati Gas Field is located 5 miles southwest of the Project site, and nearest geothermal wells are the Spring Lake Park and MacDonald wells approximately 4 miles northeast of the Project site (California Department of Conservation 2019).

Therefore, the Project will not 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. And, the Project will not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. The Project will have no impact.

12.2 Mitigation Measures

No mitigation measures are required.

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

This analysis of noise and vibration is based on the *Santa Rosa Farm Group – Cannabis Cultivation Facility Project Noise Study* prepared for the project by Rincon Consultants, Inc., in December 2019 (**Appendix G**).

13.1 Environmental Setting

13.1.1 Overview of Noise and Vibration

Noise is defined as unwanted sound that disturbs human activity. Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz).

Sound pressure level is measured on a logarithmic scale with the 0 dBA level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA and a sound that is 10 dBA less than the ambient sound level has no effect on ambient noise.

Because of the nature of the human ear, a sound must be about 10 dBA greater than the ambient noise level to be judged as twice as loud. In general, a 3 dBA change in the ambient noise level is noticeable, while 1-2 dBA changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while areas adjacent to arterial streets are typically in the 50-60+ dBA range. Normal conversational levels are usually in the 60-65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations.

Noise levels typically attenuate (or drop off) at a rate of 6 dBA per doubling of distance from point sources (such as industrial machinery). Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dBA per doubling of distance. Noise from heavily traveled roads typically attenuates at about 3 dBA per doubling of distance. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA (Federal Transit Administration [FTA] 2018). The manner in which modern structures in California are constructed generally provides a reduction of exterior-to-interior noise levels of about 25 dBA with windows closed (Illingworth & Rodkin 2018).

One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, Leq is summed over a one-hour period. Lmax is the highest RMS (root mean squared) sound pressure level within the measuring period and Lmin is the lowest RMS sound pressure level within the measuring period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using Day-Night Average Level (Ldn), which is the 24-hour average noise level with a 10-dBA penalty for noise occurring during nighttime (10 PM to 7 AM) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 PM to 10 PM and a 10 dBA penalty for noise occurring from 10 PM to 7 AM. Noise levels described by Ldn and CNEL typically do not differ by more than 1 dBA. In practice, CNEL and Ldn are often used interchangeably.

The relationship between peak hourly Leq values and associated Ldn values depends on the distribution of traffic over the entire day. There is no precise way to convert a peak hourly Leq to Ldn. However, in urban areas near heavy traffic, the peak hourly Leq is typically 2-4 dBA lower than the daily Ldn or CNEL. In less heavily developed areas, such as suburban areas, the peak hourly Leq is often roughly equal to the daily Ldn or CNEL. For rural areas with little nighttime traffic, the peak hourly Leq will often be 3-4 dBA greater than the daily Ldn or CNEL value (California State Water Resources Control Board [CSWRCB] 1999).

Vibration is a unique form of noise because its energy is carried through buildings, structures, and the ground, whereas noise is simply carried through the air. Thus, vibration is generally felt rather than heard. Some vibration effects can be caused by noise; e.g., the rattling of windows from passing trucks. This phenomenon is caused by the coupling of the acoustic energy at frequencies that are close to the resonant frequency of the material being vibrated. Typically, groundborne vibration generated by manmade activities attenuates rapidly as distance from the source of the vibration increases. The ground motion caused by vibration is measured as particle velocity in inches per second and is referenced as vibration decibels (VdB) in the U.S. Another measure of vibration is peak particle velocity (PPV), which is defined as the maximum instantaneous positive or negative peak of the vibration signal.

The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel wheeled trains, and traffic on rough roads.

13.1.2 Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Typically, noise sensitive land uses include single family residential, multiple family residential, churches, hospitals and nursing/convalescent homes, hotels and lodging, libraries, schools, and day care centers. Noise-sensitive receptors closest to the project site include the backyards at only two existing residences located adjacent to a small portion of the south-western corner of the project site. There are also residential uses further down Summercreek Drive. The other land uses around the project site are similarly zoned industrial uses to the west and north, which are not sensitive receptors. The eastern half of the project site would not be developed by the project and is fronted by Petaluma Hill Road. Thus, in totality, the project site has limited sensitive receptors along or adjacent to the majority of the project site boundary.

13.1.3 Existing Noise Conditions

The most common and primary sources of noise in the Project site vicinity are motor vehicles (e.g., automobiles, buses, trucks, and motorcycles) along Yolanda Avenue and Petaluma Hill Road. Additional vehicle traffic is present on adjacent residential roadways (e.g., Summercreek Drive), but these roadways have substantially lower traffic volumes and do not substantially contribute to overall ambient noise in the vicinity. Motor vehicle noise is of concern because it is characterized by a high number of individual events, which often create a sustained noise level, and its proximity to noise sensitive uses. Additional sources of noise in the Project site vicinity include activities associated with the nearby commercial uses to the north and west of the Project site, and nearby residential uses.

To determine existing ambient noise levels on the Project site, three peak-hour weekday afternoon 15-minute noise measurements (Leq[15] dBA) were taken on and near the Project site using an ANSI Type II integrating sound level meter.

Figure 13.1 Noise Measurement Locations shows the locations of noise measurements taken on July 19, 2017. These noise measurements are representative of existing average ambient sound levels from rush-hour traffic activity on Yolanda Avenue and Petaluma Hill Road. The noise monitoring results are provided in the Noise Study for the Project (Rincon Consultants, 2019b; **Appendix G**) and the findings are summarized in Table 13.1. Noise measurement 1 was taken at the northern border of the Project site on Yolanda Avenue. Noise measurement 2 was taken adjacent to nearby residences along Petaluma Hill Road. Noise measurement 3 was taken at the end of Summercreek Drive to represent the current ambient noise levels at the closest residential area, just southwest of the Project site.

Table 13.1 Project Vicinity Noise Monitoring Results - PM Peak Hour

Measurement Location No.	Measurement Location	Sample Times	Approximate Distance to Primary Noise Source	Leq[15] (dBA)[1]
1	Yolanda Avenue	4:18 PM – 4:33 PM	25 feet from centerline of Yolanda Avenue	67.1
2	Petaluma Hill Road	5:06 PM – 5:21 PM	20 feet from centerline of Petaluma Hill Road	77.7[2]
3	Summercreek Drive	5:32 PM – 5:47 PM	670 feet from centerline of Petaluma Hill Road[3]	53.0

See Figure 13.1 Noise Measurement Locations for a map of Noise Measurement Locations.

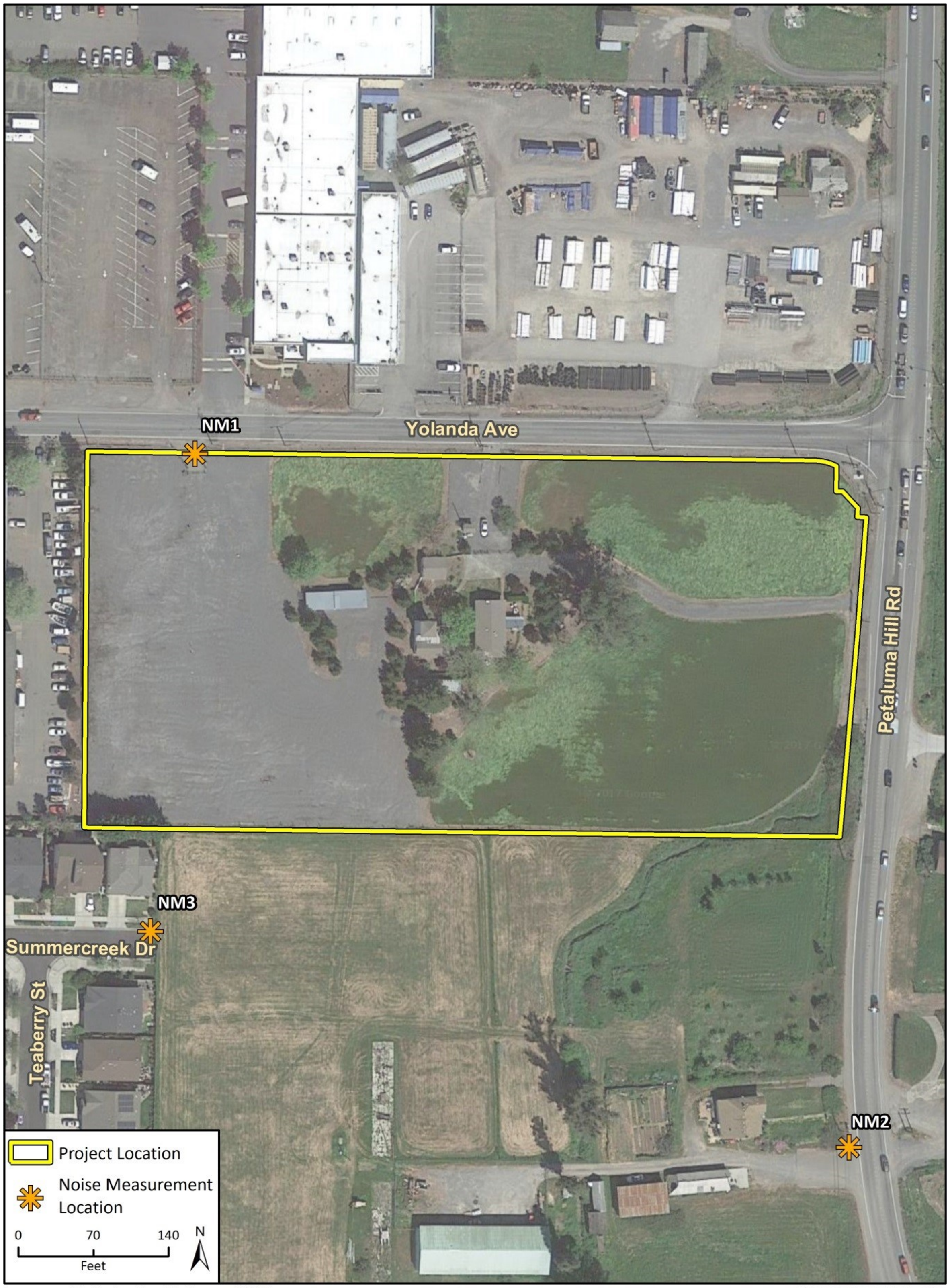
[1] The equivalent noise level (Leq) is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). For this measurement, the Leq was over a 15-minute period (Leq[15]).

[2] Noise levels at measurement location 2 exceeded 75 dBA Leq due to the proximity to a major road, which includes a slight grade change. Cars accelerating uphill result in louder noise levels than on flat terrain.

[3] While measurement 3 was taken on Summercreek Drive, the primary noise source was observed to be traffic along Petaluma Hill Road.

Source: Rincon Consultants, 2019b. Field measurements conducted on July 19, 2017, using ANSI Type II Integrating sound level meter. See **Appendix G**.

Figure 13.1 Noise Measurement Locations



Imagery provided by Google and its licensors © 2017.

13.1.4 Regulatory Setting

13.1.4.1. City of Santa Rosa General Plan Noise & Safety Element

The Noise and Safety Element of the Santa Rosa General Plan focuses on reducing excessive noise that can cause annoyance, health problems, economic loss, and ultimately hearing impairment. This element sets goals and policies in order to maintain an acceptable community noise level to protect the health and comfort of people living, working, and/or visiting in Santa Rosa, while maintaining a visually appealing community. Santa Rosa General Plan policies relating to noise, and which are applicable to the Project, are listed below:

- **NS-B-1** Do not locate noise-sensitive uses in proximity to major noise sources, except residential is allowed near rail to promote future ridership.
- **NS-B-3** Prevent new stationary and transportation noise sources from creating a nuisance in existing developed areas. Use a comprehensive program of noise prevention through planning and mitigation, and consider noise impacts as a crucial factor in project approval.
- **NS-B-4** Require new projects in the following categories to submit an acoustical study, prepared by a qualified acoustical consultant:
  - All new projects proposed for areas with existing noise above 60 dBA DNL. Mitigation shall be sufficient to reduce noise levels below 45 dBA DNL in habitable rooms and 60 dBA DNL in private and shared recreational facilities. Additions to existing housing units are exempt.
  - All new projects that could generate noise whose impacts on other existing uses would be greater than those normally acceptable (as specified in the Land Use Compatibility Standards).
- **NS-B-5** Pursue measures to reduce noise impacts primarily through site planning. Engineering solutions for noise mitigation, such as sound walls, are the least desirable alternative.
- **NS-B-6** Do not permit existing uses to generate new noises exceeding normally acceptable levels unless:
  - Those noises are mitigated to acceptable levels; or
  - The activities are specifically exempted by the City Council on the basis of community health, safety, and welfare.
- **NS-B-9** Encourage developers to incorporate acoustical site planning into their projects. Recommended measures include:
  - Incorporating buffers and/or landscaped earth berms;
  - Orienting windows and outdoor living areas away from unacceptable noise exposure;
  - Using reduced-noise pavement (rubberized-asphalt);

  - Incorporating traffic calming measures, alternative intersection designs, and lower speed limits; and
  - Incorporating state-of-the-art structural sound attenuation and setbacks.

- **NS-B-10** Work with private enterprises to reduce or eliminate nuisance noise from industrial and commercial sources that impact nearby residential areas. If progress is not made within a reasonable time, the city shall issue abatement orders or take other legal measures.

- **NS-B-14** Discourage new projects that have potential to create ambient noise levels more than 5 dBA DNL above existing background, within 250 feet of sensitive receptors.

13.1.4.2. Santa Rosa City Code

Chapter 17-16 of the SRCC outlines standards relating to noise. The following criteria, shown in Table 13.2, are used as base ambient noise levels from which noise levels can be compared.

Table 13.2 Ambient Base Noise Level Criteria

Zone	Daytime (7 AM to 7 PM) Level (dBA)	Evening (7 PM to 10 PM) Level (dBA)	Nighttime (10 PM to 7 AM) Level (dBA)
Single Family Residential, Medium Density Multi-Family Residential	55	50	45
Multi-Family Residential	55	55	50
Office and Commercial	60	60	55
Intensive Commercial	65	65	55
Industrial	70	70	70

Source: City of Santa Rosa City Code

SRCC Section 17-16.040 states that ”it is unlawful for any person to willfully make or continue, or cause to be made or continued any loud, unnecessary, or unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area. It also states that the standards which shall be considered in determining whether a violation of this section exist include but are not limited to the following:

- The level of noise
- The intensity of the noise
- Whether the nature of the noise is usual or unusual
- Whether the origin of the noise is natural or unnatural
- The level and intensity of the background noise, if any
- The proximity of the noise to residential sleeping facilities
- The nature and zoning of the area within which the noise emanates

- The time of day or night the noise occurs
- The duration of the noise
- Whether the noise is recurrent, intermittent or constant
- Whether the noise is produced by a commercial or noncommercial activity

In addition, the SRCC contains a section that relates to machinery and equipment; and Section 17-16.120 states that it is unlawful for any person to operate any machinery, equipment, pump, fan, air-conditioning apparatus or similar mechanical device so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient base noise level by more than five (5) decibels. The SRCC does not state that this quantitative standard applies to temporary construction activities and this quantitative standard for mechanical devices is similarly not applicable to intermittent noise from typical parking lot activity on properties. In addition, Section 20-30.090 provides that no operational ground vibration shall be generated that is perceptible

The SRCC also contains a section that relates to machinery and equipment; and Section 17-16.120 states that it is unlawful for any person to operate any machinery, equipment, pump, fan, air-conditioning apparatus or similar mechanical device so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient base noise level by more than five (5) decibels. The SRCC does not state that this quantitative standard applies to temporary construction activities and this quantitative standard for mechanical devices is similarly not applicable to intermittent noise from typical parking lot activity on properties. In addition, Section 20-30.090 provides that no operational ground vibration shall be generated that is perceptible without instruments by a reasonable person at the property lines of the project site, except for vibrations from temporary construction or demolition activities, and motor vehicle operations.

13.2 Impact Analysis

The analysis of noise impacts considers the effects of both temporary construction-related noise and long-term noise associated with operation of the Project. This analysis is based in part on the Santa Rosa General Plan, SRCC, the Fehr & Peers Traffic Study, the Rincon Consultants Project Noise Study, and FTA's Transit Noise and Vibration Impact Assessment. Impacts from the project would be considered significant based on the thresholds of significance set forth in Appendix G of the State CEQA Guidelines, which questions whether the project would result in:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

b) Generation of excessive groundborne vibration or groundborne noise levels?

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

a) Would the project result in the 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?

Less than Significant Impact.

As stated above, the CEQA Guidelines threshold for noise impacts is whether the project would result in the 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.

This report applies Section 17-16.040 from the City's noise ordinance as the construction noise threshold, in part because the SRCC does not have a specific quantitative construction noise threshold. Hence, the project could have a potentially significant impact if construction generates loud, unnecessary, or unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area pursuant to the factors listed in SRCC Section 17-16.040.

Table 13.3 shows estimated noise levels from each phase of construction.

Table 13.3 Construction Noise Levels by Project Phase and Construction Phase

Construction Phase	Equipment	Estimated Noise at 50 feet (dBA Leq)	Estimated Noise at 50 feet (dBA Lmax)
Demolition	Backhoe, Dozer, Loader, Saw	85	90
Site Preparation	Grader, Loader	82	85
Grading	Backhoe, Dozer, Loader, Saw	85	90
Building Construction	Backhoe, Crane, Forklift, Loader	79	81
Architectural Coating	Air Compressor	74	78
Paving	Concrete Mixer, Loader, Paver, Roller	80	80

Source: See Appendix B of the Noise Study (**Appendix G**) for equipment noise impact data sheets and assumptions.

As shown in Table 13.3, the estimated noise levels during construction would range from 74 Leq and 78 dBA Lmax to 85 dBA Leq and 90 dBA Lmax at reference distances of 50 feet from receptors. This is a conservative assumption of noise level because not all receptors are within 50 feet of noise sources and construction activities would typically be spread out around the site. Nonetheless, temporary construction noise would be clearly audible at adjacent residential receptors during construction hours. Project construction is estimated to occur over approximately one year. During this period, noise-sensitive residences southwest of the project site would be exposed to temporary noise from construction activity. The nearest residences are located adjacent to the southwest part of the project site.

The existing ambient noise level during peak traffic hours was measured at 53 dBA Leq at the residences adjacent to the project site. Estimated construction noise reaching 85 dBA Leq during the demolition and grading phases would exceed this existing ambient noise level by 32 dBA Leq. The intensity of the noise would not come from high-impact construction activities because there is no pile driving associated with construction. The noise level and intensity would be typical of normal construction activities at a reference distance of 50 feet. This type of construction noise is not unusual. Neither is this type of noise unusual for properties (like most of the surrounding uses) that are zoned light industrial or manufacturing. The origin of the noise is also not unusual, and instead is commonplace for construction sites. Construction equipment would typically operate within the body of the project site and set back from the property line adjacent to residential uses, which would reduce their exposure to construction noise. The proximity of the construction noise to residential sleeping facilities would vary depending on construction activities. However, for the most part, construction activities to develop the structures on the project site would be set back from the property line and thereby distanced from adjacent residential uses. In addition, the zoning for the site also allows industrial and manufacturing facilities and is thus consistent with the type of noise that could be produced during construction of such facilities. Similarly, the density of the site and surrounding areas is dominated by commercial uses along Yolanda Avenue.

Importantly, the City code requires, and the City imposes a standard condition of approval on, development projects to limit construction to the hours of 7:00 AM – 4:00 PM Monday through Friday, 8:00 AM – 4:00 PM Saturday, and none on Sunday. These timing restrictions would ensure that adjacent residences are not exposed to construction noise during evenings, nighttime, and Sundays, when residences are most sensitive to disturbance. The duration of the noise would be temporary and would end with conclusion of construction activities, which are approximately 12 months. Construction noise during this time would also be intermittent during different times of the day and vary accordingly to the construction phase. Construction noise would not be permanent or constant.

Therefore, based on the relevant qualitative criteria in Section 17-16.040, which is the threshold of significance used herein, the project would not result in the 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 noise ordinance. Impacts from construction noise would be less than significant.

<u>Long-Term Operational Noise Impacts</u>

Cannabis operations on the project site would generate noise from the following sources: vehicle trips on roadways to and from the project site, parking lot activities, mechanical equipment, and trash hauling trucks. Operational noise from these sources could increase existing ambient noise levels near the project site.

<u>Roadway Noise</u>

Table 13.4 shows the estimated number of daily vehicle trips generated by the project.

Table 13.4 Project-Generated Traffic

Land Use	Size	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
Primary Day Shift	45 employees	100	45	45
Early Night Shift	25 employees	60	0	25
Night Shift	10 employees	25	0	0
Early Morning Shift	25 employees	60	10	0
Product Deliveries	1 round trip per hour	20	2	2
Other Activities	--	20	6	6
	Total Project Trips	**285**	**63**	**78**

Source: Fehr & Peers 2019

Based on Figure 5 of the project traffic study (Fehr & Peers 2019), there are an estimated 6,740 existing daily trips on Yolanda Avenue. As shown in on Table 13.1, the existing noise level on Yolanda Avenue during peak traffic hours was measured at 67.1 dBA Leq at 25 feet from the roadway centerline. The nearest noise-sensitive receptors along this roadway are several single-family residences located approximately 50 feet south of the roadway centerline. Based on a standard attenuation of rate of 3 dBA per doubling of distance from typical roadways, it is estimated these residences are exposed to traffic noise of approximately 64 dBA.

All new vehicle trips would access the project site directly from Yolanda Avenue. Thus, as shown on Table 13.5, the addition of 285 daily trips would increase daily traffic on this roadway by approximately 4.2 percent. As discussed in Section 2.1, modeling of traffic noise by Rincon Consultants, Inc. indicates that regardless of the existing traffic volume on a given roadway, a 10 percent increase in traffic volume would raise traffic noise by approximately 0.4 dBA, while a 20 percent increase would raise traffic noise by about 0.8 dBA. The estimated 4.2 percent increase in traffic volume would increase the overall noise level along Yolanda Avenue by less than 0.4 dBA, which would not exceed the 1 dBA threshold that applies on this roadway (per Table 13.3). This minimal increase in average ambient roadway noise on Yolanda Avenue would not be noticeable to nearby residents.

Table 13.5 Daily Trips on Yolanda Avenue

Road Segment	Existing Daily Trips	Project Generated Trips	Daily Trips with Project	Percent Change in Daily Trips
Yolanda Avenue	6,740[1]	285	7,025	+4.2

[1]Existing daily trips estimated based on peak-hour traffic counts conducted by Fehr & Peers (Fehr & Peers 2019)

The project also would generate new vehicle trips on Petaluma Hill Road. The nearest noise-sensitive receptors along this roadway are residences located as close as approximately 75 feet from its centerline to the north and south of Yolanda Avenue. As shown in Table 13.1, the existing peak-hour noise level was measured at 77.7 dBA Leq at a distance of 20 feet from the centerline of Petaluma Hill Road. At a 75-foot distance, it is estimated that residences are currently exposed to traffic noise reaching 72 dBA Leq. Based on this existing traffic noise level, a 1 dBA threshold would apply to the project’s effect on traffic noise (per Table 13.3).

The Draft Transportation Impact Analysis prepared by Fehr & Peers (February 2019) estimates that 10 percent of new trips would be distributed on the segment of Petaluma Hill Road north of Yolanda Avenue, which would amount to about 29 additional daily trips, and 15 percent of new trips would be distributed on the segment of Petaluma Hill Road south of Yolanda Avenue, or 43 trips. This trip generation would increase the road segment’s current estimated traffic volume of 17,140 ADT on the segment north of Yolanda Avenue by approximately 0.17 percent, and would increase the estimated traffic volumes of 17,960 ADT on the segment south of Yolanda Avenue by approximately 0.24 percent. As explained above, a 10 percent increase in traffic volumes would increase traffic noise by approximately 0.4 dBA. Therefore, an increase in traffic volumes by up to 0.24 percent would not result in a perceptible increase in traffic noise levels. Vehicle trips generated by the project would not result in a noticeable increase in traffic noise along Petaluma Hill Road and would not exceed the 1 dBA threshold that applies on this roadway.

Therefore, the project would not expose nearby sensitive receptors to increases in roadway noise that exceed the FTA criteria shown in Table 13.3, and this impact would be less than significant.

Parking Lot Noise

Typical noise sources associated with parking lots include tire squealing, door slamming, car alarms, horns, and engine start-ups. The proposed project includes 85 parking stalls located in various areas of the site. Approximately half of these parking stalls would be located along the southern property line approximately 50 feet from adjacent residences. Table 13.6 shows typical sound levels at this distance from various noise sources on parking lots.

Table 13.6 Maximum Noise Levels from Parking Lot Activity

Source	Maximum Noise Level (dBA) at 50 Feet
Autos at 14 mph	50
Car Alarm Signal	69
Car Alarm Chirp	54
Car Horns	69
Door Slams or Radios	64
Talking	36
Tire Squeals	66

Source: Gordan Bricken & Associates, 1996. Estimates are based on actual noise measurements taken at various parking lots.

As shown in Table 13.6, parking lot noise could reach an estimated 69 dBA at adjacent residences. The proposed 7-foot solid wall on the southern property line would block line-of-sight between on-site parking activity and the ground floor of adjacent residences, reducing their exposure to parking lot noise by up to 10 dBA (FTA 2018). However, second-floor living areas at these residences could be directly exposed to noise from parking lot activity. Because the proposed cannabis facility would operate continuously, parking lot activity would generate noise during both daytime and nighttime hours.

As the Court of Appeal, First Appellate District, recently held in *Jensen v. City of Santa Rosa* (May 24, 2018, A144782) Cal.App.5th, “The City Code dictates no standard numeric measure expressed in decibel levels for other types of noise… such as parking lot noise.” Instead of a numeric threshold, the Court ruled that the City’s noise ordinance provides “a more flexible and qualitative approach” to evaluating the impact of parking lot noise on residential neighborhoods, based on the set of criteria in SRCC Section 17-16.040.

The isolated, intermittent sounds generated by parking lot activity do not typically count against the City’s ambient base noise thresholds identified in SRCC Section 17-16.030 (Streeter 2018). The City defines “ambient noise” as a noise level “averaged over a period of 15 minutes without inclusion of noise from isolated, identifiable sources, at the location and time of day near that at which a comparison is to be made” (SRCC Section 17-16.010). Therefore, parking lot activity would not be subject to the City’s standard of 5 dBA above ambient base noise thresholds for mechanical noise. Instead, as the court of appeal recently held in *Jensen v. City of Santa Rosa* (May 24, 2018, A144782) Cal.App.5th, the qualitative noise standards in SRCC Section 17-16.040 would apply to parking lot activity. These standards prohibit the generation of “any loud, unnecessary, or unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area."

Although activity in the proposed southern parking lot would generate noise in proximity to adjacent residences, the location, type, frequency, and loudness of parking lot activity would not substantially disturb the peace and quiet of people of normal sensitivity to noise. The two entrances to the parking lot would be located on the northern property line, no closer than approximately 375 feet from the nearest residences southwest of the project site. Approximately half of the proposed 85 parking spaces would be located north of the main building. Vehicles entering and exiting parking lot, and employees parking on the north side of the main building, would not generate noise in the southern parking lot which would be adjacent to residences. Parking lot activity is also a typical noise source in Santa Rosa, even near residential uses. For example, parking lots at auto repair uses to the immediate west of the project site are located adjacent to the north side of residences. In addition, parking lot activities such as door slams, car alarm chirps, and engine starting would only generate intermittent noise when vehicles are used. The loudest individual noise sources in parking lot areas shown in Table 13.6, including car horns, car alarm signals, and tire squeals, would occur rarely. Average noise levels from parking lot activity would be substantially lower than the maximum noise level of 69 dBA shown in Table 13.6. Estimated intermittent noise levels of up to 69 dBA also would not be unusually loud and intense. Therefore, the project would have a less than significant impact from parking lot noise.

For informational purposes only, Rincon Consultants also prepared an evaluation of noise from parking lot activity based on the City's numeric thresholds described in City Code Section 17-16.120 do apply to parking lot noise. To be clear, this analysis is not required by law, and is for informational purposes only. The code analysis that follows is only for illustrative purposes and the code applied here is not a threshold of significance for parking lot noise. Accordingly, as described above, Section 17-16.120 prohibits any operation of machinery, equipment, pump, fan, air-conditioning apparatus or similar mechanical devices that would cause the noise level at the property line of any property to exceed the ambient base noise level by more than five decibels. Given a mechanical noise standard of 5 dBA above the ambient base noise level criteria for the Single-Family Residential zone, noise from parking lot activity would be subject to the following standards:

- Daytime (7 AM to 7PM): 60 dBA Leq
- Evening (7 to 10 PM): 55 dBA Leq
- Nighttime (10 PM to 7 AM): 50 dBA Leq

To compare noise from parking lot activity to these standards, estimated parking lot noise was combined with background ambient noise levels over representative 15-minute daytime, evening, and nighttime periods. Under a conservative scenario, it was assumed that one car alarm signal, 10 car door slams, and 10 car alarm chirps would occur over one-second intervals during a given 15-minute period. The background ambient noise level at residences along Summercreek Drive was measured at 53.0 dBA Leq during peak traffic hours. This measured noise level was assumed to be representative of existing daytime and evening conditions at the residences. During nighttime hours, the background ambient noise level was assumed to be 45 dBA Leq, which is typical of suburban residential areas when nearby traffic activity is low.

Adding parking lot activity to the background ambient noise level results in a combined noise level of 53.7 dBA Leq during daytime and evening hours, and 48.5 dBA Leq during nighttime hours. Estimated parking lot noise would not exceed the standards of 60 dBA Leq and 55 dBA Leq during daytime and evening hours, nor would it exceed the nighttime standard of 50 dBA Leq. Therefore, even if the City’s mechanical noise standards were applicable to parking lot activity (which they are not), this impact would be less than significant.

Mechanical Equipment Noise

New mechanical equipment that would generate noise during operation of the cannabis facility includes Avus 550 kW natural gas co-generation units and equipment associated with the Heating Ventilation Air Condition (HVAC) system. HVAC equipment would involve up to three 500-ton adsorption chillers, up to two 5,000 BTU boilers, two cooling towers, and associated pumps, compressors, and ancillary equipment. It is assumed that this mechanical equipment would operate 24 hours per day, seven days per week. Because the individual pieces of equipment listed above would operate simultaneously, this analysis assumes their noise generation would be additive, resulting in a cumulative noise level from all mechanical equipment. The cumulative noise level is calculated below by summing the estimated noise levels from individual types of mechanical equipment at the property line facing the nearest residences.

Pursuant to SRCC Section 17-16.120, the threshold of significance for mechanical equipment noise is 5 dBA above the ambient base noise level criteria. (Those criteria are set forth above in Table 13.2.) For residential uses, the thresholds are 50 dBA at nighttime, 55 dBA during the evening, and 60 dBA during the daytime. The co-generation units would be housed in a utility building with solid walls located approximately 400 feet away from residences located to the southwest and east of the project site. The co-generation units would generate noise levels estimated at 70 dBA Leq external to the utility building from the silencer exhaust pipe, based on the manufacturer’s specifications. At a distance of 400 feet to the nearest residences, this external noise level would attenuate to an estimated 44 dBA Leq, without accounting for further attenuation by the proposed main building, or perimeter walls around the project site. The utility building’s placement relative to the proposed main building would further reduce the exposure of residents to co-generation equipment noise: the main building would serve as a single building row that obstructs line of sight from the utility building to residences located southwest of the site, reducing cogeneration noise by an estimated 5 dBA. Therefore, the nearest residences would be exposed to an estimated noise level of 39 dBA Leq from the use of cogeneration units. This noise level would be less than the measured ambient noise level of 53 dBA Leq at the nearest residences, and less than the most stringent 50 dBA nighttime threshold set by City code.

Other equipment housed inside the utility building would include chillers, boilers, and associated pumps, compressors, and ancillary equipment. Because this equipment would be fully enclosed by the utility building, it would not generate noise that noticeably contributes to ambient noise levels at the property line facing nearby residences. Modern exterior building materials typically attenuate noise by about 25 dBA, which would substantially reduce noise levels outside the utility building. For example, the chillers would generate a noise level of 74 dBA Leq at the source, based on manufacturer's specifications provided by Atlas Copco. A reduction of 25 dBA from inside to outside the utility building would result in an estimated noise level of 49 dBA Leq. At a distance of 400 feet to residences, this noise level would decrease to an estimated 31 dBA Leq, which is far below the measured ambient noise level of 53 dBA Leq at that location, and less than the most stringent 50 dBA nighttime threshold set by City code.

Two cooling towers would be installed outside the proposed utility building, although their precise location has not yet been determined. The cooling towers would either be manufactured by Evapco or another brand that generates comparable sound levels to the Evapco LPT 8312 model. Based on the manufacturer's specifications, this model of cooling tower generates a noise level of up to 64 dBA Leq at a distance of 50 feet to the side. Two cooling towers would generate a combined noise level of an estimated 67 dBA Leq. At a distance of 400 feet to the nearest residences, this external noise level would attenuate to an estimated 49 dBA Leq. If the cooling towers were located next to the west, north, or east side of the utility building, the main building would block line of sight to the nearest residences to the southwest of the project site. It is estimated that placement of the cooling towers in these areas would reduce noise exposure by 5 dBA.

In combination, the cogeneration units and cooling towers would generate an estimated cumulative noise level of 49 dBA Leq at the property line facing the nearest residences, which does not exceed the measured ambient noise level of 53 dBA Leq at these residences. In addition, the combined noise level from mechanical equipment (49 dBA Leq) would not be 5 dBA or more above the City's base ambient noise levels of 55 dBA from 7:00 AM to 7:00 PM, 50 dBA from 7:00 PM to 10:00 PM, and 45 dBA from 10:00 PM to 7:00 AM. Additionally, the proposed 7-foot solid wall on the southern property line would block line-of-sight between mechanical equipment and the ground floor of adjacent residences, further reducing their exposure to mechanical noise (FTA 2018). Because mechanical noise would not exceed applicable standards in the City's noise ordinance, it would have a less than significant impact on sensitive receptors.

<u>Delivery and Trash Truck Noise</u>

On-site activities would include the use of delivery trucks and trash hauling trucks. Delivery and trash truck trips to the site would be a periodic source of operational noise. Maximum noise levels generated by passages of medium duty delivery trucks generally range from 61 to 70 dBA Leq at a distance of 25 feet, depending on the speed at which the truck is driving (Olson 1972). However, delivery and trash truck activity would occur at the trash enclosure and truck bays along the east side of the proposed building, located approximately 250 feet from the nearest residences to the southwest. Based on an attenuation rate of 6 dBA per doubling of distance, the maximum anticipated noise levels from delivery and trash trucks would be about 50 dBA at a distance of 250 feet. This noise level would not exceed the measured background ambient noise level of 53 dBA Leq at residences adjacent to the project site.

The proposed three-story building would obstruct line of sight between residences and the truck activity area, further reducing their exposure to on-site truck noise. It is also assumed that trucks would enter and exit the project site by the eastern proposed driveway on Yolanda Avenue, which is located approximately 450 feet from the nearest residences to the southwest of the site. Loading and delivery trucks circulating the project site to and from the trash enclosure and truck bays would not typically use the southern parking lot nearest to residences. In addition, trash pick-up would occur during daytime hours only, and pickup and delivery would occur during typical business hours, between 10:00 AM and 5:00 PM. Truck activity would not generate noise during the most sensitive evening and nighttime hours.

Because truck noise at sensitive receptors would not exceed the measured ambient noise level at sensitive receptors, would be reduced by the location of truck activity on-site, and would not occur during evening or nighttime hours, on-site truck noise would not substantially disturb the peace and quiet of neighboring residences. Therefore, the impact from on-site truck noise would be less than significant.

<u>Impact Conclusion</u>

Overall, the Project will not result in the 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. Impacts will be less than significant.

b) Would the project result in the generation of excessive ground-borne vibration or ground-borne noise levels?

Less than Significant Impact.

As stated above, the CEQA Guidelines threshold is whether the project would result in the generation of excessive groundborne vibration or groundborne noise levels.

Construction of the proposed project would temporarily generate groundborne vibration. The construction equipment that is expected to cause vibration includes large and small bulldozers, loaded trucks, and jackhammers. Table 13.7 shows estimated vibration levels at the nearest sensitive receptors, which are adjacent to the southwest of the project site.

Table 13.7 Vibration Source Levels for Construction Equipment

Equipment	Approximate VdB at Nearest Sensitive Receptors at 50 feet	Approximate inches/second (PPV) at Nearest Sensitive Receptors at 50 feet
Large Bulldozer	81	0.031
Loaded Trucks	80	0.027
Jackhammer	68	0.012
Small Bulldozer	52	0.001

Source: FTA 2018.

Based on the information presented in Table 13.7, construction activities could generate maximum vibration levels of approximately 81 VdB or 0.031 PPV at the closest reference distance. For a conservative vibration estimate, the analysis assumed that a backhoe has similar vibration levels as a small bulldozer, paving equipment has similar vibration levels as a large bulldozer, and that loaded trucks and a jackhammer would be used on the project site during construction. Also, it was assumed that vibration-generating equipment, including bulldozers, loaded trucks, and jackhammers, is a limited subset of construction equipment and would typically operate at different times and locations across the project site. The structures that are closest to the project site and that could be impacted by construction vibration are the residential uses which are considered category 2 uses that are non-engineered timber and masonry structures. The threshold of significance for damage to these structures is 94 VdB or 0.2 PPV. Therefore, the project would not have a significant vibration impact (based on the building damage thresholds) on the adjacent residential uses.

Regarding human annoyance or disturbance impacts from construction, the City limits construction activity to the hours of 7:00 AM – 4:00 PM Monday through Friday, 8:00 AM – 4:00 PM Saturday, and none on Sunday. Therefore, no construction activity can occur during nighttime hours when people normally sleep. These code-based timing restrictions would prevent any construction activity from occurring during nighttime hours and thus the project would not expose adjacent residences to vibration during normal sleeping hours. In addition, construction activities are temporary and would cease once project construction is complete. The construction activities are typical of construction methods and do not involve excessive construction durations or unique methods of construction that could cause excessive vibration. There are a limited number of sensitive receptors around the site, and the site itself is zoned for light industrial uses. Furthermore, there are a limited number of sensitive receptors adjacent to the project site. Taken together, these facts demonstrate that the project would not result in the generation of excessive groundborne vibration or groundborne noise levels. Therefore, potential impacts of the project, regarding building damage and human annoyance, are considered less than significant.

Therefore, the Project will not result in the generation of excessive ground-borne vibration or ground-borne noise levels. Impacts will be less than significant.

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?

No Impact. The Project site is not located within an airport land use plan, and there are no public airports or public use airports within two miles of the Project site, and no private airstrips in the vicinity of the Project site. The closest airports to the Project site are (1) Sonoma County airport, which is located approximately 8.5 miles northwest of the Project, and (2) Graywood Ranch Airport-CA39 on Gray Road in Santa Rosa, which is approximately 7.8 miles east of the Project. The Project site is not located within the boundaries of the airport's land use compatibility plan for either airport. The Project site is not located or in the vicinity of a private strip.

As discussed above, the Project is not located within an airport land use plan, or within two miles of a public airport or public use airport, or within the vicinity of a private airstrip. Therefore, the Project will not result in noise-related impacts on people residing in or working in the Project area. There would be no impact.

13.3 Mitigation Measures

No mitigation measures are required.

14. POPULATION AND HOUSING	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Induce substantial unplanned population growth in the area, either directly (by proposing new homes or businesses) or indirectly (through extension of roads or other infrastructure improvements)?	☐	☐	☒	☐
b) Displace substantial number of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐

14.1 Environmental Setting

As of January 2018, the estimated population of the City of Santa Rosa was 178,488, with an average household size of 2.68 persons (California Department of Finance 2018). The City is composed of single- and multi-family development, but the majority (70%) of housing units are single-family homes. As of December 2018, within the Santa Rosa Metropolitan Area, the civilian labor force is approximately 268,000 and the total number of employed persons is approximately 260,000 (United States Department of Labor 2019).

The Project site is currently developed with one single-family residence and miscellaneous sheds and buildings as discussed in the Project Description. These buildings would be demolished in preparation for development of the proposed indoor cannabis cultivation facility.

14.2 Impact Analysis

This section analyzes the Project's potential impacts on population and housing. The Project would have a less than significant impact to population growth and housing displacement. A discussion of each environmental issue included under Section 14 is presented below.

a) Would the project induce substantial unplanned population growth in the area, either directly (by proposing new homes or businesses) or indirectly (through extension of roads or other infrastructure improvements)?

Less Than Significant Impact. The Project will not generate substantial population growth in the area. The Project does not include any new homes that could directly induce population growth in the area. The Project includes a new cannabis cultivation business. The business will hire approximately 105 full-time employees to operate the facility, and temporary employees during construction. This modest employment generation will not have the potential to induce significant population growth in the Santa Rosa area, which has a population of approximately 178,488 people (California Department of Finance 2017). Moreover, the new positions created by the Project will likely be filled by existing residents, or by new residents who move to the area consistent with the City's anticipated growth rate.

The Project does not include road extensions or other infrastructure improvements that could indirectly induce substantial population growth. The Project includes only minor improvements to roads and other infrastructure, such as utility connections onsite, which do not have the potential to induce population growth in the area.

Therefore, the Project does not have the potential to directly or indirectly induce substantial unplanned population growth in the area. The Project's impacts would be less than significant.

b) Would the project displace substantial number of existing people or housing, necessitating the construction of replacement housing elsewhere?

Less Than Significant Impact. The Project includes the demolition of one existing single-family residence on the Project site, as described in the Project description. The existing residence is currently vacant, and no residents will be displaced by the demolition. Therefore, the Project will not displace a substantial number of existing people or housing units and will not necessitate the construction of replacement housing elsewhere. Impacts will be less than significant.

14.3 Mitigation Measures

No mitigation measures are required.

15. PUBLIC SERVICES	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
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 would cause significant environmental impacts in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire Protection?	☐	☐	☐	☒
b) Police Protection?	☐	☐	☐	☒
c) Schools?	☐	☐	☐	☒
d) Parks?	☐	☐	☐	☒
e) Other public facilities?	☐	☐	☐	☒

15.1 Environmental Setting

The City of Santa Rosa provides Police Protection and Fire Protection services within City boundaries. The City operates ten fire stations, including the Roseland one contract station. In addition, the City has an automatic aid agreement with the Rincon Valley Fire District, which integrates its station on Todd Road into the citywide response matrix (Emergency Services Consulting International [ESCI] 2016b). The Project is less than 3 miles from three fire stations:

- Santa Rosa Fire Department (SRFD) Station 8, serving the Roseland Fire District and the southwest Santa Rosa area, located at 830 Burbank Avenue, approximately 2.8 miles northwest of the Project site. As discussed in the Santa Rosa General Plan, the City plans to move this station to a new location near Sebastopol Road and Timothy Road, approximately 2.6 miles northwest of the Project site.
- SRFD Station 1 located at 955 Sonoma Avenue, approximately 2.4 miles north of the Project site.
- Rincon Valley Fire District Bellevue Station located at 207 Todd Road, approximately 2.8 miles south of the Project site.

The Santa Rosa General Plan identifies City plans for a new fire station in Santa Rosa, southeast of the intersection of Franz Kafka Avenue and Kawana Terrace, approximately 0.3 mile northeast of the Project site (City of Santa Rosa 2009d).

The Santa Rosa Police Department is contracted to provide law enforcement services. The local headquarters is located at 965 Sonoma Avenue, which is approximately 2.3 miles north of the property.

15.2 Impact Analysis

This section analyzes the Project's potential impacts with respect to the provision of new public services. The Project would have no impact on public services. A discussion of each environmental issue included under Section 15 is presented below.

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 would cause significant environmental impacts in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

a) Fire Protection?

No Impact. As discussed above, the SFRD provides fire protection services to the Project area. While the Project will slightly increase demand on the City's fire protection services due to development of a new structure, existing SRFD facilities have adequate capacity to meet this demand while maintaining performance objectives. In particular, given the Project's proximity to local fire stations, fire personnel will be able to reach the Project site in accordance with applicable performance objectives (City of Santa Rosa 2009d). Accordingly, the Project will not trigger the need for the City to construct any new or expanded fire protection facilities.

In addition, SRFD has approved plans to construct a new fire station and response unit to serve the City's south-central area, which will further improve coverage and response time in this area (ESCI 2016a). The new fire station, to be located southeast of the intersection of Franz Kafka Avenue and Kawana Terrace (approximately 0.3 mile northeast of the Project site), and was programmed before the Project was proposed. In other words, the new station was not related to the Project, nor is it required to maintain acceptable performance objectives for service to the Project. Thus, there are no environmental impacts due to the physical construction of new fire protection facilities related to implementation of the Project.

Moreover, the Project will further reduce its demand for fire protection services by complying with mandatory state and local fire safety and suppression requirements, including for provision of fire sprinklers, fire hydrant system access, and secondary access routes. Emergency access to the Project will be provided from the driveways off Yolanda Avenue, with a secondary emergency access route off Petaluma Hill Road.

Project operations will also be subject to review and approval by the City to ensure fire safety and reduce demand on fire protection services. Extraction operations would include a closed-loop system meeting the requirements of the federal Food, Drug, and Cosmetic Act including use of authorized solvents only, the prevention of off-gassing, and certification by a California licensed engineer. In accordance with the City of Santa Rosa Cannabis Ordinance, extraction equipment would be annually inspected and recertified by a California licensed engineer. No on-site cannabis cultivation, distribution, manufacturing or testing/laboratory operations would occur until the Bureau of Fire Prevention issued an operational permit (SRCC Section 18-44.105.6.50). The closed-loop extraction system would not be utilized until inspected and approved by the City's Building Official and Fire Code Official, in accordance with the City of Santa Rosa Cannabis Ordinance.

As discussed in Section 9(f), Hazards and Hazardous Materials, the Project is assumed to be located within a Wildland-Urban Interface Fire Threat Area. Also note, however, that the existing conditions on the Project site do not contain high levels of fire fuel. Instead, the Project site is surrounded on three sides by paved road and an adjacent parking lot. Also, a large portion of the project site contains gravel surfaces that would be replaced with paved parking areas. There are regularly-disk undeveloped grass areas and some trees on the Project site. Yet, these existing conditions are not considered fire threat conducive. Even with these low-risk on-site conditions, the Project includes proactive measures to reduce the potential risk associated with wildfire. The Project would prepare and implement a Vegetation Maintenance Program, as required by **Mitigation Measure HAZ-2**. Although the Vegetation Maintenance Program is not necessary to mitigate this potential impact, its implementation will further reduce the Project's potential demand on fire protection services and ensure that the Project will not trigger the need for the City to construct new fire protection facilities.

Therefore, the Project will not result in substantial adverse physical impacts associated with the provision of or need for new or physically altered fire facilities, the construction of which would cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire services. The Project will have no impact.

b) Police Protection?

No Impact. The Santa Rosa Police Department will provide police protection services for the Project area. Although the Project will slightly increase demand for police services (due to a new structure and employees on the site), existing police facilities have adequate capacity to meet this demand, and the Project will not by itself trigger the need for any new or expanded police facilities. Accordingly, there are no environmental impacts from the physical construction of new police facilities.

In addition, the Project will further reduce its potential demand for police services by complying with mandatory safety regulations and incorporating security features. Under the City of Santa Rosa Cannabis Ordinance (ORD-2017-025), the Project must meet requirements for site security, including establishing measures for prevention of access for unauthorized persons to the property, adequate lighting, security cameras, an alarm system, securing waste and storage, and safe and secure transportation.

Security surveillance video cameras will be installed to provide 24-hour surveillance of all internal and external areas where cannabis is cultivated, weighed, manufactured, packaged, stored, transferred, and dispensed. An alarm system will also be installed, and an alarm permit will be obtained from the Santa Rosa Police Department prior to installation. The system will include sensors to detect entry and exit from secure areas. Inventory controls and loss documentation procedures will be implemented. A web-based inventory control system will be accessible upon demand to enable the City to implement a track-and-trace program. All cannabis products produced, manufactured, or distributed through the facility will be inventoried into the system along with the employee identification number, date and time, quantity, strain, and batch number. All employees will be trained to report loss or theft immediately to the company and the City of Santa Rosa. All products will be stored in a restricted-access area. Locks will be placed on points of entry and exit compliant with Building Code. Security measures will also be designed to ensure emergency access compliance with the California Fire Code and Santa Rosa Fire Department standards. A local security company, SOCO Private Security would conduct patrols of the property 24 hours per day, and walls will be constructed along the perimeter of the Project site (Figure II.7). Compliance with these requirements will further ensure that the Project will not trigger the need for the City to construct new police protection facilities.

Therefore, the Project will not result in substantial adverse physical impacts associated with the provision of or need for new or physically altered police facilities, the construction of which will cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for police services. The Project will have no impact.

c) Schools?

No Impact. The Project will not require construction of new or expanded school facilities. The Project is a cannabis cultivation facility that would not induce substantial population growth in the area, as discussed in Section 14 (Population and Housing). Therefore, the Project will not increase the City’s student population such that new schools would be required, and there is no possibility of environmental impacts due to the physical construction or expansion of schools. In addition, the Project will be required to pay taxes and fees to support future development and maintenance of school facilities.

Therefore, the Project will not result in substantial adverse physical impacts associated with the provision of or need for new or physically altered school facilities, the construction of which will cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for school services. The Project will have no impact.

d, e) Parks and/or other public facilities?

No Impact. Project development will not impact local or regional parks, nor require the construction or provision of new or expanded parks or other public facilities. The Project is a cannabis cultivation facility that will not induce substantial population growth in the area, as discussed in Section 14 (Population and Housing). Therefore, it will not trigger the need for new or expanded parks, recreational facilities, or other public facilities, and there is no possibility of environmental impacts due to the physical construction or expansion of such facilities. In addition, the Project sponsor will be required to pay development impact fees to support future development and maintenance of miscellaneous public services.

Therefore, the Project will not result in substantial adverse physical impacts associated with the provision of or need for new or physically altered parks or other public facilities, the construction of which will cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services. The Project will have no impact.

15.3 Mitigation Measures

No mitigation measures are required.

16. RECREATION	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) 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?	☐	☐	☐	☒
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?	☐	☐	☐	☒

16.1 Environmental Setting

The City of Santa Rosa operates 531 acres of neighborhood and community parks, 170 acres of undeveloped parkland, and 14 additional community and/or recreational facilities around the City. The largest City park is the 152-acre Howarth Memorial Park, located approximately 4.5 miles northeast of the Project. Additional parks located within City, but not operated by the City, include the Taylor Mountain Regional Park & Open Space Preserve (approximately 1,100 acres in size and 0.5 mile east of the Project at its nearest point), Spring Lake County Park (approximately 320 acres in size and 4 miles northeast of the Project) and Annadel State Park (approximately 5,000 acres in size and 5 miles northeast of the Project). Neighborhood parks near the Project include the 3.5-acre Harvest Park (1,200 feet southwest) and the 3.0-acre Colgan Creek Park (0.5 mile north).

16.2 Impact Analysis

This section analyzes the Project's potential impacts with respect to the provision of new recreational facilities. The Project would not materially increase or decrease the use of existing parks. There are no other recreational facilities located near the Project site that would be adversely impacted by the Project. A discussion of each environmental issue included under Section 16 is presented below.

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?

No Impact. The Project will result in the development of a cannabis cultivation facility with approximately 105 employees. The project will not result in a permanent population increase around the Project site. Instead, the employees will commute to the facility and leave the facility when their shift is complete. It is not anticipated that the employee will travel to, or use, the parks in the area in connection with their employment at the facility. There is no direct path of travel from the project Site to Harvest Park, which is the closest park to the facility. Even if an occasional employee utilize a nearby park, that is not enough use to cause a substantial deterioration of the recreational facility. Therefore, the Project will not increase the use of existing neighborhood or regional parks or other recreational facilities, such that substantial physical deterioration of the facility will occur or be accelerated; nor will the Project require the construction or expansion of recreational facilities. The Project will have no impact.

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?

No Impact. The Project does not include recreational facilities or require construction or expansion of recreational facilities because it is a light industrial facility that does not increase demand for, or the use of, recreational facilities.

16.3 Mitigation Measures

No mitigation measures are required.

17. TRANSPORTATION	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Conflict with a plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b) Conflict or be inconsistent with CEQA Guidelines section 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?	☐	☐	☒	☐

17.1 Existing Conditions

This section outlines the transportation setting, methodology of the transportation analysis, and existing operating conditions of the study roadway network.

17.1.1 Transportation Setting

The Project site is located at 800 Yolanda Avenue in the City of Santa Rosa, California. The Project site is located at the southwest corner of the intersection of Yolanda Avenue and Petaluma Hill Road. Yolanda Avenue is a two-lane, east-west roadway that is designated as a regional/arterial street in the Santa Rosa General Plan Transportation (Circulation) Element. Petaluma Hill Road is a two-lane, north-south roadway that is designated as a regional/arterial street in the Santa Rosa General Plan Transportation (Circulation) Element. The Project includes an internal circulation system that takes access to the public roadway network through the use of two driveways on Yolanda Avenue. The easternmost driveway will be located approximately 400 feet west of the intersection of Yolanda Avenue and Petaluma Hill Road. The westernmost driveway will be located about 200 feet west of the eastern driveway.

17.1.2 Transportation Analysis Methodology

Multimodal transportation operations in the City of Santa Rosa are governed by the goals and policies in the Santa Rosa General Plan Transportation (Circulation) Element. The operations of roadway facilities are described with the term “level of service” (LOS). LOS is a qualitative description of traffic flow from a vehicle driver's perspective based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined ranging from LOS A (free-flow conditions) to LOS F (over capacity conditions). LOS E corresponds to operations "at capacity." When volumes exceed capacity, stop-and-go conditions result, and operations are designated LOS F.

For signalized intersections, the method described in Chapter 18 of the Transportation Research Board's *2010 Highway Capacity Manual* (2010 HCM) was used to conduct the level of service calculations for the signalized study intersections. This method is used to estimate the control delay experienced by motorists at an intersection. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections was calculated using the Synchro traffic analysis software and correlated to a LOS designation.

For unsignalized intersections, the method described in Chapter 19 of the 2010 HCM was used to conduct the level of service calculations for the side-street stop-controlled intersections. The average control delay for unsignalized intersections was also calculated using the Synchro traffic analysis software. For side-street stop-controlled intersections, the worst movement (for multi-lane approaches) or worst approach (for single-lane approaches) delay was used to determine the LOS for the intersection, using the LOS designations.

A multimodal transportation impact analysis (TIA) for the Project was completed by Fehr & Peers to assess existing transportation conditions and to identify the potential for the Project to significantly impact the circulation system (Fehr & Peers 2019a). Additionally, Fehr & Peers prepared a technical memorandum presenting the results of its parking analysis (Fehr & Peers 2019b). The TIA and parking memorandum are included as **Appendix H.**

The multimodal TIA evaluates the following seven intersections:

1. Kawana Springs Road/Petaluma Hill Road
2. Yolanda Avenue/Petaluma Hill Road
3. Yolanda Avenue-US 101 Northbound Ramps/Santa Rosa Avenue
4. Hearn Avenue/Santa Rosa Avenue
5. Hearn Avenue/Corby Avenue
6. Project Driveway East/Yolanda Avenue
7. Project Driveway West/Yolanda Avenue

17.1.3 Existing Facilities and Operating Characteristics

Existing intersection operating conditions during the typical weekday morning (AM) and afternoon (PM) commute periods were analyzed and documented for the above intersections. These operations are documented below in Table 17.1; all intersections operate acceptably with respect to the LOS D standard, except for the intersection of Hearn Avenue/Corby Avenue, which operates at LOS E during the AM peak hour and PM peak hour.

Table 17.1 Existing Intersection Levels of Service

Intersection		Control Type	Peak Hour	Delay	LOS
1	Kawana Springs Road/ Petaluma Hill Road	Signalized	AM PM	23.5 23.7	C C
2	Yolanda Avenue/ Petaluma Hill Road	Signalized	AM PM	20.0 29.8	B C
3	Yolanda Avenue-US 101 Northbound Ramps/Santa Rosa Avenue	Signalized	AM PM	35.3 37.8	D D
4	Hearn Avenue/ Santa Rosa Avenue	Signalized	AM PM	25.0 29.5	C C
5	Hearn Avenue/ Corby Avenue	Signalized	AM PM	**57.8** **62.3**	**E** **E**
6	Project Driveway East/ Yolanda Avenue	*Intersection does not exist in this scenario.*			
7	Project Driveway West/ Yolanda Avenue	*Intersection does not exist in this scenario.*			

Source: Fehr & Peers, 2019. Delay measured in seconds per vehicle. LOS = Level of Service designation per 2010 Highway Capacity Manual. **Bold** represents unacceptable operations.

The study area roadways are characterized as the following:

Yolanda Avenue is a two-lane regional/arterial street located north of the project; the facility runs in an east-west direction from Santa Rosa Avenue in the west, to Petaluma Hill Road in the east. Further to the west of Santa Rosa Avenue, Yolanda Avenue transitions to/from the ramps at the US 101/Yolanda Avenue-Hearn Avenue interchange. The speed limit on the facility near the Project site is 35 miles per hour; bicycle and pedestrian facilities are generally not provided in the vicinity of the Project site. The Yolanda Avenue corridor is also proposed to connect to the future Farmers Lane Extension, a portion of which is currently under construction as part of a nearby development project.

Petaluma Hill Road is a north-south two-lane regional/arterial street that extends from Santa Rosa Avenue (near State Route 12 [SR 12]) in the north to Adobe Road in Penngrove. In addition to the roadway being designated as a regional/arterial street in the Santa Rosa General Plan, Petaluma Hill Road is a major regional roadway paralleling US 101, and provides connections between southeastern Santa Rosa, eastern Rohnert Park, Penngrove and Petaluma (via subsequent connections to Old Redwood Highway and Adobe Road). The posted speed limit is 35 miles per hour between Colgan Avenue and Burt Street and 40 miles per hour between Burt Street and the city limits south of the study area; on-street parking is prohibited along the roadway.

Santa Rosa Avenue is a north-south four-to-six lane regional/arterial street that extends from Downtown Santa Rosa (at Third Street) in the north to US 101 and Roberts Lake Road in the south. The facility serves a mix of residential, retail, and industrial uses along the corridor. The posted speed limit is 40 miles per hour and on-street parking is (generally) not permitted.

Hearn Avenue is a two-to-four lane east-west regional/arterial street that connects residential areas west of Stony Point Road (in the west) to Santa Rosa Avenue in the east. The roadway serves as one of the three local US 101 overcrossings between SR 12 and Rohnert Park. The US 101/Hearn Avenue interchange is proposed to be improved as part of the *US 101/Hearn Avenue Interchange Project*. The posted speed limit in the vicinity of the interchange is 30 miles per hour.

Kawana Springs Road is an east-west two-lane regional/arterial street that connects Santa Rosa Avenue in the west to residential neighborhoods in the east. The roadway is proposed to connect to the future Farmers Lane Extension. The current posted speed limit is 30 miles per hour to the east of Petaluma Hill Road and 35 miles per hour to the west of Petaluma Hill Road.

US 101 is a six-lane north-south freeway that connects the project site to destinations throughout central Sonoma, Marin, and Mendocino Counties, with further connections to San Francisco, Los Angeles, and California's North Coast region. In the vicinity of the project site, US 101 includes high-occupancy vehicle lanes, which require a vehicle occupancy of two or more persons. The on-ramps at the US 101/Hearn Avenue-Yolanda Avenue are subject to ramp metering during the morning and afternoon commute periods; the northbound US 101 on-ramp includes a high-occupancy vehicle bypass lane, subject to a vehicle occupancy restriction of two or more persons per vehicle.

The intersection operations/LOS analysis includes an evaluation of Existing Conditions, Existing plus Approved Projects Conditions, and Cumulative Conditions. The Existing plus Approved Projects and Cumulative scenarios include a LOS analysis of intersection operations both without and with the addition of trips generated by the Project. Existing plus Approved Projects scenario traffic volumes were generated using traffic count data and data regarding approved project trip generation as provided by City of Santa Rosa staff for nearby approved projects. As explained in Section 5.0 of the TIA, the baseline conditions analysis includes certain improvements and approved projects in the vicinity of the project site because that is a more accurate picture of the proposed project's likely impacts once operational. This is due to changes in the city roadway infrastructure and status of developments that affect conditions surrounding the project site that would occur before implementation of the project. This approach provides the decision makers and public a more realistic and accurate picture of the potential traffic impacts the project would have. Cumulative Conditions scenario traffic volumes were developed using the Sonoma County Transportation Authority (SCTA) travel demand model. The SCTA travel demand model includes land use data to reflect project buildout of the Santa Rosa General Plan and other regional land use planning projections, such as Plan Bay Area (2040). Future roadway improvements, such as the proposed Farmers Lane extension between Bennett Valley Road and Yolanda Avenue/Bennett Valley Road, are included in the SCTA travel demand model.

The study area is served by a variety of public transit operators, which provide local, regional and intercity transit services. Local transit connections are provided by Santa Rosa CityBus. Sonoma County Transit provides regional and intercity transit service.

The City of Santa Rosa *Bicycle and Pedestrian Master Plan* notes the presence of several existing and proposed bicycle facilities in the study area (City of Santa Rosa 2019). Figure 3-14 of the plan notes the presence of existing Class II bike lanes along Petaluma Hill Road, Kawana Springs Road, and Santa Rosa Avenue. Improvements to the bicycle system, as noted on Figure 5-6 of the plan, include Class II bike lanes on Yolanda Avenue, Hearn Avenue and the proposed Farmers Lane Extension. The existing Class II bike lanes on Petaluma Hill Road are proposed to be upgraded to buffered bike lanes north of Yolanda Avenue.

17.2 Thresholds of Significance

The Fehr & Peers multimodal transportation impact analysis (TIA) assessed the Project's effect on intersection operations, as well as the project's effect on transit, bicycle and pedestrian facilities. This analysis was based on the following impact criteria, with the applicable Santa Rosa General Plan Transportation Element policy or polices noted.

Signalized Intersection

The Project would have significant impacts to signalized intersection operations if:

- For intersections operating acceptably (LOS A, B, C or D) prior to the implementation of the Project: the Project would create a significant impact if it would cause intersection operations to degrade to LOS E or LOS F
- For intersections operating unacceptably (LOS E or LOS F) prior to the implementation of the Project: the Project would create a significant impact if it would result in an increase of greater than 5.0 seconds in the average delay at the intersection *and* the number of project trips added to the intersection results in an increase in volume-to-capacity ratio of more than 0.020.

Unsignalized Intersection

The Project would have significant impacts to unsignalized intersection operations if:

- For intersections operating acceptably (LOS A, B, C or D) prior to the implementation of the Project: the Project would create a significant impact if both the following criteria are met:
  - It would cause intersection operations to degrade to LOS E or LOS F
  - The intersection meets California Manual on Uniform Traffic Control Devices (MUTCD) Signal Warrant 3A or Warrant 3B (commonly known as the "Peak Hour Signal Warrant")
- For intersections operating unacceptably (LOS E or LOS F) prior to the implementation of the Project: the Project would create a significant impact if both the following criteria are met:
  - The Project would result in an increase of greater than 5.0 seconds in the worst approach or worst movement delay at the intersection

- The intersection meets California MUTCD Signal Warrant 3A or Warrant 3B (commonly known as the "Peak Hour Signal Warrant")

Pedestrian System

The Project would create a significant impact related to the pedestrian system if any of the following criteria are met:

- The Project generates 20 or more pedestrians in any single hour at an unsignalized intersection, mid-block crossing, or where no crossing has been established;
- The Project disrupts existing pedestrian facilities, including existing paths of travel and direct access;
- The Project interferes with or precludes planned pedestrian facilities; or
- The Project creates inconsistencies with adopted pedestrian system plans, guidelines, policies, or standards.

Bicycle System

The Project would create a significant impact related to the bicycle system if any of the following criteria are met:

- The Project disrupts existing bicycle facilities, including existing paths of travel and direct access;
- The Project interferes with or precludes planned bicycle facilities; or
- The Project creates inconsistencies with adopted bicycle system plans, guidelines, policies, or standards.

Public Transit System (Policy T-H-3)

The Project would create a significant impact related to public transit service if any of the following criteria are met:

- The Project generates a substantial increase in public transit riders that cannot be adequately served by existing public transit services;
- The Project establishes transit facilities or equipment that results in a sight distance deficiency or vehicle conflict point; or
- The Project disrupts or conflicts with existing or planned public transit facilities.

Emergency Access

Ease of access and travel time are critical for first responders traveling in emergency access vehicles. Obstructions in the roadway, detours, and congestion delay are among the factors that can affect emergency response time. Using the Santa Rosa General Plan as a guide, significant impacts would occur if a project or an element of a project:

- Conflicts with an existing or planned emergency response facility or route; or
- Provides inadequate access to accommodate emergency vehicles

17.3 Impact Analysis

This section analyzes the Project's potential impacts to the multimodal transportation system. This analysis is based on applicable plans and policies for the assessment of significant impacts, and the TIA prepared by Fehr & Peers (Fehr & Peers 2019a).

The Project does not conflict with the LOS standards established by the City, the City of Santa Rosa Bicycle and Pedestrian Master Plan goals, the pending "vehicle miles traveled" (VMT) requirements (CEQA Guidelines section 15064.3(b)), or emergency access-ways. The sight-distances associated with the Project driveways meet the Caltrans Highway Design Manual standards. The technical reports were prepared, and this Mitigated Negative Declaration was published, before July 1, 2020, and thus more detailed VMT analysis was not required by the Lead Agency.

A discussion of each environmental issue included under Section 17 is presented below.

a) Would the project conflict with a plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

Less than Significant Impact. The multimodal TIA evaluated intersection operations, and the transit, bicycle and pedestrian facilities in the study area for the Existing plus Approved Projects condition and the Cumulative condition.

The trip generation for the Project was estimated based on travel characteristics for the employees and visitors traveling to uses on site. These characteristics include the following:

- Employee shifts: As described in Section II.5 of the Project Description
- Deliveries: One (1) peak hour round trip per peak hour, up to 10 daily round trips
- Other trips generated by visitors, employee appointments, US Mail, etc.: 20 daily trips, with three (3) round trips occurring in each peak hour

Under these assumptions, the Project is estimated to generate 285 daily total trips, 63 AM peak hour trips (54 inbound and 9 outbound), and 78 PM peak hour trips (29 inbound and 49 outbound). The trip generation estimation project, as described in the TIA developed by Fehr & Peers, assumes that the employee shifts generate commute-related trips by employees during the 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM peak periods of travel. As described in Section II.5 of the Project Description, the employee shifts are not proposed to begin or end during the 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM peak periods, indicating a substantially reduced potential for the generation of Project-related trips during the morning and evening peak hours of travel.

Existing plus Approved Projects Scenario

The Existing plus Approved Projects scenario baseline (i.e. "No Project") includes existing traffic demand plus traffic demand generated by nearby approved or built but not yet occupied projects. Additionally, a growth factor of five percent (approximately 2.5 percent per year) is applied to reflect growth in regional travel demand beyond the trips generated by nearby projects. The Existing plus Approved Projects plus Project scenario includes the addition of Project-generated trips in addition to the baseline volumes. The Existing plus Approved Projects scenario also includes partial buildout of the Farmers Lane extension project (project currently under construction to serve the Kawana Springs neighborhood); the partial buildout assumption includes only the portion of the Farmers Lane extension project between Petaluma Hill Road and the Kawana Springs neighborhood – the connection to Bennett Valley Road is not assumed for this scenario. Table 17.2 presents the operations of study intersections under the Existing plus Approved Projects scenario; and also shows the impacts of adding the project to the baseline conditions.

Table 17.2 Existing Plus Approved Projects Intersection Levels of Service

Intersection		Control Type	Peak Hour	Existing plus Approved Projects		Existing plus Approved Projects plus Project	
				Delay	LOS	Delay	LOS
1	Kawana Springs Road/ Petaluma Hill Road	Signalized	AM PM	31.9 28.7	C C	31.9 28.8	C C
2	Yolanda Avenue/ Petaluma Hill Road	Signalized	AM PM	40.7 **63.7**	D **E**	42.4 **67.0**	D **E**
3	Yolanda Avenue-US 101 Northbound Ramps/ Santa Rosa Avenue	Signalized	AM PM	41.6 40.4	D D	42.3 41.0	D D
4	Hearn Avenue/ Santa Rosa Avenue	Signalized	AM PM	18.6 25.3	B C	19.0 25.8	B C
5	Hearn Avenue/ Corby Avenue	Signalized	AM PM	**77.9** **72.6**	**E** **E**	**79.2** **75.4**	**E** **E**
6	Project Driveway East/ Yolanda Avenue	Side-Street Stop-Controlled	AM PM	*Intersection does not exist in this scenario.*		0.2 (16.6) 0.8 (16.4)	A (C) A (C)
7	Project Driveway West/ Yolanda Avenue	Side-Street Stop-Controlled	AM PM	*Intersection does not exist in this scenario.*		0.1 (17.8) 0.1 (16.1)	A (C) A (C)

Source: Fehr & Peers, 2019. Delay measured in seconds per vehicle. Delay for side street stop-controlled intersections presented as: whole intersection average delay (worst movement delay). LOS = Level of Service designation per 2010 Highway Capacity Manual. **Bold** represents unacceptable operations.

As presented in Table 17.2, the effect of the addition of Project generated traffic to the roadway system is that most intersections operate within the City's LOS D standard. For those intersections where intersections would operate at LOS E, the addition of Project trips does not result in a delay change of more than five seconds. Therefore, the project does not conflict with applicable LOS standards and other congestion related policies regarding impacts to the circulation system. Impacts would be less-than-significant.

Cumulative Scenario

The Cumulative scenario considers a horizon year of 2040, which includes buildout of the Santa Rosa General Plan. Traffic volume forecasts were developed using outputs from the Sonoma County Transportation Authority (SCTA) travel demand model, which includes land use projections for Santa Rosa and Sonoma County, as well as buildout of the roadway network per the General Plan. Under the Cumulative scenario, nearby roadway improvements include the full buildout of the Farmers Lane extensions between Yolanda Avenue/Petaluma Hill Road and Bennett Valley Road, and the US 101/Hearn Avenue interchange improvements project. A widening of Yolanda Avenue to four lanes would also result with the implementation of the Farmers Lane extension, and the Yolanda Avenue/Petaluma Hill Road intersection would be widened to accommodate the additional through lanes. The Cumulative plus Project scenario analysis considers baseline Cumulative scenario volumes plus traffic generated by the Project.

Table 17.3, below, presents the results of the Cumulative scenario analysis.

Table 17.3 Cumulative (Year 2040) Intersection Levels of Service

Intersection		Control Type	Peak Hour	Cumulative Conditions		Cumulative plus Project Conditions	
				Delay	LOS	Delay	LOS
1	Kawana Springs Road/ Petaluma Hill Road	Signalized	AM PM	**66.1** **62.2**	**E** **E**	**66.1** **62.2**	**E** **E**
2	Yolanda Avenue/ Petaluma Hill Road	Signalized	AM PM	28.6 50.1	C D	28.9 50.7	C D
3	Yolanda Avenue-US 101 Northbound Ramps/ Santa Rosa Avenue	Signalized	AM PM	52.9 41.6	D D	53.2 42.0	D D
4	Hearn Avenue/ Santa Rosa Avenue	Signalized	AM PM	42.4 47.9	D D	44.8 49.1	D D
5	Hearn Avenue/ Corby Avenue	Signalized	AM PM	**95.1** **135.9**	**F** **F**	**95.7** **139.9**	**F** **F**
6	Project Driveway East/ Yolanda Avenue	Side-Street Stop-Controlled	AM PM	*Intersection does not exist in this scenario.*		0.1 (19.5) 0.8 (30.9)	A (C) A (D)
7	Project Driveway West/ Yolanda Avenue	Side-Street Stop-Controlled	AM PM	*Intersection does not exist in this scenario.*		0.1 (21.4) 0.1 (27.1)	A (C) A (D)

Source: Fehr & Peers, 2019. Delay measured in seconds per vehicle. Delay for side street stop-controlled intersections presented as: whole intersection average delay (worst movement delay). LOS = Level of Service designation per 2010 Highway Capacity Manual. **Bold** represents unacceptable operations.

As presented in Table 17.3, the effect of the addition of Project generated traffic to the roadway system is that most intersections operate within the City's LOS D standard. For those intersections where intersections operate at LOS E or LOS F, the addition of Project trips does not result in a delay change of more than five seconds. Therefore, the project does not conflict with applicable LOS standards and other congestion related policies regarding the circulation system. Impacts would be less-than-significant in the Cumulative scenario.

<u>Transit, Bicycle and Pedestrian Facilities</u>

Public transit, bicycle and pedestrian facilities in the vicinity of the project will not be significantly impacted by the Project. While the Project would generate minor amounts of additional demand for public transit on nearby public transit lines, the Santa Rosa CityBus and Sonoma County Transit routes serving the site currently have adequate capacity to accommodate the additional demand. Therefore, the Project impact to the transit system is less than significant.

The recently adopted *City of Santa Rosa Bicycle and Pedestrian Master Plan* details goals and policies for the pedestrian and bicycle circulation system in the vicinity of the Project. The Yolanda Avenue corridor is proposed to receive Class II bike lanes; the Project would not preclude the installation of these Class II bike lanes. Likewise, the Project would provide a dedication of land to the City to facilitate construction of sidewalks along the Yolanda Avenue project frontage, which would facilitate the installation of other planned or programmed pedestrian facilities in this area when the City implements street improvements in the vicinity.

In addition, as noted above, public street, sidewalk, and utility improvements along the parcel's Petaluma Hill Road and Yolanda Avenue frontages, as well as any associated right-of-way or easement dedications, shall be designed, installed, and dedicated in a manner consistent with the requirements and allowances set forth in the City of Santa Rosa's General Plan, Design and Construction Standards, and Chapter 18-12 of the Santa Rosa City Code.

The project would generate a minor amount of additional pedestrian activity at the project site. However, it would not significantly impact pedestrian, bike, or transit facilities in the vicinity. Also note that the Project Site and surrounding land uses are industrial uses that are not typically associated with high rates of pedestrian activity. Data from the California Household Travel Survey indicates that about 89% of commute trips in Santa Rosa are done by car, with 9% walking, 1.7% bicycling and <1.0% on transit. Under a peak shift change condition at the Project (i.e., 45 day shift employees changing with 25 night shift employees), and a 21.5% non-drive share assumption (which is a conservative estimate higher than the referenced data), the Project could potentially generate approximately 15 non-auto trips total. Therefore, the Project would not create significant pedestrian-related impacts and also would not generate a substantial increase in public transit riders. Therefore, the project's impacts to pedestrians and bicyclists are less-than-significant.

b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

Less than Significant Impact. CEQA Guidelines Section 15064.3 establishes that VMT, rather than automobile delay or LOS, will become the most appropriate measure of transportation impacts in the future. The new requirements of CEQA Guidelines Section 15064.3 do not apply statewide until July 1, 2020. (Subd. (c).). A lead agency may elect to be governed immediately by the new requirements, but the City of Santa Rosa has not made this election. And, the City (as the Lead Agency) has set forth that any project environmental document released for public review prior to July 1, 2020, will not be subject to the new VMT CEQA requirements. Accordingly, the Project analysis was performed according to LOS standards in effect prior to July 1, 2020, and is not in conflict or inconsistent with CEQA Guidelines Section 15064.3, and impacts are less than significant.

Although no legally binding VMT threshold of significance applies to the Project, this analysis includes a discussion of VMT for informational purposes. Even if CEQA Guidelines Section 15064.3 applied, the Project would be consistent with its requirements, and the Project's VMT impacts would be less than significant.

Projects within one-half mile of either an existing major transit stop or along an existing high-quality transit corridor are presumed to cause a less than significant transportation impact(Subd. (b)(1)). A high-quality transit corridor is defined as an existing fixed-route bus corridor with a headway of 15 minutes or better during both the morning and evening peak periods.

Here, the Project site is located approximately one-half mile from transit stops along the Santa Rosa Avenue corridor. These stops are served by Santa Rosa CityBus and Sonoma County Transit routes that, combined, result in service frequencies of about 15 minutes. These routes all travel along Santa Rosa Avenue between Yolanda Avenue and downtown Santa Rosa, and all routes serve the downtown Santa Rosa transit mall, which is a major local and regional transit hub. Collectively, these routes form a high-quality transit corridor for purposes of CEQA Guidelines Section 15064.3. Given the project's proximity to this corridor, it complies with the requirements of CEQA Guidelines Section 15064.3, and it is presumed to have a less than significant transportation impact.

c) Would the project substantially increase traffic hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Less than Significant Impact. The multimodal TIA completed by Fehr & Peers included a sight distance evaluation along the Yolanda Avenue corridor in the vicinity of the Project driveways. The posted speed limit along Yolanda Avenue is 35 miles-per-hour, which corresponds to a required stopping sight distance of 250 feet per Table 201.1 of the Caltrans Highway Design Manual. According to Table 405.1B of the Caltrans Highway Design Manual, required corner sight distance for private driveway intersections with public roadways is equal to the stopping sight distance along the public roadway. The observed sight distance along Yolanda Avenue appears to be in excess of 250 feet, and thus sight distance at the driveway intersections would be adequate.

The proposed driveways are to intersect Yolanda Avenue at or near 90-degree angles, which is consistent with general practices for minimizing sight distance hazards. While it is recommended that the final site plan be reviewed prior to issuance of building permits for potential sight distance impediments (including, but not limited to, new signs, above ground utility boxes, light poles, or landscaping proposed in the corner sight triangle), the Project does not propose to construct geometric design features or incompatible uses that would substantially increase traffic hazards. The Yolanda Avenue corridor is frequently traveled by large trucks, and the addition of a limited amount of new daily truck trips will not be incompatible with the corridor. Therefore, the Project does not result in an increase in traffic hazards, and the impact is less than significant.

d) Would the project result in inadequate emergency access?

Less than Significant Impact. The Project would accommodate emergency vehicle access through the use of two driveways along Yolanda Avenue. A fire tender roof access area is located along the southern perimeter of the main building, and a ring road encircles the main building.

The Project would not significantly degrade the operations along public roadway system in the vicinity of the project site, and thus emergency vehicle access routes would not be impacted. Therefore, the project does not conflict with existing or planned emergency vehicle response routes, nor does it provide inadequate access to accommodate emergency response vehicles. Therefore, the Project does not result in inadequate emergency access and the impact is less than significant.

17.4 Mitigation Measures

No mitigation measures are required.

18. TRIBAL CULTURAL RESOURCES	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in the 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:				
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	☐	☒	☐	☐
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 resources to a California Native American tribe.	☐	☒	☐	☐

18.1 Environmental Setting

Origer prepared a Historical Resources Study for the Project site dated September 6, 2017 (Origer 2017; **Appendix F**). The Historical Resources Study included an archival search at the NWIC, Sonoma State University, Rohnert Park, California and at the Origer offices. Archival research found that the Project area had not been previously subject to a cultural resources survey. Two studies have been conducted adjacent to the Project area (Jones & Stokes 2000; Origer 1976). Two resources are recorded within ¼ mile of the Project site (Chattan 2003, 2009). These resources do not have the potential to extend onto the Project site.

On April 24, 2017, Origer submitted a Sacred Lands File & Native American Contacts List Request to the NAHC. On April 27, 2017, NAHC responded to the request and indicated that the Sacred Lands File was completed for the Project site with negative results. The NAHC provided a list of Native American tribes with traditional lands or cultural places located within the boundaries of Sonoma County to contact for further information. Four tribes are listed: Federated Indians of Graton Rancheria, Kashia Band of Pomo Indians of the Stewarts Point Rancheria, Lytton Rancheria of California, and Mishewal-Wappo Tribe of Alexander Valley. Representatives the Federated Indians of Graton Rancheria (FIGR) and Lytton Rancheria of California were contacted via USPS on April 24, 2017, and representatives of the Kashia Band of Pomo Indians of the Stewarts Point Rancheria and Mishewal-Wappo Tribe of Alexander Valley were contacted via USPS on May 2, 2017.

On May 10, 2017, a response was received via email from Buffy McQuillen, Tribal Heritage Preservation Officer representing the FIGR. Ms. McQuillen acknowledged receipt of the notification letter and stated that the Tribe would review the project within ten days. No other comments have been received as of February 9, 2018 (Origer 2018).

In accordance with AB 52, notification of the Project was mailed by City of Santa Rosa Planning Department staff to the following local tribes on May 10, 2018:

- Lytton Rancheria of California
- Federated Indians of Graton Rancheria

None of the contacted tribes requested consultation under AB 52.

18.2 Impact Analysis

The following section analyzes the Project's potential impacts on tribal cultural resources. This analysis is based upon the Historical Resources Study prepared for the Project site, archival research including at the Northwest Information Center, and information received from the Native American Heritage Commission and Sacred Lands File.

Although highly unlikely based on the geological and historical resource reports prepared for the Project, there is a possibility the grading and construction activities associated with the Project could potentially disturb unknown tribal cultural resources on the Project site. Implementation of **Mitigation Measures CUL-1 and CUL-2** will reduce the potential impact to less than significant. A discussion of each environmental issue included under Section 18 is presented below.

a, b) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in the 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 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)? Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in the 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 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?

Less than Significant Impact with Mitigation. A search of the Sacred Land File did not indicate the presence of a Native American Sacred Site within or in the immediate vicinity of the Project site. The site-specific Historical Resources Study noted that two resources are recorded within ¼ mile of the Project site (Chattan 2003, 2009); however, neither resource has the potential to extend into the Project site. Origer concluded that based on the study area's geologic age, analysis of the environmental setting, and analysis of soil sensitivity for buried sites, the probability of identifying a buried prehistoric archaeological site is very low. See further discussion in Section 5 (Cultural Resources).

It is highly unlikely that tribal cultural resources are present on the Project site. There is nevertheless a low possibility of discovery of unknown tribal cultural resources during Project construction. If a potential tribal cultural resource is unearthed on the Project site, **Mitigation Measures CUL-2** and **CUL-3** must be implemented. **Mitigation Measure CUL-2** requires that ground-disturbing activity immediately halt, that a qualified archeologist and tribal representative (if appropriate) be notified, and that the resource be appropriately evaluated and addressed. In the event that human remains are unearthed on the project site, **Mitigation Measure CUL-3** requires that ground-disturbing activity immediately halt, and that the Sonoma County Coroner be contacted to fulfill its legally mandated duties. Consistent with Sonoma County General Plan Policies HP-A-1 through HP-A-5, implementation of **Mitigation Measures CUL-2** and **CUL-3** will ensure that any tribal cultural resources are appropriately addressed and that any Native American human remains are treated with sensitivity and dignity.

Accordingly, the Project will not cause a substantial adverse change in the significance of a tribal cultural resource that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources, or that is significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. With implementation of **Mitigation Measures CUL-2 and CUL-3**, impacts will be less than significant.

18.3 Mitigation Measures

The Project must implement **Mitigation Measures CUL-2 and CUL-3**, as described in Section 5 (Cultural Resources) in the event of an accidental find.

19. UTILITIES AND SERVICE SYSTEMS	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b) Have sufficient supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
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?	☐	☐	☒	☐
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

19.1 Environmental Setting

Water

The Project site is currently connected to the City's public water supply system. The Sonoma County Water Agency (SCWA) provides domestic water to the project area. SCWA provides the City with 56.6 million gpd of water. The City has three groundwater wells in the Santa Rosa Plain, which offer an average of 3,870 acre-feet per year. Under its agreement with the SCWA, the City is entitled to receive 56.6 million gpd of water up to an annual volume of 29,100 acre-feet. The City operates a 12-inch diameter water line along Yolanda Avenue, adjacent to the Project site (City of Santa Rosa Water Department 2018b).

Wastewater

The Project site is currently connected to the City's public sewerage system. Sewerage discharged to the City's public system is collected and transported to Laguna Sub-Regional Wastewater Treatment Plant (LWTP) for treatment and disposal. The LWTP is currently rated to treat up to 21.34 million gpd of wastewater. The Incremental Recycled Water Program (IRWP) has been approved and will increase the plant's capacity rating of 25.79 million gpd. Approximately 18.25 million gpd of that will be allocated to the City, which will be sufficient to meet the City's wastewater services (City of Santa Rosa 2014). The City operates a 6-inch diameter sewer line along Yolanda Avenue, adjacent to the Project site (City of Santa Rosa 2018b).

Stormwater

Surface water runoff from the Project site flows in a southerly direction and sheet flows into the drainage channel at the southeast end of the site. Portions of the site along the northern site boundary flow north into the roadside drainage ditch along Yolanda Avenue. Storm drain inlets are located in the gravel area on the western portion of the site that connect to the roadside drainage ditch along Yolanda Avenue which ultimately drains to Colgan Creek. Colgan Creek is located approximately 3,000 feet north of the Project site.

Electricity and Natural Gas

Pacific Gas and Electric (PG&E) provides electricity and natural gas service to the area. The Project sponsor has received a will-serve letter from PG&E indicating that service is available for the Project site and that extensions will be made in accordance with PG&E gas and electric rules and regulations on file with the California Public Utilities Commission (PG&E 2019; Attachment 2).

Municipal Solid Waste

North Bay Corporation (NBC) provides the City with municipal solid waste collection services. NBC provides curbside pickup for regular trash, green waste, and recyclables. Sonoma County's Central Disposal Site is permitted to dispose of approximately 1,050 tons per day. Santa Rosa and the other cities in Sonoma Country dispose of solid waste to three county landfills in the Bay Area. Solid waste generated from the county's waste system is diverted to Redwood Landfill and Recycling Center in Marin County, Keller Canyon Landfill in Contra Costa County, or Potrero Hills Landfill in Solano County.

19.2 Impact Analysis

This section analyzes the Project's potential impacts to utilities and service systems. This analysis is based on the Project's plans for stormwater and drainage improvements, the available capacity of the City's water and wastewater systems, the City's available water supplies, the available capacity of landfills serving the Project, the Santa Rosa General Plan and related infrastructure planning documents, and generally applicable laws and regulations governing stormwater and solid waste.

The Project would not exceed the service capacities of existing water facilities, sewer facilities, stormwater drainage infrastructure, or landfills. The Project would not exceed wastewater treatment requirements. A discussion of each environmental issue included under Section 19 is presented below.

a) Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

Less Than Significant Impact.

Water and Wastewater Treatment Facilities

The Project will construct an onsite network of water and sewer piping that will connect to the existing 12-inch water line and 6-inch sewer line on Yolanda Avenue.

Water will mostly be consumed by cultivation operations, which will require approximately 9,000 gpd of water. Additional water usage for sanitary purposes and incidental usage (e.g., cleaning, ancillary operations, landscape irrigation, etc.) will increase the total water usage to approximately 12,000 gpd. The Project will not be a “water-demand project” as defined in CEQA Guidelines Section 15155(a) which would require a detailed water assessment, because (a) it will not plan to house more than 1,000 persons, occupy more than 40 acres of land, or have more than 650,000 square feet of floor area; and (b) it will not demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling-unit project, which would require approximately 27,500 gpd of water (based on 55 gallons per capita per day water use for indoor residential water use [City of Santa Rosa 2014a]).

The Project includes characteristics that reduce water demand, such as efficient irrigation of landscaping, use of water-efficient fixtures, and use of the water reclamation and biowaste recycling system discussed in Section II.4.5.4 of the Project Description. This system will enable approximately 70% to 90% of wastewater from cannabis cultivation operations to be reclaimed and reused onsite, thereby reducing water and wastewater demand. In addition, all landscaping plantings will require moderate to very low water use in compliance with the City’s Water Efficient Landscape Ordinance (SRCC Chapter 14-30).

Depending on the efficiency of the water reclamation system, between 5,300 and 6,800 gpd will be needed to support the Project (Terraphase 2019a; Attachment 1). However, to provide a conservative analysis of potential impacts in this document, the quantitative analysis herein assumes the Project would demand 12,000 gpd (Id.). Even in this scenario, the water supply for the Project is adequate and will be provided from the City’s existing public water supply via the existing connection to the 12-inch main on Yolanda Avenue. Per the CDFA Cannabis Regulations (3 CCR 8102(v) and 8107), the source of the cultivation water supply must be identified. In this case, the City’s public water supply and infrastructure will be used to supply the Project.

The City has confirmed that water and wastewater service is available for new development projects that are consistent with the Santa Rosa General Plan (City of Santa Rosa Water Department 2018a, 2018b; Attachment 2). As discussed in Section 11(b) (Land Use and Planning), the Project is consistent with the Santa Rosa General Plan and Zoning ordinances. As such, the Project will not increase water or wastewater demand beyond what has already been anticipated. Therefore, existing water supplies, facilities and infrastructure are sufficient to meet the demands of the project.

The Project will not require or result in the relocation or construction of new water or wastewater treatment facilities, the construction or relocation of which could cause significant environmental effects. Impacts will be less than significant.

Stormwater Drainage Facilities

The Project includes the construction of minor stormwater drainage facilities typical for this type of development. Stormwater inlets will be located in the paved areas of the Project site. Inlets installed in the parking areas and asphalt-covered areas north and east of the main building will be connected via underground concrete pressure piping (CPP) to a proposed rock outfall located on the northern portion of the Project site, adjacent to Yolanda Avenue. An inlet installed southwest of the main building and a slot drain installed at the base of the loading dock along the main building's eastern exterior will connect underground via CPP to an outfall located at the southwestern corner of the Project site. Underslab and/or foundation drains will be installed per the structural drawings and will be kept separate from stormwater drainpipes. As discussed in Section 10 (Hydrology and Water Quality), the construction of these minor facilities within the developed portion of the Project site will not cause significant environmental effects.

The eastern portion of the Project site will remain undeveloped and unpaved, and stormwater will percolate through unpaved areas or travel overland to adjacent roadways. There will not be any new or expanded stormwater drainage facilities in this area.

Accordingly, the Project will not require or result in the relocation or construction of new stormwater drainage facilities, the construction or relocation of which could cause significant environmental effects. Impacts will be less than significant.

Electric Power and Natural Gas Facilities

As discussed in Section 3 (Air Quality), the Project proposes to use electricity entirely from a natural gas-powered cogeneration system onsite. In the unlikely event that the cogenerator system fails, the Project would use electricity from PG&E. These events, by their nature, would be infrequent and temporary. Nonetheless, in order to provide a complete analysis of energy use, two electricity source scenarios are discussed including electricity provided by the cogenerator system and electricity provided by PG&E.

The annual Project energy demand is assumed to be approximately 21,900,000 kWh of electricity and 331,870 therms to operate the natural gas boiler. Per the will serve letter provided by PG&E, electricity and natural gas are available for the Project (PG&E 2019).

Accordingly, the Project will not require or result in the relocation or construction of new electricity production facilities beyond the cogeneration system evaluated in this Initial Study, and natural gas facilities, the construction or relocation of which could cause significant environmental effects. Impacts will be less than significant.

Telecommunications Facilities

Several telecommunications service providers operate within the area, including Comcast. Accordingly, the Project will not require or result in the relocation or construction of telecommunication facilities, the construction or relocation of which could cause significant environmental effects. Impacts will be less than significant.

b) Would the project have sufficient supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

Less Than Significant Impact. As discussed in Section 19(a), above, the City of Santa Rosa Water Department has confirmed that adequate water supply exists to serve new development projects that are consistent with the Santa Rosa General Plan (Attachment 2). Given the Project's consistency with the Santa Rosa General Plan (see Section 11, Land Use and Planning), this serves as confirmation from the that the Project's projected water supply needs can be effectively met based on available supplies.

The Project will have sufficient water supplies available to serve the Project from existing entitlements and associated resources during normal, dry and multiple dry years, and new or expanded entitlements are not expected to be needed. Impacts will be less than significant.

c) Would the project 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?

Less Than Significant Impact. The LWTP has a capacity of 21.34 million gpd. Projects are currently being implemented to increase the LWTP's capacity to 25.79 million gpd, 18.25 million gpd of which would be allocated to Santa Rosa. The LWTP implements all RWQCB, SWRCB, and City of Santa Rosa 2014 Sanitary Sewer System Master Plan requirements pertaining to water quality and wastewater discharge. As discussed in Section 19(a), above, the City of Santa Rosa Water Department has confirmed that adequate sewer availability to serve new development projects that are consistent with the Santa Rosa General Plan.

Accordingly, the Project will result in a determination by the wastewater treatment provider which serves the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments. Impacts will be less than significant.

d, e) Would the project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals? Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Less Than Significant Impact. The Project will be served by Redwood Landfill and Recycling Center in Marin County or Potrero Hills Landfill in Solano County, which both have sufficient permitted capacity to accommodate the project's solid waste disposal needs for all phases and aspects of the project, including construction, demolition, and operations. Additionally, the Project and any facilities accepting waste from it will comply with all federal, state, and local management and reduction statutes and regulations related to solid waste, including the requirements of CAL Green, the Mandatory Commercial Recycling Regulation (AB 341), California Integrated Waste Management Act (AB 939 and SB 1016), Mandatory Commercial Organics Recycling (AB 1826), and Solid Waste Reuse and Recycling Access Act (AB 1327). Mandatory compliance with these management and reduction statutes and regulations will require recycling, minimize solid waste, and divert solid waste from landfills. Therefore, impacts will be less than significant.

<u>Construction & Demolition Waste</u>

CALGreen (Title 24 Part 11, California Green Building Standards Code) applies to all new buildings and to additions and alterations of residential and nonresidential buildings. The City has incorporated the requirements of CALGreen into the Building Permit approval process. Construction and demolition will be conducted in accordance with the CALGreen Construction Waste Management Requirements (24 CCR 5.408) which requires that owners of new construction and demolition projects divert 65 percent of non-hazardous construction and demolition waste. The project sponsor will be required to meet the requirements of 24 CCR 5.408 through one of the following methods:

- Develop and submit a waste management plan prior to the start of construction to the City which identifies materials and facilities to be used and document diversion,
- Use a waste management company, approved by the City, that can document 65 percent diversion, or
- Use the disposal reduction alternative, as appropriate for the type of project.

Project construction and demolition activities will generate the following waste:

- Demolition waste and construction debris: Approximately 500 to 1,000 cubic yards (approximately 200 to 400 tons) of non-hazardous waste is anticipated to be generated during demolition and construction. Through implementation of the required CALGreen diversion methods, approximately 325 to 650 cubic yards of demolition waste will be diverted for recycling or reuse, and approximately 175 to 350 cubic yards of demolition waste will be managed for disposal.

- Petroleum hydrocarbon-impacted soil: Approximately 15 cubic yards of impacted soil from underneath the mower shop will be excavated and removed from the site. The soil will be sampled and analyzed for hazardous waste characteristics prior to off-haul. The PHC-impacted soil will be transported to a disposal facility permitted to accept soil with elevated total petroleum hydrocarbon concentrations.

- Hazardous building material waste: Based on the age of the buildings to be demolished, they may contain hazardous building materials, including, but not limited to, asbestos-containing materials, lead-based paint on the interior and exterior of the buildings, and electrical equipment that could contain PCBs or DEHP. The Hazardous Materials Survey included in **Mitigation Measure HAZ-1** will identify potential hazardous and universal waste materials, which would be segregated prior to demolition, and managed in accordance with hazardous and universal waste regulations. The volume of hazardous building materials, if present, would be a fraction of the overall construction and demolition waste, and would be accommodated by existing hazardous waste landfill facilities.

Non-hazardous waste and recyclables will be collected by NBC, or an alternate licensed commercial transporter, and transported to a permitted non-hazardous disposal or recycling facility. The following local landfills have confirmed available capacity to accept the anticipated volume of construction and demolition debris:

- Redwood Landfill and Recycling Center in Marin County is permitted to accept 2,310 tons of material daily and reported an average daily tonnage of approximately 900 tons; it has an estimated closure year of 2024 (CalRecycle 2018; Redwood Landfill 2016).

- Potrero Hills Landfill in Solano County is permitted to accept up to 4,330 tons of material daily and reported an average daily tonnage of approximately 2,500 tons; it has an estimated closure year of 2048 (Solano County LEA 2012; Daily Republic 2016).

As such, the Redwood Landfill and Recycling Center and Potrero Hills Landfill would have sufficient daily capacity to accept construction solid waste and soil generated by the Project.

Operational Waste

As discussed in the CDFA PEIR, Project operations would generate solid waste from cultivation (soils, fertilizers, pesticides, pots, wool cubes), as well as typical office trash from workers, discarded irrigation tubing, and other equipment. Additionally, cannabis cultivation would typically generate green waste throughout the cultivation process from trimming of unwanted leaves and plant parts. The CDFA Cannabis Regulations require that the cultivator develop a cannabis waste disposal plan (3 CCR 8308). In accordance with the CDFA Cannabis Regulations, cannabis waste will be disposed of at either a solid waste or composting facility that has a permit to operate from the California Department of Resources Recycling and Recovery (CalRecycle).

Hazardous waste, including spent solvents, may be generated from the extraction process. Project operations will also generate universal waste such as used lamps, batteries, and aerosol cans. In accordance with the requirements of AB 351 (California's Mandatory Commercial Recycling Law), commercial solid wastes such as paper, plastic, metals, and cardboard would be recycled.

Based on the estimated solid waste generation rates presented by the CalRecycle, a light industrial facility would produce approximately 42 pounds of solid waste per employee per day (CalRecycle 2019). Based on these estimates, the Project would generate approximately 805 tons per year, or 15 tons per week, of solid waste. The estimated solid waste production is approximately 0.3 percent of the solid waste generation in Sonoma County, and the Redwood Landfill and Recycling Center and Potrero Hills Landfill would have sufficient capacity to accept operational waste generated by the Project.

The facility operators are required to meet all local, state, and federal standards for solid waste disposal. Compliance with these regulations will further reduce the project's impact on solid waste generation. Therefore, the impacts associated with solid waste disposal will be less than significant.

The Project will not generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals. The Project will also comply with management and reduction federal, state, and local statutes and regulations related to solid waste. With implementation of **Mitigation Measure HAZ-1**, impacts will be less than significant.

19.3 Mitigation Measures

No mitigation measures are required, with the exception of **Mitigation Measure HAZ-1** (discussed in Section 8).

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

20.1 Environmental Setting

In 2017, Santa Rosa was substantially affected by the Central LNU Complex fire incident, which included the Tubbs Fire. The Tubbs Fire consumed 36,807 acres, destroyed 5,936 structures, damaged 317 structures, and resulted in loss of life (CalFire 2018). During November 2018, air quality throughout northern California was affected by the Camp Fire in Butte County. Due to levels of particulate matter in the unhealthy range, schools in Santa Rosa were closed during that period.

The Project site is located in an area designated as a Non-Very High Fire Hazard Severity Zone (Non-VHFHSZ) within the Local Responsibility Area (CalFire 2008).[5] The Project site is adjacent to areas designated as Moderate Fire Hazard Severity Zone within the SRA located to the southeast of the Project site across Petaluma Hill Road. Per the City of Santa Rosa Wildland-Urban Interface Map, the Project is not located within the Wildland-Urban Interface (WUI) fire threat (City of Santa Rosa 2009a; Michael Baker International 2016). However, CalFire Fire and Resource Assessment Program Wildland Urban Interface identifies the Project as being within the WUI (CalFire 2003). As discussed in Section 9 (Hazards and Hazardous Materials), given the discrepancy in data, and the recent wildfires in Santa Rosa, it is conservatively assumed that the Project site is located within the WUI for analytical purposes only.

Based on the CalFire Fire Hazard Severity Zone Viewer, the Project site is approximately 4.2 miles south of the closest Very High Fire Hazard Severity Zone (VHFHSZ) in the Local Responsibility Area. The nearest VHFHSZ in the SRA is located approximately 5.4 miles northeast of the Project site.

The City of Santa Rosa has the following emergency response and preparedness plans; however, these plans have not been modified since the 2017 fires:

- Local Hazard Mitigation Plan (LHMP; Michael Baker International 2016). The LHMP identifies the capabilities, resources, information, strategies for risk reduction, and critical facilities, as well as providing guidance for and coordination of mitigation actions, all of which are important for the City to reduce its vulnerability to disasters.

- Emergency Operations Plan (EOP; City of Santa Rosa 2017c). The EOP identifies the City's emergency planning, organization, response policies, and procedures. The EOP also addresses integration and coordination with other governmental levels when required.

- Continuity of Operations Plan (COOP; City of Santa Rosa 2017a). The COOP prepares for the continuation of government and the performance of essential functions during and after a disaster or other disruption to normal government operations.

As discussed in the LHMP, areas in Santa Rosa with higher potential for wildfire risks include hillside residential neighborhoods in the northern and eastern areas of the City with tall grasses and chaparral, which provide fuel for wildfires.

The Project design includes two driveways for site access from Yolanda Avenue, an area to the north of the building for fire roof access, and a designated fire lane around the entire building. As discussed in Section 10 (Hydrology and Water Quality), the Project would include the addition of impervious surfaces on the western portion of the property, which would act as fuel breaks in the event of a fire.

---

5 As discussed in the LHMP, fire areas generally fall into two categories – State Responsibility Areas, where the California Department of Forestry and Fire Protection (CalFire) is responsible for fire protection, and Local Responsibility Areas, where local fire departments and fire protection districts have responsibility. CalFire designates levels of wildfire severity based on the amount of vegetation, topography, and weather (temperature, humidity, and wind).

20.2 Impact Analysis

This section analyzes the Project's potential impacts to wildfires. This analysis is based on the state and local fire and hazard maps prepared by government agencies, City of Santa Rosa emergency preparedness plans, and other relevant materials described below. Implementation of **Mitigation Measure HAZ-2** will reduce the risk associated with wildland fires to less than significant.

A discussion of each environmental issue included under Section 20 is presented below.

a) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

Less than Significant Impact with Mitigation Incorporated. The Project site is located adjacent to Non-VHFHSZ SRA lands and approximately 5.4 miles from VHFHSZ SRA lands. The LHMP states: "Wildfire risk in Santa Rosa is elevated in the wildland-urban interface, where development is introduced into natural environments such as vegetated areas where the likelihood of wildfires is increased" (Michael Baker International 2016). The Project consists of the re-development of the western portion of the Site, which was previously developed with a primary single-family residence, two secondary single-family residences, a barn, a storage shed and landscaped areas. The eastern portion of the Project site, which contains pastureland that has been annually disked and mowed and also includes a gravel driveway, will remain Not a Part of the Project. As such, the Project would not include the introduction of development into natural environments.

As discussed in Section 17 (Transportation), the Project would not significantly alter the existing circulation pattern in the Project area or adversely impact emergency response or emergency evacuation plans, including during Project construction. The Project site is also designed in accordance with current building and fire codes to ensure adequate road or fire road access for fire equipment, in accordance with LHMP Mitigation Action 2.5.

LHMP Mitigation Measure 1.2 requires that the City evaluate a zoning code update to identify vegetation management requirements in the WUI zone for existing and new development. While the Zoning Code has not been updated to reflect vegetation management requirements, as discussed in Section 9(g), the Project will be required to implement **Mitigation Measure HAZ-2**, which requires the preparation of a Vegetation Maintenance Program, including an onsite fire hazard assessment consultation with a representative of the Santa Rosa Fire Department, identification of defensible space zone boundaries developed in accordance with the requirements of Government Code Section 51182, the maintenance measures to be taken within each zone (e.g., removal of dead material, maintaining "fuel breaks" such as the eastern driveway), and the frequency at which the maintenance measures will be performed (i.e., annually or less); and the performance of the maintenance measures at regular intervals.

For information and analytical purposes, the Project site can be considered located in (although it is technical not in a WUI zone) or near an area with elevated fire risks. Even with this conservative assumption, development and operation of the Project would not increase fire risk at the site and it would not substantially impair emergency response plans based on the design of the circulation system, compliance with fire code, and general lack of fire fuels on the site.

Accordingly, the Project will not substantially impair an adopted emergency response plan or emergency evacuation plan, and therefore, would have a less than significant impact with implementation of **Mitigation Measure HAZ-2**.

b) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Less than Significant Impact with Mitigation Incorporated. As discussed above, the Project site is located adjacent to SRA lands. The Project site and surrounding area is relatively flat with hills approximately one-half mile to the east, and as such would not exacerbate wildfire risks. The Project would remove certain existing vegetation and trees, and develop impervious surfaces and an industrial structure. These changes in the existing conditions of the site would not exacerbate wildfire risk, and would in fact, result in less wildfire risk for the site overall. In addition, as discussed in Section 3 (Air Quality), the prevailing winds in the summer are from the northwest to the southeast, and as a result, in the event of a wildfire in the area, the fire and embers may travel in a southeasterly direction from the high hazard areas to the north, and occupants of the Project may be exposed to pollutant concentrations from a wildfire. The employees have an immediate path of travel to evacuate the site along Yolanda Avenue, and there are no slopes or other factors that would limit timely departure from the site. In addition, the vegetation management, including fuel breaks, required by **Mitigation Measure HAZ-2** will further reduce the likelihood of the occupants being exposed to high wildfire risk.

Accordingly, based on project design and location, and with implementation of **Mitigation Measure HAZ-2**, the Project will have a less than significant impact due to slope, prevailing winds, and other factors, to exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.

c) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Less than Significant Impact with Mitigation Incorporated. The Project is served by existing roads and will not require new road to maintain adequate circulation. The Project will include fuel modification and fire breaks, in compliance with applicable fire codes, which can generally reduce the risk associated with wildfire on the site because of the reduced vegetation. The

Project will not require the City to install new above-ground power lines to service the site. Instead, the Project will include the installation and operation of five cogeneration units to produce electricity onsite. The Project will connect to the PG&E electricity grid for auxiliary electrical support with underground lines connecting to a pad-mounted transformer. The onsite power generation and distribution system will be operated and maintained in accordance with industry standards to prevent deterioration or failure. The power generation system is inside the main structure, and to the extent certain components of the system are outside, those facilities are surrounded by impervious surfaces and setback from any onsite or nearby fire fuel sources. Relevant site features and layout including the fire tender area and entry gates have been approved by the City of Santa Rosa Fire Department (Attachment 2). In addition, the implementation of **Mitigation Measure HAZ-2** will include a vegetation maintenance program, which will include the use of fuel breaks such as the existing eastern driveway, to further reduce the potential fire risk from aboveground power lines and utilities.

The Project impacts from the installation of or maintenance of associated infrastructure that will be less than significant impact, and further minimized with implementation of **Mitigation Measure HAZ-2,** with respect to exacerbating fire risk or potentially resulting in temporary or ongoing impacts to the environment.

d) **If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?**

Less than Significant Impact. The Project site is relatively flat and will not expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

20.3 Mitigation Measures

No specific wildland fire mitigation measures are required, with the exception of **Mitigation Measure HAZ-2** (discussed in Section 9).

21. MANDATORY FINDINGS OF SIGNIFICANCE	Potentially Significant Impact	Less Than Significant Impact 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 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?	☐	☒	☐	☐
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.)	☐	☒	☐	☐
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

21.1 Impact Analysis

With implementation of previously identified mitigation measures and compliance with mandatory regulations, the Project would not significantly affect the environment as a whole, would not have cumulatively considerable impacts, and would not have substantially adverse effects on human beings, either directly or indirectly. A discussion of each environmental issue included under Section 21 is presented below.

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 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?**

Less than Significant Impact. As discussed throughout this Initial Study, the Project does not have the potential to degrade the quality of the environment, with implementation of mitigation measures for air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards/hazardous materials, hydrology and water quality, and tribal cultural resources, as well as compliance with mandatory regulations and development standards.

As discussed in Section 4 (Biological Resources), the Project would not have any significant biological impacts, with implementation of standard mitigations for nesting birds and roosting bats. The Project would not substantially reduce the habitat of any fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate any plan or animal community, or significantly affect any special status plant or animal species.

As discussed in Section 5 (Cultural Resources), Section 7 (Geology and Soils), and Section 18 (Tribal Cultural Resources), the Project site is highly unlikely to contain any historic or archaeological resources, and **Mitigation Measures CUL-1**, **CUL-2**, **CUL-3**, and **GEO-2** will reduce any potential impacts to a less-than-significant level.

Accordingly, the Project's potential impacts under this threshold will be less than significant.

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.)**

Less than Significant Impact. The CEQA Guidelines define cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (14 CCR 15355).

The analysis of cumulative impacts for each environmental factor can employ one of two methods. First, a lead agency may select a list of other past, present, and reasonably foreseeable future projects, including those outside the control of the agency, to evaluate together with the Project. Second, the lead agency may rely on a summary of development projections. These projections may be from an adopted general plan or related planning document, or from a prior environmental document that has been adopted or certified, and these documents may describe or evaluate the regional or area-wide conditions contributing to the cumulative impact (14 CCR 15130(b)).

The cumulative analysis for the Project uses both methods, depending on which is most appropriate for each impact category. Where applicable, the projections method is based on projections contained in the Santa Rosa General Plan and General Plan EIR. Where applicable, the list method is based on the following list of other past, present, and reasonably foreseeable future projects:

- Santa Rosa Avenue Widening Project between Yolanda Avenue and Colgan Avenue: completed in 2014 to 2015 (located 0.4 mile west of the Project site).
- Residences at Taylor Mountain at 2880 Franz Kafka Avenue: in-progress development of 93 apartment units (located at northeastern adjoining property from Project site).
- Taylor Mountain Estate at 2800 Petaluma Hill Road: in-progress development of five single-family residences (located east of the Residences at Taylor Mountain).
- Kawana Springs Apartments at 2604 Petaluma Hill Road: planned 120-unit apartment home development to be located at the southeastern corner of Kawana Springs Road and Petaluma Hill Road (to be located approximately ¼ mile northeast of Project site); design review is complete.
- Modified Kawana Meadows at 1162 Kawana Springs Road: planned development of 62 single-family residences (to be located approximately ¼ mile northeast of the Project site).
- Valley Point Professional Center Apartments at 2660 Petaluma Hill: planned 126-unit residential development (to be located directly northeast of Petaluma Hill Road from the Project).
- Green Trove Wellness Cultivation & Manufacturing Facility (Green Trove project) at 368 Yolanda Avenue: planned 24,000-square-foot cannabis cultivation facility (to be located approximately ¼ mile west of the Project site).
- Yolanda Apartments at 325 Yolanda Avenue: 252-unit multi-family residential development currently in design review with the City (to be located approximately ½ mile west of the Project site).

This list of cumulative projects is based on a review of the Santa Rosa General Plan, Santa Rosa General Plan EIR, the City's Pending Development Report (City of Santa Rosa 2019a), the Traffic Impact Analysis report (Fehr & Peers 2019), discussion with City staff, and online documentation accessed via the City's Planning Documents & Environmental Impact Reports website (Santa Rosa 2019b). In addition to the relevant projects listed, the 2017 Tubbs Fire destroyed about

2,900 houses in Santa Rosa. Redevelopment of the areas impacted by the wildfire, is anticipated in the coming years, although such redevelopment will be focused north of Highway 12, on the opposite side of the City from the Project site.[6] Based on the communications with City staff, the City has approved permits for 1,171 replacement housing units and is in the process of processing permits for 232 replacement housing units. Substantial rebuilding efforts are anticipated over the duration of the project construction.[7]

The following presents the cumulative impact analysis for the Project for each impact area required by CEQA. Where the project-specific analysis found that the Project will have no impact, no further cumulative impact analysis was conducted. With implementation of previously identified mitigation measures and compliance with mandatory regulations, the Project's impacts will not be cumulatively considerable.

Aesthetics

The cumulative setting for visual impacts is the land adjacent to the Project. Cumulative impacts were evaluated using the Taylor Mountain project from the list. A cumulative impact to aesthetic resources could be created if multiple projects within the area significantly altered scenic vistas, damaged scenic resources, degraded visual character of the area, or resulted in substantial glare.

As described in Section 1 (Aesthetics), the Project will not result in a significant aesthetic impact by creating a substantial adverse effect on a scenic vista; substantially damaging scenic resources; substantially degrading the existing visual character or quality of the site and its surroundings; or creating a new source of substantial light or glare.

The Residences at Taylor Mountain and Taylor Mountain Estates project (collectively, the Taylor Mountain project) located on the east side of Petaluma Hill Road are currently in construction, with a completion date estimated in 2019. As documented in their 2017 IS/MND[8], the Taylor Mountain project would include mitigation measures for aesthetic resources, including landscaping requirements, preservation of views from Todd Creek Trail, screening of subdivision from Taylor Mountain Regional Park, and tree preservation measures.

Although the Taylor Mountain project would be visible within the same viewshed as the Project, neither the Project nor the Taylor Mountain project will substantially obstruct views from Petaluma Hill Road or cause significant adverse impacts on the character of the area. As discussed in Section 1, all new development is subject to the Santa Rosa General Plan Urban

6 https://srcity.org/2675/Rebuilding

7 https://data.srcity.org/stat/goals/nfyv-t4uw/gnc9-dfn8/jkvm-7dgu

8 https://srcity.org/DocumentCenter/View/17087/Residences-at-Taylor-Mountain-and-Taylor-Mountain-Estates?bidId=

Design policies which addresses the visual quality and character of the built environment in Santa Rosa and outlines specific policies for the city entries and corridors (such as Petaluma Hill Road). Through conformance with the Urban Design policies, both projects improve the visual quality of the City and enhance the appearance of major entries to the City. Light and glare associated with each of the projects would be localized to the immediate vicinities of the project sites.

Therefore, the Project will not have cumulatively considerable impacts.

Air Quality and Greenhouse Gas Emissions:

The cumulative setting for air quality is the air basin. Cumulative impacts were evaluated using the criteria identified in the BAAQMD guidelines. Similarly, BAAQMD's significance thresholds for air pollutants measure whether a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions or significant contribution to climate change. In accordance with BAAQMD methodology, since the Project's impacts to air quality and climate change would be less than significant, additional analysis to assess cumulative impacts is unnecessary (BAAQMD 2017).

The cumulative setting for greenhouse gas emissions is global. Cumulative impacts were evaluated using the criteria identified in BAAQMD guidelines and the City's CAP. As explained in Section 8 (Greenhouse Gas Emissions), the CAP was developed to assist the City in reducing cumulative GHG emissions with reduction measures in order to meet a local reduction of GHG emissions by 15% below 2007 levels by 2020. Projects are analyzed using the New Development Checklist included in the CAP, and when the checklist shows that a new project is in compliance with the CAP, then it will have a less than significant impact both on a project-specific and cumulative basis with respect to greenhouse gas emissions. As discussed in Section 8, the Project is in compliance with the CAP.

Because the Project would comply with the City's CAP and applicable BAAQMD significance thresholds, cumulative impacts with respect to air quality and greenhouse gas emissions would be less than significant. In accordance with BAAQMD methodology, additional analysis to assess cumulative impacts is unnecessary (BAAQMD 2017). Therefore, the Project will not have cumulatively considerable impacts.

Biological Resources

The cumulative setting for biological resources includes projects within approximately 5-miles of the Project site. This area represents the reasonable distance for populations of nesting birds and bats discussed in Section 4 (Biological Resources). Cumulative impacts were evaluated using both projects from the list as well as the projections in the General Plan EIR. The existing setting of the areas to the north, west, and south of the Project site are currently developed and therefore future projects in these areas would not be expected to impact special status species.

The area to the northeast across Petaluma Hill includes the Taylor Mountain development, and is planned for low, medium and medium-high residential uses. The area east of the Taylor Mountain development is Taylor Mountain open space. The area east and southeast of the Project site is agricultural use.

As explained in Section 4, the Project will have no impact on Biological Resources, with the exception of potential impacts to nesting birds and bats which would be reduced to less than significant with implementation of **Mitigation Measures BIO-1** and **BIO-2**. Development activities associated with the Project, as well as other concurrent and future development projects in the area, may impact nesting birds and bats. Standard pre-construction surveys and, if necessary, avoidance procedures would be required for any project with the potential to affect nesting birds and/or bats. Therefore, the Project will not have cumulatively considerable impacts on biological resources. Further, the impacts associated with the proposed development will not contribute to a cumulative reduction of important wildlife habitat.

Cultural and Tribal Cultural Resources

The cumulative setting is the Project site. This setting was selected because there were no cultural or tribal cultural resources identified in the Cultural Resources Study, and therefore, impacts would be limited to construction impacts on previously unidentified cultural or tribal cultural resources on the Project site. Additionally, cultural resources are inherently local and would not span between the Project site and other development projects.

As discussed in Section 5 (Cultural Resources) and Section 18 (Tribal Cultural Resources), the Project would not result in impacts to known cultural or tribal cultural resources. The analysis of cumulative impacts on cultural resources is limited to construction impacts on previously unidentified cultural and paleontological resources that could occur as a result of the Project, and where the same unidentified resources could also be affected by construction of other projects. As discussed in Section 5 (Cultural Resources, implementation of **Mitigation Measures CUL-1**, **CUL-2**, and **CUL-3** would ensure that the Project would have a less than significant impact to unknown archaeological artifacts or human remains. Therefore, with implementation of **Mitigation Measures CUL-1**, **CUL-2**, and **CUL-3**, the Project would not have cumulatively considerable impacts.

Geology and Soils

The cumulative setting is the area immediately around the Project site. There are no projects from the Project list that are located in the immediate area of the Project site. As discussed in Section 7 (Geology and Soils), implementation of the Project would not result in a change to the geology or soil characteristics of the project area or surrounding properties. As with the Project, any future development would be required to comply with the requirements of the current CBC, which would ensure that development on unstable or expansive soil is sufficiently mitigated to reduce hazards to a less than significant level. Therefore, the Project would not have cumulatively considerable impacts.

Hazards and Hazardous Materials and Wildfire

The cumulative setting area is regional given that an accidental release of hazardous materials or a wildfire can have regional impacts. The Project would have no potential to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school, and no impact with respect to aviation-related safety hazards or excessive noise, and therefore, would not contribute to a cumulative impact in these areas. The cumulative impacts were evaluated using the summary of projects from the General Plan EIR.

As discussed in Section 4.N of the General Plan EIR, the proposed development in the General Plan 2035 is expected to include commercial, light industry and general industrial uses which would involve hazardous materials and wastes, however, conformance with the hazardous materials regulations and General Plan policies would result in a less-than-significant impact.

As discussed in Section 9 (Hazards and Hazardous Materials), the Project would result in less-than-significant impacts with mitigation incorporated associated with the handling and disposal of hazardous building materials and the preparation and maintenance of a Vegetation Management Program (**Mitigation Measure HAZ-2**). While other projects within the region would include the management of hazardous materials onsite, excavation and transport of impacted soils or other environmental media, and demolition of hazardous building components, those projects will be required to comply with all applicable hazardous materials handling and storage requirements to ensure that public health and safety are not at risk. Therefore, the Project will not have cumulatively considerable impacts.

As discussed in Section 9 (Hazards and Hazardous Materials) and Section 20 (Wildfire), the Project is assumed to be located within the WUI. Through preparation and maintenance of a Vegetation Management Program (**Mitigation Measure HAZ-2**), the Project's impact associated with wildland fires will be less than significant. Several of the related projects, including the Taylor Mountain development, are also located within the WUI or Moderate Fire Hazard Severity Zones in State Responsibility Area, and therefore, may pose a similar or increased risk of wildland fire. Those projects will also be required to comply with applicable federal, state, and local laws related to fire prevention, design features, and operational measures. Therefore, the Project will not have cumulatively considerable impacts.

Hydrology and Water Quality

The cumulative setting is regional and includes the following: North Coast Hydrologic Region, Russian River Hydrologic Unit, Middle Russian River Hydrologic Area, Santa Rosa Hydrologic Sub-Area, Laguna Super Planning Watershed and Laguna de Santa Rosa Planning Watershed. Cumulative impacts were evaluated using the General Plan EIR. As discussed in Section 4.H of the General Plan EIR, new development and intensification under the General Plan 2035 could alter existing drainage patterns, cause erosion, increase potential for flooding, or degrade water quality. However, through compliance with NPDES permitting requirements including the

SUSMP, and required design standards, impacts associated with General Plan 2035 development are less than significant.

As discussed in Section 10 (Hydrology and Water Quality), long-term operational effects of the Project will include creation of new impervious surfaces (roof top, parking, etc.), which will increase the amount of stormwater runoff from the Project site compared to pre-project conditions, if unmitigated. Increased runoff will increase both the volume of runoff and the rate of stormwater runoff into the nearby creek, which has the potential cumulative effect of increasing sediment loading and could increase in-channel souring/erosion. However, following demonstration of compliance with the City's LID standards (i.e., implementation of **Mitigation Measure HYD-1**), the Project will not have cumulatively considerable impacts.

Land Use

The cumulative setting is city-wide. The cumulative impacts were evaluated using the summary of projections from the General Plan EIR. The Project is consistent with the Santa Rosa General Plan and Zoning Ordinance. Future development projects would be required to demonstrate consistency with General Plan policies and Zoning Ordinance and ensure that they do not create land use conflicts with adjacent properties. Additionally, any nearby cannabis cultivation projects would be required to comply with the Santa Rosa General Plan and Zoning ordinance and to obtain necessary authorizations from the City. Therefore, the Project will not have cumulatively considerable impacts.

Population and Housing

The cumulative setting is city-wide. The cumulative impact was evaluated using the General Plan EIR. The Project will result in the removal of one housing unit from the City's housing supply. The 2017 wildfires resulted in the destruction of thousands of housing units within the City. Many housing development projects, including the relevant projects listed above, were in the planning stages prior to the wildfire. Additional housing development is anticipated to rebuild in the areas impacted by the wildfire. The reduction of one housing unit, which has been unoccupied since at least 2016, will not have a cumulatively considerable impact to housing. The Project will have no considerable impact to population growth.

Transportation

The cumulative setting is the Project vicinity including the intersections identified in Section 17 (Transportation). The cumulative impacts are analyzed in Section 17.3(a). The Cumulative scenario considers a horizon year of 2040, which includes buildout of the City of Santa Rosa General Plan. Traffic volume forecasts were developed using outputs from the SCTA travel demand model, which includes land use projections for Santa Rosa and Sonoma County, as well as buildout of the roadway network per the General Plan. As discussed in Section 17.3(a), the effect of the addition of Project generated traffic to the estimated 2040 roadway system is that most intersections operate within the City's LOS D standard. For those intersections where intersections operate at LOS E or LOS F, the addition of Project trips does not result in a delay change of more than five seconds. Impacts due to a conflict with applicable LOS standards and other congestion related policies would be less than significant in the Cumulative scenario. Therefore, the Project will not have cumulatively considerable impacts.

Energy and Utilities and Service Systems

The impacts evaluated in Section 6 (Energy) Section 19 (Utilities and Services Systems) are assessed in their cumulative context. As discussed in Section 6, the Project will be consistent with the Santa Rosa CAP and will not obstruct implementation of a local plan for renewable energy or energy efficiency such that a significant cumulative environmental impact would occur. As discussed in Section 19, the Project will result in an increase in the cumulative water demand and wastewater capacity demand of the region; however, the demand is consistent with the Santa Rosa General Plan and Zoning ordinances, and as such will not increase water demand beyond what has already been anticipated. Other approved projects are anticipated to be in accordance with the Santa Rosa General Plan and Zoning ordinances and would therefore also be included in current water and wastewater projections. Similarly, the Project will contribute to an increase in the cumulative demand for solid waste disposal; however, the Project will be served by a landfill with permitted capacity and will comply with federal, state, and local statutes and regulations related to solid waste. The Project will not have cumulatively considerable impacts to utilities and service systems. Therefore, the Project will not have cumulatively considerable impacts.

The Project has no impact on Agriculture and Forestry, Mineral Resources, Public Services, and Recreation, and therefore, potential cumulative impacts on these resource areas are not discussed in this section. Based on both the consistency with the General Plan EIR and the review of projects planned in the vicinity, the Project's cumulative impacts will be less than significant.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less than Significant Impact. As discussed previously, the Project could result in adverse effects on humans in the following areas; however, with implementation of the identified mitigation measures and compliance with mandatory regulations and development standards, the Project's indirect and direct adverse impacts on human beings onsite and in the Project vicinity would be less than significant:

- Air Quality – Odors associated with the Project have the potential to adversely affect humans. Implementation of **Mitigation Measure AQ-1**, which requires the preparation and implementation of an Odor Control Plan, will reduce this impact to less-than-significant.

- Geology and Soils – The Project development in conjunction with the Project site geological and soil conditions has the potential to adversely affect humans. Implementation of **Mitigation Measure GEO-1**, which requires the preparation and implementation of a

Geotechnical Investigation and Design Report, will reduce this impact to less-than-significant.

- Wildfire – Given that the Project site is located adjacent to SRA lands, the Project could expose people to risks associated with wildfire. Implementation of **Mitigation Measure HAZ-2**, which requires the preparation and implementation of a Vegetation Management Program, will reduce this impact to less-than-significant.

21.2 Mitigation Measures

Mitigation measures are described in previous sections.

V. REPORT AUTHORS AND CONSULTANTS

City of Santa Rosa Preparers

Gabe Osborn, Deputy Director of Development Services

Andrew Trippel, Principal Planner

Terraphase Engineering Inc.

Alice Hale Price, PE, Senior Associate

Michele Briening, PE, Associate

Jeff Raines, PE, Principal

Lucas Paz, Ph.D., Principal

Kathy Kinsland, Consultant

Fehr & Peers – Transportation

Ian Barnes, P.E.

PLACEMAKERS – Aesthetics / Land Use

Patricia Jeffery, Principal

Rincon Consultants – Air Quality, Energy, Greenhouse Gases, Noise

Karly Kaufman, MESM, Senior Environmental Planner/Project Manager

Hannah Mize, Sustainability Project Manager

Jonathan Berlin, Senior Environmental Planner

Tom Origer & Associates – Cultural Resources

Tom Origer, Principal

Julia Franco Karnowski, Associate

Wiemeyer Ecological Sciences – Biological Resources

Darren Wiemeyer, Principal

Monk & Associates Environmental Consultants – Biological Resources

Geoff Monk, Principal

VI. REFERENCES

The following list of referenced documents that were used in the preparation of the IS and are hereby incorporated by reference into the document.

Association of Bay Area Governments. 2017. *ABAG GIS, San Francisco Bay Area Hazards – Wildland Urban Interface Fire Threat Map*. Accessed November 10, 2017.

_____. 2018. Resilience Program Website http://gis.abag.ca.gov/website/Hazards/?hlyr=liqSusceptibility

Association of Environmental Professionals (AEP). 2016. *Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California*. October 18.

Axiom Engineers. 2017. *Water System Sizing Estimate*. September 11.

Bay Area Air Quality Management District (BAAQMD). 2009. *Options and Justification Report*.

_____. 2017a. Air Quality Standards and Attainment Status. http://www.baaqmd.gov/research-anddata/air-quality-standards-and-attainment-status.

_____. 2017b. 2017 Clean Air Plan: Spare the Air, Cool the Climate. http://www.baaqmd.gov/plansand-climate/air-quality-plans/current-plans

_____. 2017c. California Environmental Quality Act: Air Quality Guidelines. http://www.baaqmd.gov/~/media/files/planning-andresearch/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.

BC Engineering Group, Inc. 2017a. *Hydrology Map*. April 25.

_____. 2017b. *Preliminary Landscape Plan, Sheet L1*. October 30.

_____. 2018. *Grading and Drainage Plans. 800 Yolanda Avenue, Santa Rosa CA*. March 2.

California Air Resources Board (CARB). 2011. *Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Public Hearing to Consider the "LEV III" Amendments to the California Greenhouse Gas and Criteria Pollutant Exhaust and Evaporative Emission Standards and Test Procedures and to the On-Board Diagnostic System Requirements for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, and to the Evaporative Emission Requirements for Heavy-Duty Vehicles*. December 7. http://www.arb.ca.gov/regact/2012/leviiighg2012/levisor.pdf

_____. 2014a. AB 32 Scoping Plan Website. http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm

_____. 2014b. *Technical Evaluation of the Greenhouse Gas Emission Reduction Quantification for the Association of Bay Area Governments' and Metropolitan Transportation Commission's SB 375 Sustainable Communities Strategy*. April. https://www.arb.ca.gov/cc/sb375/mtc_scs_tech_eval_final0414.pdf

_____. 2015. *Frequently Asked Questions About Executive Order B-30-15*. http://www.arb.ca.gov/newsrel/2030_carbon_target_adaptation_faq.pdf

_____. 2016. *California Greenhouse Gas Emission Inventory – 2016 Edition*. https://www.arb.ca.gov/cc/inventory/data/data.htm

_____. 2017a. *Air Quality Data Statistics*. https://www.arb.ca.gov/adam/index.html.

_____. 2017b. *California Greenhouse Gas Emission Inventory – 2017 Edition*. http://www.arb.ca.gov/cc/inventory/data/data.htm

_____. 2017c. 2020 *Business-as-Usual (BAU) Emissions Projection – 2014 Edition*. https://www.arb.ca.gov/cc/inventory/data/bau.htm

_____. 2017d. *California's 2017 Climate Change Scoping Plan*. December 14. https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf.

_____. 2018. California Greenhouse Gas Emission Inventory - 2018 Edition. [online]: https://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed January 2019.

California Climate Action Registry (CCAR). 2009. *General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1*.

California Climate Change Center (CCCC). 2006. *Climate Scenarios for California*.

_____. 2009. *The Impacts of Sea-Level Rise on the California Coast*.

CalFire. 2003. Wildland Urban Interface Spatial Data - Forest and Range 2003 Assessment. http://frap.fire.ca.gov/projects/wui/index

_____. 2008. Sonoma County – Very High Fire Hazard Severity Zone in Local Responsibility Area. November 10.

_____. 2018. Incident Information – Tubbs Fire (Central LNU Complex). February 9. Website accessed June 20, 2019. http://cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=1867

California Department of Conservation. 1997. *California Agricultural Land Evaluation and Site Assessment Model, Instruction Manual*.

_____. 2014. *Sonoma County Important Farmland 2014*.

California Department of Conservation, Department of Mines and Geology. 1987. Special Report 136, Part III: Mineral Land Classification: Aggregate Materials, The San Francisco-Monterey Bay Area; Classification of Aggregate Resource Areas, North San Francisco Bay Production-Consumption Region.

California Department of Fish and Wildlife. 2017. California Regional Conservation Plans. October. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=68626&inline

California Department of Natural Resources. (2018). Final Adopted Text of Updates to the CEQA Guidelines. Sacramento, CA: State of California. (http://resources.ca.gov/ceqa/docs/2018_CEQA_FINAL_TEXT_122818.pdf)

California Department of Water Resources (DWR). 2008. *Managing an Uncertain Future: Climate Change Adaption Strategies for California's Water*.

California Energy Commission (CEC). 2009. *Environmental Health and Equity Impacts from Climate Change and Mitigation Policies in California: A Review of the Literature*.

_____. 2016a. California Gasoline Data, Facts, and Statistics. [online]: http://www.energy.ca.gov/almanac/transportation_data/gasoline/. Accessed January 2019.

_____. 2016b. Diesel Fuel Data, Facts, and Statistics. [online]: https://www.energy.ca.gov/almanac/transportation_data/diesel.html. Accessed January 2019.

_____. 2018a. *Total System Electric Generation*. http://www.energy.ca.gov/almanac/electricity_data/total_system_power.html

_____. 2018b. *Supply and Demand of Natural Gas in California*. http://www.energy.ca.gov/almanac/naturalgas_data/overview.html

_____. 2019a. Total System Electric Generation. [online]: https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html. Accessed January 2019.

_____. 2019b. "Renewables Portfolio Standard (RPS)." Sacramento, CA. [online]: http://www.energy.ca.gov/portfolio/. Accessed January 2019.

California Environmental Protection Agency (CalEPA). 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*.

_____. 2010. *Climate Action Team Biennial Report. Final Report*.

California Geological Survey. 1982. *Fault Evaluation Report FER-141*.

CalRecycle. 2019. *Estimated Solid Waste Generation Rates*. https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates. Website accessed September 9, 2019.

California State Office of Planning and Research. 2018. Technical Advisory on Evaluating Transportation Impacts in CEQA. Sacramento, CA: State of California. (http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf)

CalRecycle. 2018. *Facility/Site Summary Details: Redwood Landfill (21-AA-0001)*. Website accessed on February 8, 2018.

Cascadia Consulting Group. 2006. *Targeted Statewide Waste Characterization Study: Waste Disposal and Diversion Findings for Selected Industry Groups*. June.

Chattan, C. 2003. *Primary Record for ARS 03-038-01*. Document P49-003098 of file at the Northwest Information Center, Rohnert Park.

_____. 2009. *Primary Record for ARS 09-024-01*. Document P49-004257 of file at the Northwest Information Center, Rohnert Park.

City of Santa Rosa. 2009a. *Wildland-Urban Interface Fire Area Map*. January.

_____. 2009b (amended thereafter). *Santa Rosa General Plan 2035*. November 3.

_____. 2009c. City of Santa Rosa. *Draft Environmental Impact Report for the General Plan 2035*. March.

_____. 2009d. *City of Santa Rosa 2035 General Plan Environmental Impact Report*. June.

_____. 2012. *Climate Action Plan: City of Santa Rosa*. Available at: http://www.cailg.org/sites/main/files/file-attachments/santa_rosa-climate_action_plan.pdf.

_____. 2014a. City of Santa Rosa Water Master Plan Update. August. Chapter 2 available at: https://srcity.org/DocumentCenter/View/13857/2-Water-Demands.

_____. 2014b. *Santa Rosa Sanitary Sewer System Master Plan Update*. October.

_____. 2016. *General Plan Land Use Diagram*. March 29.

_____. 2017. *Santa Rosa City Code*. December.

_____. 2019. City of Santa Rosa Bicycle and Pedestrian Master Plan. Santa Rosa, CA: City of Santa Rosa.

City of Santa Rosa Community Development. 2015. *Zoning Map of the City of Santa Rosa*. August 14.

City of Santa Rosa Water Department. 2018a. Will Serve Letter – 800 Yolanda Avenue. January 17.

_____. 2018b. Phone Conversation with Caryn Lozada. January 29.

_____. 2019a. City of Santa Rosa Pending Development Report. May.

Daily Republic. 2016. *Potrero Hills Landfill Handles Trash, Makes Environmental Moves*. December 31.

Davidson, 2002. Soil remediation - 800 Yolanda Avenue, correspondence to J. M. Frank. December 13.

EBA Engineering. 2016. *Phase I Environmental Site Assessment, 800 Yolanda Avenue, Santa Rosa, California 95404*. November 3.

e-conolight. 2018. *Photometric Study, 800 Yolanda, Santa Rosa, California*. August 15.

Emergency Services Consulting International (ESCI). 2016. *City of Santa Rosa Fire Department, California, Standards of Coverage and Deployment Plan*.

Engineering Enterprises, Inc. 2018. *Exterior Lighting Plan*. Sheet dated January 5, 2018.

Environmental Science Associates. 2009. *Santa Rosa General Plan 2013, Final Environmental Impact Report*. June.

Farmland Mapping and Monitoring Program. 2016. *Sonoma County Important Farmland 2014*. December.

Fawcett Environmental Consulting. 2012. *Site Assessment for California Tiger Salamander, 800 Yolanda Avenue, Santa Rosa, Sonoma County, APN 044-091-063*. March 30.

Federal Transit Administration (FTA). 2006. Transit Noise and Vibration Impact Assessment.

_____. 2017. Policy and Governmental Affairs: Office of Highway Policy Impacts, Motor Fuel Use – 2016 (1). [online]: https://www.fhwa.dot.gov/policyinformation/statistics/2016/mf21.cfm. Accessed January 2019.

Fehr & Peers. 2017. *Preliminary Trip Analysis*. August 29.

_____. 2019a. *800 Yolanda Avenue, Transportation Impact Analysis Report*. July 28.

_____. 2019b. *Memorandum re: Parking Analysis for the 800 Yolanda Avenue Project in Southeastern Santa Rosa, California*. August 7.

Graymer, R.W., E.E. Brabb, D.L. Jones, J. Barnes, R.S. Nicholson, and R.E. Stamski. 2007. *Geologic Map and Map Database of Eastern Sonoma and Western Napa Counties, California*.

Horizon Water and Environment, LLC. 2017. *CalCannabis Cultivation Licensing, Draft Program Environmental Impact Report*. June.

Horticultural Associates. 2017. *Tree Preservation and Mitigation Report, Yolanda Avenue, Santa Rosa, CA*. December 1, 2017.

_____. 2018. Email Subject: Re: 800 Yolanda Avenue. From John Meserve. February 9.

Institute of Transportation Engineers. 2017. Trip Generation Manual, 10th Edition. Washington, DC: Institute of Transportation Engineers.

Intergovernmental Panel on Climate Change (IPCC). 2007. Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

_____. 2014. Summary for Policymakers. In: Climate Change 2014, Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Johnston, Mike, PE. 2018. Engineering Enterprises, Inc. Email dated January 5, 2018.

Jones & Stokes Associates, Inc. 2000. *Final Cultural Resources Inventory Report for the Proposed Fiber Optic Cable Routes between Point Arena and Robbins, and Point Arena and Sacramento, California*. Volume 1. Document S-22736 on file at the Northwest Information Center, Rohnert Park.

Metropolitan Transportation Commission. 2017. Plan Bay Area 2040. San Francisco, CA: Metropolitan Transportation Commission. (http://2040.planbayarea.org/reports)

Monk & Associates Environmental Consultants (Monk & Associates). 2020. California Tiger Salamander Impact Analysis. April.

National Resource Conservation Service (NRCS). 2017. U.S. Department of Agriculture, National Resource Conservation Service Soil Survey. http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Origer, T. 1976. *An Archaeological Survey of Four Segments of Roadway, Sonoma County, California*. Document S-387 on file at the Northwest Information Center, Rohnert Park.

_____. 2017. *Historical Resources Study of the Property at 800 Yolanda Avenue (APN 044-091-063) Santa Rosa, Sonoma County, California*. September 6.

_____. 2018. Email Subject: RE: Santa Rosa Farms - Cultural Initial Study Section. From Julia Franco. February 5.

Parmesan, C. 2006. *Ecological and Evolutionary Responses to Recent Climate Change*.

Pacific Gas and Electric (PG&E). 2019. Will Serve Letter. May 16.

Redwood Landfill Inc. 2016. *2016 Redwood Landfill Greenhouse Gas Reduction Plan*. September.

Regional Water Quality Control Board (RWQCB). 2005. Approval letter for Report of Investigation and Revised Work Plan for Site Remediation, Former Landscaping Facility, 800 Yolanda Avenue, dated April 29. May 11.

Rincon Consultants. 2019a. *Santa Rosa Farm Group – Cannabis Cultivation Facility Project, Air Quality, Greenhouse Gas, and Energy Study*. November.

_____. 2019b. *Santa Rosa Farm Group – Cannabis Cultivation Facility Project, Noise Study*. December.

Saga Architecture. 2018. *Design Set*. March, with August 2019 revisions.

Salix Consulting, Inc. 2013. *Memorandum regarding: Request for reverification of the Wetland Delineation for the Bill Davidson Property, 800 Yolanda Avenue, Santa Rosa, Sonoma County, CA, Regulatory #2009-00319N*. June 25.

Santa Rosa CityBus. 2018. Santa Rosa CityBus Maps and Schedules. Retrieved from https://srcity.org/1661/Maps-and-Schedules

SCS Engineers. 2005a. *Report of Investigation and Revised Work Plan for Site Remediation, Former Landscaping Facility 800 Yolanda Avenue (formerly 2917 Petaluma Hill Road), Santa Rosa, California*. April 29.

_____. 2005b. *Detection Limit for TRPH in Report of Investigation and Revised Work Plan for Site Remediation, Former Landscaping, Facility800 Yolanda Avenue (formerly 2917 Petaluma Hill Road), Santa Rosa, California*. May 10.

_____. 2005c. *Results of Soil Remediation Site Excavation Activities, Former Landscaping Facility 800 Yolanda Avenue (formerly 2917 Petaluma Hill Road), Santa Rosa, California*. September 28.

_____. 2009. *Jurisdictional Waters Delineation, Assessor's Parcel No. 044-091-063, 800 Yolanda Avenue, Santa Rosa, Sonoma County, CA*. July 17.

_____. 2010. *Biological Assessment, Assessor's Parcel No. 044-091-063, 800 Yolanda Avenue, Santa Rosa, Sonoma, CA*. February 24.

Sendy, Andrew. 2017. Our Complete Guide to Solar Power in California. Available at: https://www.solar-estimate.org/solar-panels/california#solar-summary.

Solano County Local Enforcement Agency. 2005a. Approval letter for Report of Investigation and Revised Work Plan for Site Remediation, Former Landscaping Facility, 800 Yolanda Avenue. April 29.

_____. 2005b. Approval of supplemental correspondence from SCS on May 9 and 10 for Report of Investigation and Revised Work Plan for Site Remediation, Former Landscaping Facility, 800 Yolanda Avenue, dated April 29, e-mail correspondence to W. Davidson. May 10.

_____. 2012. Solid Waste Facility Permit – Potrero Hills Landfill. SRFD. 2002. Soil remediation - 800 Yolanda Avenue, correspondence to W. Davidson. December 17.

Solar Power World. 2015. 2015 *Renewable Energy Handbook*. http://www.myussi.com/pdf_files/solar_handbook/SolarPowerWorld_Handbook_2015.pdf.

Sonoma County. 2016. *Sonoma County General Plan 2020, Open Space and Resource Conservation Element, Chapter 3 Biotic Resources*. Available on the County website at: http://sonomacounty.ca.gov/PRMD/Long-Range-Plans/General-Plan/

Sonoma County Transit. 2019. Sonoma County Transit Routes and Schedules. Retrieved from http://sctransit.com/maps-schedules/

State of California, Department of Finance. 2017. *E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2011- 2017*. May.

State Water Resources Control Board (SWRCB). 2017a. *Cannabis Cultivation Policy: Principles and Guidelines for Cannabis Cultivation*. October 17.

_____. 2017b. Order WQ 2017-0023-DWQ, General Waste Discharge Requirements and Waiver of Waste Discharge Requirements for Discharges of Waste Associated with Cannabis Cultivation Activities. October 17.

Terraphase. 2019a. *Water Use Process Flow and Wastewater Estimates Based on Water Use Process Flow.* August 26.

_____. 2019b. *Pre- and Post-Development Runoff Calculations*. August 27.

Transpedia Consulting Engineers. 2017. *Draft Report Traffic Impact Analysis for Santa Rosa Farms Group Cannabis Cultivation Project*. November.

United States Army Corps of Engineers (USACE). 2009a. File Number 2009-00319N. September 17.

_____. 2009b. File Number 2009-00319N. September 24.

United States Energy Information Administration (EIA). 2018a. “California - Profile Overview.” Last modified: November 15, 2018. [online]: https://www.eia.gov/state/?sid=CA. Accessed January 2019.

_____. 2018b. Natural Gas: Natural Gas Consumption by End Use. December 31, 2018. [online]: https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SCA_a.htm. Accessed January 2019.

United States Environmental Protection Agency (U.S. EPA). 2017. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015. U. S. EPA #430-R-17-001 (April 2017). https://www.epa.gov/sites/production/files/2017-02/documents/2017_complete_report.pdf

United States Fish & Wildlife Service, Sacramento Fish & Wildlife Office. 2005. *Santa Rosa Plain Conservation Strategy Plan*. December 1.

_____. 2011. *Endangered and threatened wildlife and plants: Revised designation of critical habitat for the Sonoma county Distinct Population Segment of California tiger salamander. Final Rule. Federal Register 76(169): 54346-54372*. 31 August.

_____. 2016. *Recovery Plan for the Santa Rosa Plain*. May 31.

United States Fish & Wildlife Service (USFWS)/United States Army Corps of Engineers (USACE). 2007. Programmatic Biological Opinion.

Waste Management – Redwood Landfill. 2018. Phone Conversation with Redwood Landfill and Recycling Center Scale House. February 8.

Whatford, Charles. 1995. *Historic Stone Quarries as Rural Cultural Landscapes: An Example from Sonoma County, California*. California Archaeology, 8:189-193.

Wiemeyer Ecological Services. 2017. *Biological Assessment*. May 2.

_____. 2017. *California Tiger Salamander Habitat Evaluation of Subject Area – 800 Yolanda Avenue, Santa Rosa, CA*. June 26.

_____. 2018. *Biological Assessment, Santa Rosa Farm Group, 800 Yolanda Avenue, Santa Rosa, CA*. March 7.

World Meteorological Organization (WMO). 2013. *A summary of current and climate change findings and figures*.

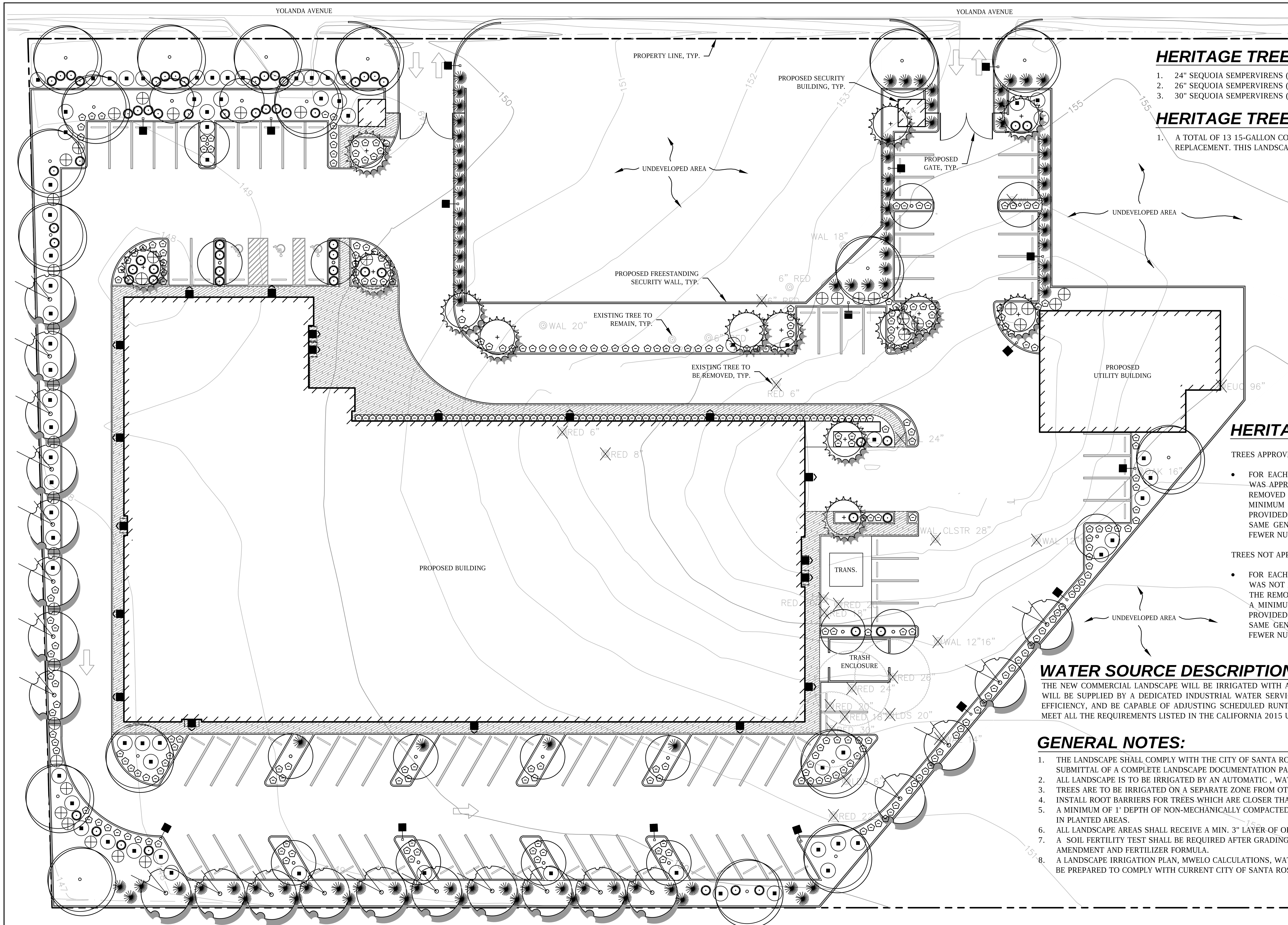
APPENDIX A
PROJECT SITE PHOTOGRAPHS

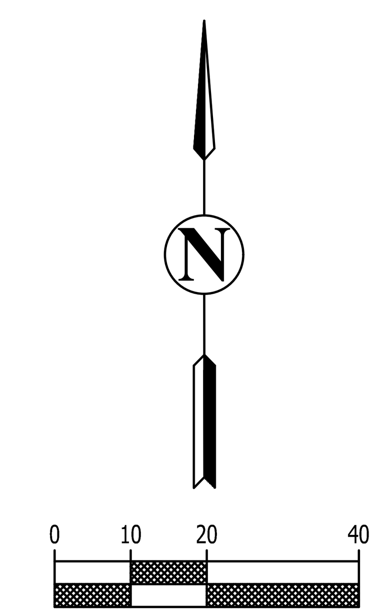
Photograph 1-1 Commercial and industrial development – north of Project site

Photograph 1-2 Adjacent Yolanda Industrial Park – west of Project site

Photograph 1-3 Adjacent residences – southwest corner of Project site

APPENDIX B
PRELIMINARY LANDSCAPE PLAN PREPARED BY
BC ENGINEERING GROUP, INC., SEPTEMBER 6, 2018





HERITAGE TREES PROPOSED FOR REMOVAL:

1. 24" SEQUOIA SEMPERVIRENS (COAST REDWOOD)
2. 26" SEQUOIA SEMPERVIRENS (COAST REDWOOD)
3. 30" SEQUOIA SEMPERVIRENS (COAST REDWOOD)

HERITAGE TREES PROPOSED FOR REPLACEMENT:

1. A TOTAL OF 13 15-GALLON CONTAINER SIZE QUERCUS AGRIFOLIAS (COAST LIVE OAKS) ARE REQUIRED FOR REPLACEMENT. THIS LANDSCAPE PLAN PROPOSES A TOTAL OF 22 COAST LIVE OAK TREES BE PLANTED.

HERITAGE TREE MITIGATION:

TREES APPROVED FOR REMOVAL:

- FOR EACH SIX INCHES OR FRACTION THEREOF OF THE DIAMETER OF A TREE WHICH WAS APPROVED FOR REMOVAL, TWO TREES OF THE SAME GENUS AND SPECIES AS THE REMOVED TREE (OR ANOTHER SPECIES, IF APPROVED BY THE DIRECTOR), EACH OF A MINIMUM 15-GALLON CONTAINER SIZE, SHALL BE PLANTED ON THE PROJECT SITE, PROVIDED HOWEVER, THAT AN INCREASED NUMBER OF SMALLER SIZE TREES OF THE SAME GENUS AND SPECIES MAY BE PLANTED IF APPROVED BY THE DIRECTOR, OR A FEWER NUMBER OF SUCH TREES OF A LARGER SIZE IF APPROVED BY THE DIRECTOR.

TREES NOT APPROVED FOR REMOVAL:

- FOR EACH SIX INCHES OR FRACTION THEREOF OF THE DIAMETER OF A TREE WHICH WAS NOT APPROVED FOR REMOVAL, FOUR TREES OF THE SAME GENUS AND SPECIES AS THE REMOVED TREE (OR ANOTHER SPECIES, IF APPROVED BY THE DIRECTOR), EACH OF A MINIMUM 15-GALLON CONTAINER SIZE, SHALL BE PLANTED ON THE PROJECT SITE, PROVIDED HOWEVER, THAT AN INCREASED NUMBER OF SMALLER SIZE TREES OF THE SAME GENUS AND SPECIES MAY BE PLANTED IF APPROVED BY THE DIRECTOR, OR A FEWER NUMBER OF SUCH TREES OF A LARGER SIZE IF APPROVED BY THE DIRECTOR.

WATER SOURCE DESCRIPTION:

THE NEW COMMERCIAL LANDSCAPE WILL BE IRRIGATED WITH A HIGH EFFICIENCY, WEATHER BASED IRRIGATION CONTROL SYSTEM WHICH WILL BE SUPPLIED BY A DEDICATED INDUSTRIAL WATER SERVICE. THE SYSTEM WILL INCLUDE THE LATEST TECHNOLOGY FOR WATER USE EFFICIENCY, AND BE CAPABLE OF ADJUSTING SCHEDULED RUNTIMES BY UTILIZING THE SITE'S WEATHER BASED DATA. THE SYSTEM SHALL MEET ALL THE REQUIREMENTS LISTED IN THE CALIFORNIA 2015 UPDATED MWELO AND THE MANUFACTURERS' RECOMMENDATIONS.

GENERAL NOTES:

1. THE LANDSCAPE SHALL COMPLY WITH THE CITY OF SANTA ROSA'S WATER EFFICIENT LANDSCAPE ORDINANCE #4051, INCLUDING SUBMITTAL OF A COMPLETE LANDSCAPE DOCUMENTATION PACKAGE.
2. ALL LANDSCAPE IS TO BE IRRIGATED BY AN AUTOMATIC , WATER CONSERVING IRRIGATION SYSTEM.
3. TREES ARE TO BE IRRIGATED ON A SEPARATE ZONE FROM OTHER PLANTS.
4. INSTALL ROOT BARRIERS FOR TREES WHICH ARE CLOSER THAN 8' TO HARDSCAPES.
5. A MINIMUM OF 1' DEPTH OF NON-MECHANICALLY COMPACTED SOIL SHALL BE AVAILABLE FOR WATER ABSORPTION AND ROOT GROWTH IN PLANTED AREAS.
6. ALL LANDSCAPE AREAS SHALL RECEIVE A MIN. 3" LAYER OF ORGANIC MULCH.
7. A SOIL FERTILITY TEST SHALL BE REQUIRED AFTER GRADING IS COMPLETE AND BEFORE ANY PLANT WORK TO DETERMINE THE FINAL AMENDMENT AND FERTILIZER FORMULA.
8. A LANDSCAPE IRRIGATION PLAN, MWELO CALCULATIONS, WATER USE CALCULATIONS, AND PLANTING AND IRRIGATION DETAILS SHALL BE PREPARED TO COMPLY WITH CURRENT CITY OF SANTA ROSA REQUIREMENTS, AND SUBMITTED AT THE FINAL DESIGN REVIEW STAGE.

PRELIMINARY LANDSCAPE PLAN

SCALE: 1"=20'

Plant Legend

SPECIES NAME	COMMON NAME	SIZE	QTY.	WATER USE	COMMENTS
TREES					
LAGERSTROMERIA 'TUSCARORA'	CRAPE MYRTLE	24" BOX	18	LOW	STANDARD
ACER RUBUM	RED MAPLE	24" BOX	18	MODERATE	STANDARD
QUERCUS AGRIFOLIA	COAST LIVE OAK	24" BOX	22	VERY LOW	STANDARD
LAGERSTROEMIA 'NATCHEZ'	CRAPE MYRTLE	24" BOX	14	LOW	STANDARD

Plant Legend

SPECIES NAME	COMMON NAME	SIZE	QTY.	WATER USE	COMMENTS
SHRUBS					
ARCTOSTAPHYLOS 'SENTINEL'	MANZANITA	5 GAL	71	LOW	6' O.C. SPACING
ROSEMARINUS OFFICIANALUS	'BLUE SPIRES' ROSEMARY	5 GAL	39	LOW	6' TALL, 3' WIDE
CALLISTEMON 'LITTLE JOHN'	DWARF BOTTLE BRUSH	5 GAL	61	LOW	6' TALL, 3' WIDE
GRASSES & GRASSLIKE					
MUHLENBERGIA 'REGAL MIST'	PINK MUHLY GRASS	5 GAL	92	LOW	5' TALL, 4'
LOMANDRA LONGIFOLIA	MAT RUSH	5 GAL	344	LOW	3' CLUMPS. EVERGREEN GRASS

REV.	DESCRIPTION	BY	DATE

BC ENGINEERING GROUP, INC.
CIVIL ENGINEERING & LAND PLANNING
2800 Cleveland Ave, Suite C
Santa Rosa, CA 95403
www.bcengineeringgroup.com
Phone: 707.542.4321

PRELIMINARY LANDSCAPE PLAN

800 YOLANDA LLC
800 YOLANDA AVENUE
SANTA ROSA CA 95404

Date:	9/6/18
Job:	237-17
Drawn:	MD
Scale:	1" = 20'
APN:	044-091-063
Permit #:	
Sheet:	L1

APPENDIX C

PHOTOMETRIC STUDY PREPARED BY E-CONOLIGHT
AUGUST 15, 2018

Luminaire Schedule							
Symbol	Qty	Label	Arrangement	Lumens/Lamp	LLF	Total Watts	Description
	18	F1	SINGLE	N.A.	1.000	2106	E-APA12A-C340Z
	19	F2	SINGLE	N.A.	1.000	627	E-WFC03A-F40Z

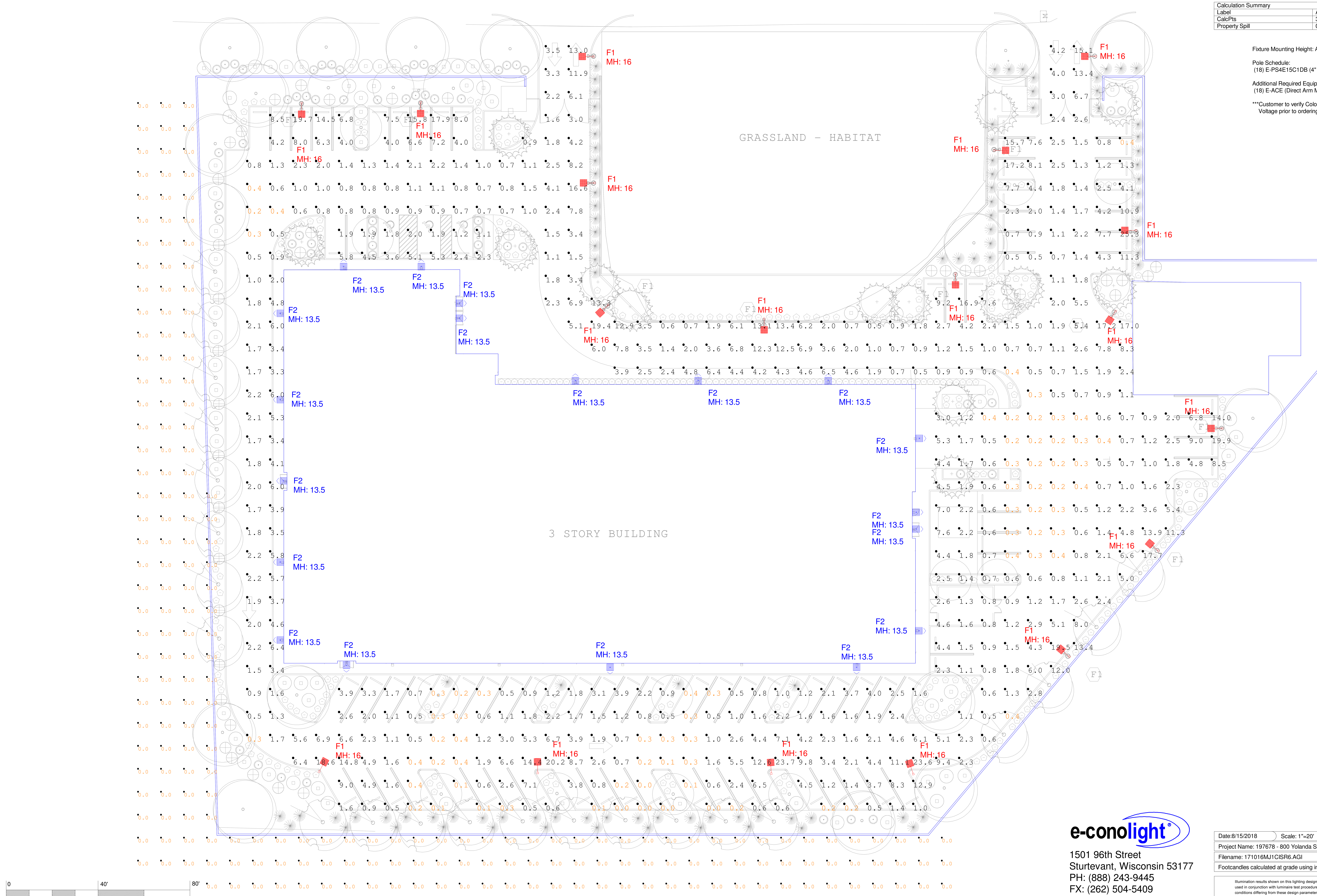
Calculation Summary					
Label	Avg	Max	Min	Avg/Min	Max/Min
CalcPts	3.34	25.3	0.0	N.A.	N.A.
Property Spill	0.00	0.0	0.0	N.A.	N.A.

Fixture Mounting Height: As Shown

Pole Schedule:
(18) E-PS4E15C1DB (4" X 15' SQUARE STEEL POLE)

Additional Required Equipment:
(18) E-ACE (Direct Arm Mount)

Customer to verify Color, Mounting, Fixture Location and Voltage prior to ordering.



e-conolight®
1501 96th Street
Sturtevant, Wisconsin 53177
PH: (888) 243-9445
FX: (262) 504-5409
www.e-conolight.com

Customer responsible to verify ordering information/ catalogue number prior to placing order.

Date:8/15/2018 | Scale: 1"=20' | Layout by: Chris Schlitz

Project Name: 197678 - 800 Yolanda Santa Rosa, CA | Salesforce: 26667

Filename: 171016MJ1CISR6.AGI

Footcandles calculated at grade using initial lumen values

APPENDIX D

SANTA ROSA FARM GROUP - CANNABIS CULTIVATION FACILITY PROJECT AIR QUALITY AND GREENHOUSE GAS STUDY PREPARED BY RINCON CONSULTANTS, INC., NOVEMBER 2019

Santa Rosa Farm Group – Cannabis Cultivation Facility Project

Air Quality, Greenhouse Gas, and Energy Study

prepared for
Danny Abdelmalak, 800 Yolanda LLC
800 Yolanda Avenue
Santa Rosa, California 95404

prepared by
Rincon Consultants
449 15th Street, Suite 303
Oakland, California 94612

November 2019

Rincon Consultants, Inc.
Environmental Scientists Planners Engineers
www.rinconconsultants.com

This page left intentionally blank.

Table of Contents

Tables

Figures

Appendices

1 Project Description

1.1 Introduction

This study is an analysis of the potential air quality and greenhouse gas impacts of a proposed project located at 800 Yolanda Avenue in Santa Rosa, California. The study has been prepared by Rincon Consultants, Inc. under contract to 800 Yolanda LLC for use by the City of Santa Rosa in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). This analysis considers both temporary impacts that would result from project construction and long-term impacts associated with operation of the project.

1.2 Project Summary

The following describes the project background and the currently proposed project.

Project Background

The project site encompasses approximately 5.5 acres (240,886 square feet [sf]) and is largely vacant, but is currently developed with an occupied residence and ancillary structures, totaling approximately 5,000 square feet. The western portion of the project site is covered with gravel, and the eastern portion consists of an undeveloped area with a gravel driveway accessing Petaluma Hill Road. The project site is generally level with limited topographic relief, and site elevation is approximately 155 feet above mean sea level. Figure 1 shows the location of the project site.

Project Description

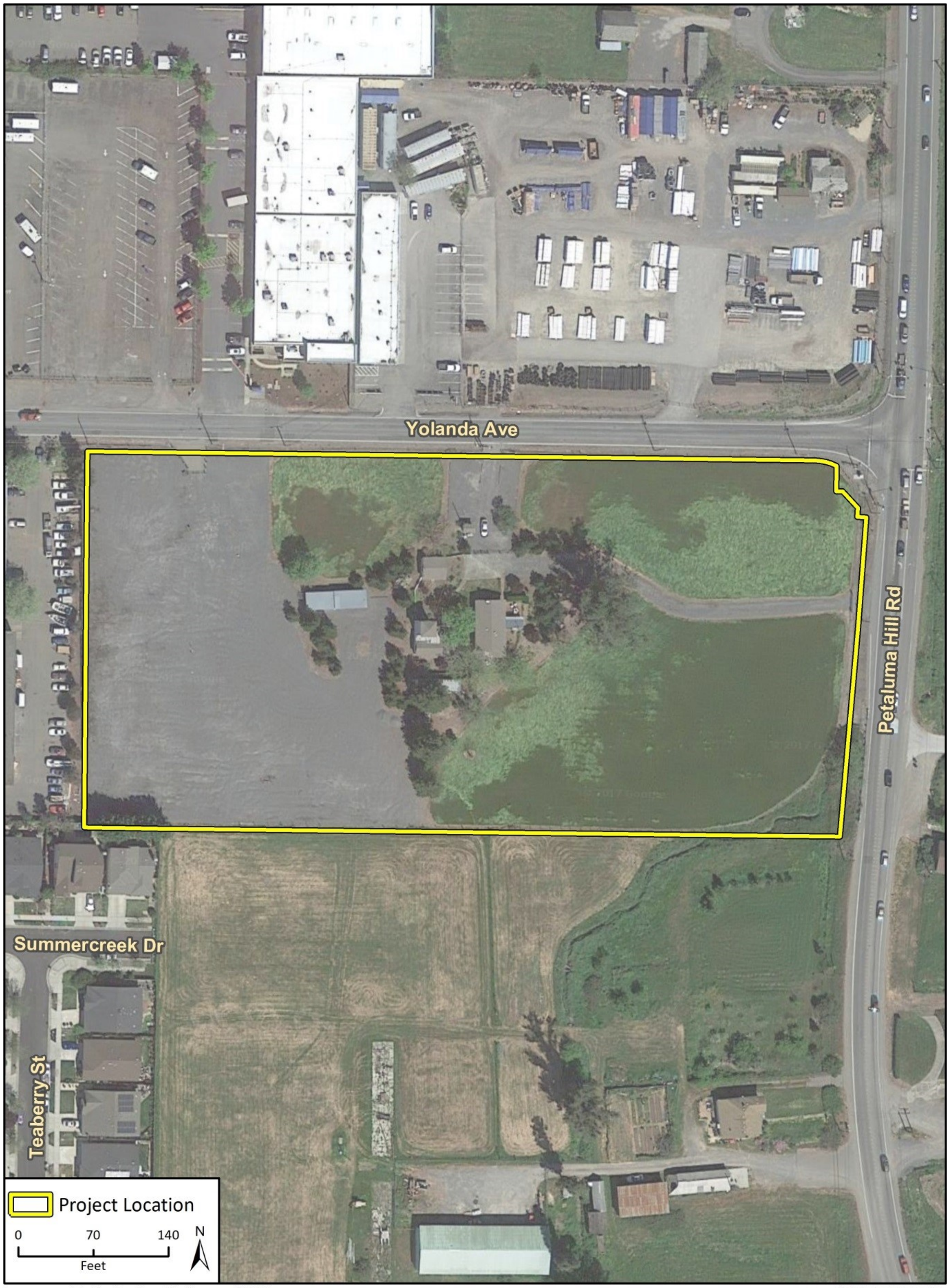
The proposed project involves construction of a three-story, approximately 120,000-square-foot industrial building, would be constructed on the western portion of the project site. The second and third stories would be equipped with grow canopies with a combined total of approximately 44,000 sf to be used for cannabis cultivation. The project would also utilize compressed CO_2 to encourage plant growth through CO_2 injection of approximately 98 pounds per day. The remaining space would be used for offices, manufacturing and distribution. Approximately three acres of the project site would be developed with the proposed building, parking lot, and landscaping. The parking lot would contain 85 vehicle stalls and three bicycle stalls. The remaining 2.5-acres of the project site would not be disturbed. Site security measures would include two security booths, which would be staffed by security guards 24-hours per day. The project developer would hire a security company with electric vehicles in the fleet to patrol.

Sustainability Features

The project would incorporate the following sustainability features:

- Water reclamation and desalination
- Natural gas co-generation system
- Incorporate PG&E's Smart Meter System (cost/energy savings)
- Use cool paving materials for high solar reflectivity

Figure 1 Project Site Location



Imagery provided by Google and its licensors © 2017.

- Pre-wire and plumb for solar thermal/photovoltaic systems
- Install electric vehicle charging systems
- Use water meters to track water use
- Meet on-site meter separation requirements in locations with current/future recycled water capabilities
- Provide outdoor outlets for charging landscaping equipment
- Limit GHG construction equipment emissions by using electric/alternative fuel as available

In addition, the project applicant is proposing to implement the following best practices to limit emissions of air pollutants during construction activities as recommended by BAAQMD (BAAQMD 2017a). Standards duplicative of City Code dust management requirements during construction are not included.

- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Water Demand

Water would be primarily consumed by cultivation operations, which would require approximately 9,000 gallons of water per day. Incidental and sanitary water demand would bring the total to approximately 12,000 gallons of water per day. The project would reclaim and treat approximately 70 – 90 percent of water used in cultivation for reuse onsite.

Energy Demand

The electrical power that would be required for the proposed cultivation and ancillary equipment, including lighting and heating, ventilation, and air conditioning (HVAC), is approximately 5,000 kilowatts (kW). The HVAC system would be in compliance with CCR Title 24, specifically Part 11 – *California Green Building Standards Code* (CalGreen). Assuming the facility would be operational 24-hours a day, with the grow lights operational for approximately 12 hours per day, total annual electricity demand would be approximately 21,900,000 kilowatt-hours (kWh) per year.

The proposed cogenerator would be a 2.75 megawatt (MW) system. The cogenerator system has been sized to supply the project's energy needs. The cogenerator system would include five 550 kW generators. For the purposes of this analysis, it is conservatively assumed that all five generators would operate 8,300 hours annually. In reality, it is expected that only four generators would be operated simultaneously throughout the year with one backup generator for greater electrical demand and maintenance. Assuming five generators operating regularly, the cogenerator system would require approximately 1,918,130 therms per year to operate and would generate approximately 22,825,000 kWh per year. The project would also include a natural gas boiler, which would demand approximately 331,870 therms per year. Therefore, total facility natural gas demand would be approximately 2,250,000 therms per year. Natural gas and electrical services are available to the property by Pacific Gas and Electric (PG&E).

Odor Control

The project would include various methods for odor control, including engineering controls, carbon filtration, neutralization and oxidation to control odors from growing operations. In addition, the project would include an odor mitigation control plan that establishes a protocol to continuously sample representative effluent air following the carbon adsorption system during grow periods. The sample(s) would be analyzed to determine reasonable odor threshold limits for various strains and species. Air dispersion modeling would be performed to identify a worse case concentration isopleth at the property boundary and determine where the highest ground level concentration might result at or beyond the property boundary. It is possible then to determine what maximum control efficiency is required of the carbon control system to reduce ground level concentration impacts of each grow below their respective odor thresholds. If the carbon filtration system alone is not adequate in obtaining the control efficiency determined under the odor mitigation control plan, then odor control abatement will be enhanced through one of several means. Additional controls may include, but are not limited to, mist eliminators via spray application, oxidation using hydrogen peroxide or ozone and/or other neutralizing agents. All added controls and their guarantee efficiency would be backed by vendor suppliers.

Construction

The project construction schedule would extend for approximately eleven months and would include the following phases: Demolition, site preparation, grading, building construction, architectural coating, paving, and landscaping. Approximately 70 cubic yards (CY) of material would be imported onsite and 3,505 square feet would be demolished. The applicant provided construction schedule and equipment list are detailed in Appendix A.

2 Air Quality

2.1 Background

Local Climate and Meteorology

The project site is in Santa Rosa in Sonoma County, which is located within the San Francisco Bay Area Air Basin (Basin). The Basin is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The Pacific Ocean influences the moderate climate of Sonoma County. In summer, afternoon northwesterly winds blow contaminants south toward San Francisco. In winter, periods of stagnant air can occur, especially in periods between storms.

Sonoma County's climate is largely affected by the topography of the Petaluma, Cotati, and Sonoma valleys. Temperatures are similar in the Petaluma and Cotati valleys, while Sonoma Valley temperatures are warmer, similar to Napa Valley. Average daily temperatures range from moderate overnight to hot during the day in the summer, and from cool overnight to moderate during the day in the winter. Wind patterns in the Petaluma and Cotati valleys are strongly influenced by the Petaluma Gap, with calm to mild winds typical in both Santa Rosa and Petaluma. During late afternoons in summer, fog is common in the Petaluma and Cotati valleys, and can persist until late morning the following day. Sunshine in the Sonoma Valley is plentiful. Annual rainfall ranges from 24 inches in Petaluma, 29 inches in Sonoma, and 30 inches in Santa Rosa.

Ozone and fine particle pollution, or $PM_{2.5}$, are major regional air pollutants of concern in the San Francisco Bay Area. Ozone is primarily a problem in the summer, and fine particle pollution in the winter. Although much of the interior of Sonoma County can get quite hot during summer, air monitoring results show that this area experiences some of the lowest ozone levels in the entire Bay Area. Gaps in the hills to the west allow fresh marine air inland on all but the hottest summer days. $PM_{2.5}$ can become elevated, particularly due to wood burning during the holiday season; however, air monitoring results indicate that this region has some of the lowest levels of $PM_{2.5}$ in the Bay Area.

Air Pollutants of Primary Concern

The federal and State Clean Air Acts mandate the control and reduction of certain air pollutants. Under these Acts, the U.S. Environmental Protection Agency (U.S. EPA) and the California Air Resources Board (CARB) have established ambient air quality standards for criteria pollutants. Ambient air pollutant concentrations are affected by the rates and distributions of air pollutant emissions, as well as by the climate and topographic influences discussed above. The primary determinant of concentrations of non-reactive pollutants (such as carbon monoxide and suspended particulate matter) is proximity to major sources. In particular, ambient carbon monoxide levels usually closely follow the spatial and temporal distributions of vehicular traffic.

Primary criteria pollutants are emitted directly from a source (e.g., vehicle tailpipe, an exhaust stack of a factory, etc.) into the atmosphere. Primary criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), fine particulate matter (PM_{10} and $_{PM2.5}$), sulfur dioxide (SO_2), and lead (Pb). Ozone (O_3) is considered a secondary criteria pollutant because it is created by atmospheric chemical and photochemical reactions between reactive organic gases (ROG) and nitrogen oxides

(NO_X). The project would generate SO_2, PM_{10}, $PM_{2.5}$, as well as ozone precursors ROG and NO_X (including NO_2) during construction and operation. These pollutants can have adverse impacts on human health at certain levels of exposure. The following subsections describe the characteristics, sources, and health and atmospheric effects of air pollutants. The impact analysis contained within this study correlates the increase in emissions that the project would generate to potential adverse impacts on human health, even though the state of environmental science modeling at this time is not capable of precisely identifying how pollutant concentrations directly or indirectly correlate to specific levels of human health impacts. It should also be noted that, as discussed further in Section 2.2, *Impact Analysis*, project-related emissions would be below the applicable air emission thresholds of significance, which are created by the air districts to address, in part, the potential impacts of criteria pollutants on human health.

A discussion of primary criteria pollutants is provided below.

Ozone

Ozone (O_3) is produced by a photochemical reaction (triggered by sunlight) between nitrogen oxides (NO_X) and reactive organic gases (ROG). NO_X is formed during the combustion of fuels, while reactive organic gases are formed during combustion and evaporation of organic solvents. Because ozone requires sunlight to form, it mostly occurs in substantial concentrations between the months of April and October. Ozone is a pungent, colorless, toxic gas with direct health effects on humans including respiratory and eye irritation and possible changes in lung functions. Groups most sensitive to ozone include children, the elderly, people with respiratory disorders, and people who exercise strenuously outdoors.

Carbon Monoxide

Carbon monoxide (CO) is a local pollutant that is found in high concentrations only near fuel combustion equipment and other sources of carbon monoxide. The primary source of CO, a colorless, odorless, poisonous gas, is automobile traffic. Elevated concentrations, therefore, are usually only found near areas of high traffic volumes. CO's health effects are related to its affinity for hemoglobin in the blood. At high concentrations, CO reduces the amount of oxygen in the blood, causing heart difficulty in people with chronic diseases, reduced lung capacity, and impaired mental abilities.

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a by-product of fuel combustion, with the primary source being motor vehicles and industrial boilers and furnaces. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts rapidly to form NO_2, creating the mixture of NO and NO_2 commonly called NO_X. Nitrogen dioxide is an acute irritant. A relationship between NO_2 and chronic pulmonary fibrosis may exist, and an increase in bronchitis in young children at concentrations below 0.3 parts per million (ppm) may occur. NO_2 absorbs blue light and causes a reddish brown cast to the atmosphere and reduced visibility. It can also contribute to the formation of PM_{10} and acid rain.

Suspended Particulates

Atmospheric particulate matter is comprised of finely divided solids and liquids such as dust, soot, aerosols, fumes, and mists. The particulates that are of particular concern are PM_{10} (which measures no more than 10 microns in diameter) and $PM_{2.5}$ (a fine particulate measuring no more than 2.5

microns in diameter). The characteristics, sources, and potential health effects associated with the small particulates (those between 2.5 and 10 microns in diameter) and $PM_{2.5}$ can be different. Major man-made sources of PM_{10} are agricultural operations, industrial processes, combustion of fossil fuels, construction, demolition operations, and entrainment of road dust into the atmosphere. Natural sources include windblown dust, wildfire smoke, and sea spray salt. The finer, $PM_{2.5}$ particulates are generally associated with combustion processes as well as being formed in the atmosphere as a secondary pollutant through chemical reactions. $PM_{2.5}$ is more likely to penetrate deeply into the lungs and poses a serious health threat to all groups, but particularly to the elderly, children, and those with respiratory problems. More than half of the small and fine particulate matter that is inhaled into the lungs remains there, which can cause permanent lung damage. These materials can damage health by interfering with the body's mechanisms for clearing the respiratory tract or by acting as carriers of an absorbed toxic substance.

Sulfur Dioxide

SO_2 is a colorless, pungent, irritating gas formed primarily by the combustion of sulfur-containing fossil fuels. When SO_2 oxidizes in the atmosphere, it forms sulfur trioxide (SO_3). Collectively, these pollutants are referred to as sulfur oxides (SO_X). In humid atmospheres, SO_2 can also form sulfuric acid mist, which can eventually react to produce sulfate particulates that can inhibit visibility. Combustion of high sulfur-content fuels is the major source, while chemical plants, sulfur recovery plants, and metal processing are minor contributors. At sufficiently high concentrations, SO_2 irritates the upper respiratory tract. At lower concentrations, when in conjunction with particulates, SO_2 appears to do still greater harm by injuring lung tissues. This compound also constricts the breathing passages, especially in people with asthma and people involved in moderate to heavy exercise. Sulfur dioxide causes respiratory irritation, including wheezing, shortness of breath, and coughing. Long-term SO_2 exposure has been associated with increased risk of mortality from respiratory or cardiovascular disease. Sulfur oxides, in combination with moisture and oxygen, can yellow leaves on plants, dissolve marble, and eat away iron and steel.

Lead

Lead (Pb) is a metal found naturally in the environment, as well as in manufacturing products. Lead occurs in the atmosphere as particulate matter. The major sources of Pb emissions historically have been mobile and industrial sources. In the early 1970s, the U.S. EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The USEPA completed the ban prohibiting the use of leaded gasoline in highway vehicles in December 1995. As a result of the USEPA's regulatory efforts to remove lead from gasoline, atmospheric lead concentrations have declined substantially over the past several decades. The most dramatic reductions in lead emissions occurred prior to 1990 due to the removal of lead from gasoline sold for most highway vehicles. Lead emissions were further reduced substantially between 1990 and 2008, with reductions occurring in the metals industries in part due to national emissions standards for hazardous air pollutants (USEPA 2013). As a result of phasing out leaded gasoline, metal processing is currently the primary source of Pb emissions. The highest level of Pb in the air is generally found near lead smelters. Other stationary sources include waste incinerators, utilities, and lead-acid battery manufacturers. Lead may cause a range of health effects, including anemia, kidney disease, and neuromuscular and neurological dysfunction (in severe cases). Demolition of buildings containing lead-based paint is regulated by existing laws and regulations, including California Code of Regulations Title 17, Division 1, Chapter 8 and Senate Bill 460, to reduce or eliminate the risk to nearby receptors. Furthermore, the proposed project does not include any stationary sources of lead emissions. Therefore, implementation of the project would not result in substantial emissions of lead, and this pollutant is not discussed further in this analysis.

Toxic Air Contaminants

Toxic air contaminants (TACs) are a diverse group of air pollutants that may cause or contribute to an increase in deaths or serious illness or that may pose a present or potential hazard to human health. TACs include both organic and inorganic chemical substances that may be emitted from a variety of common sources, including gasoline stations, motor vehicles, dry cleaners, industrial operations, painting operations, and research and teaching facilities. One of the main sources of TACs in California is diesel engines that emit exhaust containing solid material known as diesel particulate matter (DPM; California Air Resources Board [CARB] 2011a). TACs are different than the criteria pollutants previously discussed because ambient air quality standards have not been established for TACs. TACs occurring at extremely low levels may still cause health effects, and it is typically difficult to identify levels of exposure that do not produce adverse health effects. TAC impacts are described by carcinogenic risk and by chronic (i.e., of long duration) and acute (i.e., severe but of short duration) adverse effects on human health.

Current Ambient Air Quality

CARB and the U.S. EPA establish ambient air quality standards for major pollutants. Standards have been set at levels intended to be protective of public health. California standards are typically more restrictive than federal standards. Local air districts and CARB monitor ambient air quality to ensure that air quality standards are met, and if they are not met, develop strategies to meet the standards. Air quality monitoring stations measure pollutant ground-level concentrations (typically, ten feet above ground level). Depending on whether the standards are met or exceeded, the local air basin is classified as in “attainment” or “non-attainment.” Some areas are unclassified, which means no monitoring data are available. Unclassified areas are considered to be in attainment. Table 1 summarizes the California Ambient Air Quality Standards (CAAQS) and the National Ambient Air Quality Standards (NAAQS) for each of these pollutants as well as the attainment status of the Basin. As shown in Table 1, the Basin is in nonattainment for the federal standards for ozone and $PM_{2.5}$. The Basin is also in nonattainment for the State standard for ozone, PM_{10}, and $PM_{2.5}$.

Table 1 Federal and State Ambient Air Quality Standards

		California Standards		National Standards	
Pollutant	Averaging Time	Concentration	Attainment Status	Concentration	Attainment Status
Ozone	8 Hour	0.070 ppm	N	0.070 ppm	N
	1 Hour	0.09 ppm	N		
Carbon Monoxide	8 Hour	9.0 ppm	A	9 ppm	A
	1 Hour	20 ppm	A	35 ppm	A
Nitrogen Dioxide	1 Hour	0.18 ppm	A	0.100 ppm	U
	Annual Arithmetic Mean	0.030 ppm		0.053 ppm	A
Sulfur Dioxide	24 Hour	0.04 ppm	A	0.14 ppm	A
	1 Hour	0.25 ppm	A	0.075 ppm	A
	Annual Arithmetic Mean			0.030 ppm	A
Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N		
	24 Hour	50 µg/m^3	N	150 µg/m^3	U
Particulate Matter - Fine ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	N	12 µg/m^3	U/A
	24 Hour			35 µg/m^3	N
Sulfates	24 Hour	25 µg/m^3	A		
Lead	Calendar Quarter			1.5 µg/m^3	A
	Rolling 3 Month Average			0.15 µg/m^3	
	30 Day Average	1.5 µg/m^3)			A
Hydrogen Sulfide	1 Hour	0.03 ppm	U		
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm	No information available		
Visibility Reducing particles	8 Hour(10:00 to18:00 PST)		U		

A=Attainment; N=Nonattainment; U=Unclassified; mg/m^3=milligrams per cubic meter; ppm=parts per million; µg/m^3=micrograms per cubic meter

Source: BAAQMD 2017a.

The Sebastopol Monitoring Station is the BAAQMD-operated monitoring station located closest to the City of Santa Rosa and is approximately 6 miles west of the project site. Table 2 summarizes the representative annual air quality data for the project site over the years 2014 to 2017 at the Sebastopol Monitoring Station for all criteria pollutants, except PM_{10} and CO since they were unavailable for that station. Data for PM_{10} was is from the Healdsburg-133 Matheson Street station approximately 17 miles north of the project site. CO data is not available at any station in Sonoma County or for the San Francisco air basin as a whole.

Table 2 Ambient Air Quality at the Nearest Monitoring Stations

Pollutant	2014	2015	2016	2017
Ozone (ppm), Worst 1-Hour	0.67	0.068	0.073	0.087
Number of days of State exceedances (>0.09 ppm)	0	0	0	0
Ozone (ppm), 8-Hour Average	0.061	0.062	0.064	0.071
Number of days of State exceedances (>0.07 ppm)	0	0	0	1
Number of days of Federal exceedances (>0.07 ppm)	0	0	0	0
Carbon Monoxide (ppm), Highest 8-Hour Average	*	*	*	*
Number of days of above State or Federal standard (>9.0 ppm)	*	*	*	*
Particulate Matter <10 microns, $\mu g/m^3$, Worst 24 Hours[1]	45.6	50.7	43.5	161.5
Number of days above State standard (>50 $\mu g/m^3$)	0	1	0	7
Number of days above Federal standard (>150 $\mu g/m^3$)	0	0	0	1
Particulate Matter <2.5 microns, $\mu g/m^3$, Worst 24 Hours	26.2	29.9	18.7	81.8
Number of days above Federal standard (>35 $\mu g/m^3$)	0	0	0	4

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

* No data available

Sebastopol Monitoring Station was used for all pollutants, except PM_{10}, which used data from Healdsburg-133 Matheson Street station.

Source: CARB 2019a

[1] Reporting the California "First High"

As shown in Table 2, PM_{10} exceeded the state standard in 2015 and state and federal standards in 2017 and $PM_{2.5}$ exceeded the federal standard in 2017 (PM exceedances in 2017 were likely due to the local wildfire). The 8-hour average of ozone also exceed the state standard one time in 2017.

Federal and State

The federal and state governments have authority under the federal and state Clean Air Acts to regulate emissions of airborne pollutants and have established ambient air quality standards (AAQS) for the protection of public health. An air quality standard is defined as "the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without harming public health" (CARB 2019b). The USEPA is the federal agency designated to administer air quality regulation, while CARB is the state equivalent in California. Federal and state AAQS have been established for six criteria pollutants: O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and Pb. AAQS are designed to protect those segments of the public most susceptible to respiratory distress, such as children under the age of 14, the elderly (over the age of 65), persons engaged in strenuous work or exercise, and people with cardiovascular and chronic respiratory diseases (U.S. EPA 2016). In addition, the State of California has established health-based ambient air quality standards for these and other pollutants, some of which are more stringent than the federal standards (California Air Resources Board 2019c and 2019d). Table 1 lists the current federal and state standards for regulated pollutants.

Air Quality Management Plan

The BAAQMD is primarily responsible for ensuring that the national and State ambient air quality standards are attained and maintained in the Bay Area. The BAAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, and conducting public education campaigns. The BAAQMD has jurisdiction over much of the nine-county Bay Area, including Sonoma County.

The BAAQMD, along with other regional agencies (such as the Association of Bay Area Governments [ABAG] and the Metropolitan Transportation Commission [MTC]), has prepared the Ozone Attainment Plan to guide the region's air quality planning efforts and address the federal standard for ozone. The 2017 Clean Air Plan is the most recently approved regional Clean Air Plan, which was adopted in April 2017, as an update to the Bay Area 2005 Ozone Strategy and the 2010 Clean Air Plan. The 2017 Clean Air Plan provides an integrated, multi-pollutant strategy to improve air quality, protect public health, and protect the climate. The plan is designed to provide a control strategy to reduce ozone, particulate matter, air toxics, and greenhouse gases in a single, integrated plan. The 2017 Clean Air Plan included Transportation Control Measures (TCMs) from the 2005 Ozone Strategy, measures that were modified and expanded based on new investment and policy decisions as well as public input. In particular, the TCMs have been updated to reflect the policy and investment decisions made in the Metropolitan Transportation Commission's (MTC) regional transportation plan, Transportation 2035: Change in Motion. The 2017 Clean Air Plan is also based on population and employment forecasts from ABAG (BAAQMD 2017b).

City of Santa Rosa

The City of Santa Rosa's General Plan 2035, adopted in 2019, lists several air quality policies as part of its Open Space and Conservation element that supplement those of the BAAQMD. The following policies are applicable to the proposed project (City of Santa Rosa 2019):

OSC-J Take appropriate actions to help Santa Rosa and the larger Bay Area region achieve and maintain all ambient air quality standards.

OSC-J-1 Review all new construction projects and require dust abatement actions as contained in the CEQA Handbook of the Bay Area Air Quality Management District.

OSC-J-2 Budget for clean fuels and vehicles in the city's long-range capital expenditure plans, to replace and improve the existing fleet of gasoline and diesel powered vehicles. Initiate a policy to make its fleet among the cleanest in the North Bay by:

- Purchasing electric vehicles wherever possible, and especially for stop-and-go units such as parking meter readers.
- Purchasing electric or hybrid electric fleet vehicles for general staff use, especially for building inspectors and other uses primarily within the city.
- Purchasing alternative fuel vehicles, such as natural gas, as the existing diesel-powered fleet is replaced. Alternatively, purchase diesel vehicles only if they meet or exceed emission specifications for available natural gas fuel vehicles.
- Purchasing biodiesel fuel for use by the city diesel truck fleet.
- As possible, use lo-NOx fuel additives, such as Purinox, in all diesel vehicles.

OSC-J-3 Reduce particulate matter emissions from wood burning appliances through implementation of the city's Wood Burning Appliance code.

Sensitive Receptors

Ambient air quality standards have been established to represent the levels of air quality considered sufficient, with an adequate margin of safety, to protect public health and welfare. They are designed to protect people most susceptible to respiratory distress, such as children under 14; persons over 65; persons engaged in strenuous work or exercise; and people with cardiovascular and chronic respiratory diseases. CARB identifies sensitive receptors as "land uses where sensitive individuals are most likely to spend time," such as "schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities" (CARB 2005). The sensitive receptors nearest to the project site are residences located adjacent to the southwest corner of the project site.

2.2 Impact Analysis

Methodology and Significance Thresholds

This analysis uses the BAAQMD's May 2017 *CEQA Air Quality Guidelines*. The May 2017 *CEQA Air Quality Guidelines* include revisions made to the 2010 *Guidelines*, addressing the California Supreme Court's 2015 opinion in the *Cal. Bldg. Indus. Ass'n vs. Bay Area Air Quality Mgmt. Dist.*, 62 Cal. 4th 369 (BAAQMD 2017c). Therefore, the numeric thresholds in the May 2017 *CEQA Air Quality Thresholds* were used for this analysis to determine whether the impacts of the project exceed the thresholds identified in Appendix G of the State CEQA Guidelines.

Significance Thresholds

To determine whether a project would have a significant impact to air quality, Appendix G of the 2019 *State CEQA Guidelines* asks whether a project would:

a) Conflict with or obstruct implementation of the applicable air quality plan

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard

c) Expose sensitive receptors to substantial pollutant concentrations

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people

The BAAQMD's significance thresholds in the May 2017 *CEQA Air Quality Guidelines* for project operations within the Basin are used to determine the air quality impacts of the proposed project. Table 3 shows the quantitative thresholds for air quality impact evaluation from the May 2017 *CEQA Air Quality Guidelines*. These represent the levels at which a project's individual emissions of criteria air pollutants or precursors would result in a cumulatively considerable contribution to the Basin's existing air quality conditions for all pollutants in which the basin is in state or federal non-attainment (ROG, NO_X, PM_{10}, and $PM_{2.5}$).

In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is unnecessary.

Table 3 Air Quality Thresholds of Significance

	Construction	Operational	
Pollutant/Precursor	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (tpy)	Average Daily Emissions (lbs/day)
ROG	54	10	54
NO_X	54	10	54
PM_{10}	82 (exhaust)	15	82
$PM_{2.5}$	54 (exhaust)	10	54

Source: BAAQMD 2017c.

Notes: tpy = tons per year; lbs/day = pounds per day; NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; tpy = tons per year.

Methodology

The construction emissions associated with development of the project were calculated using the California Emissions Estimator Model (CalEEMod) version 2016.3.1. Temporary emissions would result from three primary sources: operation of construction vehicles (e.g., scrapers, loaders, and excavators); ground disturbance during clearing and grading, which creates fugitive dust; and the application of asphalt, paint, or other oil-based substances. The extent of daily emissions, particularly reactive organic gases (ROGs) and nitrogen oxide (NO_X) emissions, generated by construction equipment would depend on the quantity of equipment used and the hours of operation for each project. The extent of fugitive dust ($PM_{2.5}$ and PM_{10}) emissions would depend upon the following factors: 1) the amount of disturbed soils; 2) the length of disturbance time; 3) whether existing structures are demolished; 4) whether excavation is involved; and 5) whether transporting excavated materials offsite is necessary. The amount of ROG emissions generated by paints and oil-based substances such as asphalt depends upon the type and amount of material utilized.

CalEEMod was used to estimate air pollutant emissions associated with project construction, which was estimated to extend approximately 11 months based on the applicant’s preliminary construction schedule (see Appendix A). Demolition of the existing single-family dwelling would occur first, followed by site preparation, grading, construction, paving, architectural coating, and landscaping. Construction activities would result in temporary air quality impacts that may vary substantially from day to day, depending on the level of activity, the specific type of operation, and, for dust, the prevailing weather conditions.

CalEEMod was also used to estimate non-stationary source operational emissions. Operational emissions included mobile source emissions, area source emissions, and emissions from energy use. Mobile source emissions would be generated by the increase in motor vehicle trips to and from the project site. This analysis uses daily trip generation estimates provided by Fehr & Peers in the Transportation Impact Analysis Report (Fehr & Peers 2019). Area source emissions are generated by landscape maintenance equipment, consumer products, and architectural coating. CalEEMod also estimates emissions from water demand and wastewater generation. As discussed in the Project Description, the project would demand approximately 12,000 gallons of water per day. This assumption was included in the CalEEMod analysis.

It is the goal of the project to use electricity entirely from a natural gas powered cogenerator system onsite, a stationary source. In the unlikely event that the cogenerator system fails, the project would use electricity from PG&E. These events, by their nature, would be infrequent and temporary. Nonetheless, in order to provide a conservative, worst case analysis of air pollutant and GHG emissions, two electricity source scenarios were evaluated in this study:

- Scenario 1: Total Electrical Demand Supplied by Cogenerator System
- Scenario 2: Total Electrical Demand Supplied by Utilities

For Scenario 1, it was assumed that all electricity would be generated on site and no electricity demand was included in CalEEMod, as associated criteria pollutant emissions from the cogenerator system were calculated separately using manufacturer specific emission factors. For Scenario 2, it was assumed that all electricity would be supplied by PG&E and 21,900,000 kWh annual electricity consumption was included in CalEEMod. The proposed chiller could run on exhaust heat from the cogenerator system, further reducing energy demand of the facility; however, this reduction in demand is not included in order to provide a conservative estimate of energy related emissions. In addition, CalEEMod calculates emissions from natural gas combustion onsite (California Air Pollution Control Officers Association [CAPCOA] 2017). Modeling assumptions for both scenarios included that the project would demand approximately 331,870 therms per year to operate proposed natural gas boiler. Emissions associated with combustion of natural gas by the cogenerator system were calculated separately using manufacturer specific emission factors.

Consistent the May 2017 *CEQA Air Quality Guidelines*, stationary source criteria pollutant emissions were quantified and added to project mobile- and area-source emissions for comparison to thresholds of significance (BAAQMD 2017; page 3-1). Emissions from the cogenerator units, stationary sources, were estimated separately using emission factors provided by Western Energy Systems for the Avus 500 Plus NG/Agenitor 412, which is a generator unit likely to be used by the project. Exact generator equipment has not been selected for the project, as final selection will be made during the facility design phase; nonetheless, the emissions estimated in this study provide a reasonable estimate of emissions from similarly-sized cogenerator units that are likely to be used by the project. As required by BAAQMD Rule 1, General Requirements, the project applicant would be required to obtain an Authority to Construct and Permit to Operate from the BAAQMD in order to operate the cogenerator system on the project site. Pursuant to BAAQMD Rule 2, New Source Review, in order to receive an authority to construct and permit to operate, the proposed cogenerator system would be required to implement Best Available Control Technology (BACT) to control criteria pollutant emissions, if it would emit pollutants in an amount of 10 or more pounds per day (see Rule 2, Section 2-2-301). The proposed cogenerator system would emit more than 10 pounds per day each of NO_X, CO, and VOC; therefore, the project is required to comply with BAAQMD Rule 2 by implementing BACT. Consistent with the May 2017 *CEQA Air Quality Guidelines*, the stationary source analysis takes into account this mandatory regulatory compliance measure and stationary emissions estimates are based on emission factors with BACT in place (selective catalytic reduction [SCR] or oxidation catalyst system; BAAQMD 2017, page 4-3). Post-catalyst emission factors and manufacturer emissions estimates are provided in Appendix B.

Human Health Impacts

The methodology in this report makes a reasonable effort to substantively connect the project's air quality impacts to the likely health consequences. The methodology in this report also connects the project's air quality impacts to the likely health consequences, consistent with the California Supreme Court's (Court) decision regarding Sierra Club v. County of Fresno (Friant Ranch, L.P.)

(2018). The following information is provided to be consistent with the Court's opinion by explaining the limitations of available AQ modeling tools and thresholds and why it is not scientifically feasible at the time of drafting this report to provide an analysis explaining the direct connection between the project's regional pollutant emissions and human health. This information is based upon the South Coast Air Management District (SCAQMD) and San Joaquin Valley Air Pollution Control District (SJVAPCD) amicus briefs filed in the Friant Ranch decision that explain the difficulties in providing a precise correlation between regional pollutant emissions and human health. The BAAQMD did not comment on the Friant Ranch decision. However, the findings and conclusions from the SJVAPCD and SCAQMD are considered applicable and germane to this methodological issue.

With regard to the analysis of air quality-related health impacts, the SCAQMD, the air quality authority for the South Coast Air Basin, has stated that "in some cases, it is not feasible to correlate [air pollutant] emissions to specific, quantifiable health impacts (e.g., premature mortality; hospital admissions)." In such cases, a general description of the adverse health impacts resulting from the pollutants at issue may be sufficient.

The SCAQMD has further stated that from a scientific standpoint, it takes a large amount of additional precursor emissions to cause a modeled increase in ambient ozone levels over an entire region. For example, the SCAQMD's 2012 AQMP showed that reducing NO_X by 432 tons per day and reducing ROC by 187 tons per day would only reduce ozone levels at SCAQMD's monitor site with the highest levels by only 9 parts per billion (SCAQMD 2013). SCAQMD staff does not currently know of a way to accurately quantify ozone- related health impacts caused by NO_X or ROC precursor emissions from relatively small projects.

SCAQMD acknowledged that it may be feasible to analyze regional air quality related health impacts for projects on a regional scale with very high emissions of NO_X and ROCs. The example SCAQMD provided was for proposed Rule 1315, which authorized various newly-permitted sources to use offsets from the SCAQMD's "internal bank" of emission reductions. The CEQA analysis accounted for essentially all of the increases in emissions due to new or modified sources in the District between 2010 and 2030, or approximately 6,620 pounds per day of NO_X and 89,947 pounds per day of ROC, to expected health outcomes from ozone and particulate matter (e.g., 20 premature deaths per year and 89,947 school absences in the year 2030 due to ozone). The SCAQMD stated that its staff does not currently know of a way to accurately quantify ozone- related health impacts caused by ozone from relatively small projects like the proposed project. Therefore, a general description of the adverse health impacts resulting from the pollutants at issue is all that can be provided at this time.

The SJVAPCD amicus brief addresses whether it is scientifically feasible to correlate an individual project's air quality emissions to specific health impacts. As discussed under Section 2.1, Background, human health impacts associated with criteria pollutants are analyzed and taken into consideration when the EPA sets the NAAQS for each criteria pollutant (42 U.S.C. § 7409(b)(1)). The health impact of a particular criteria pollutant is analyzed on a regional, not a facility level, based on how close the area is to complying with (attaining) the NAAQS. As discussed by the SJVAPCD, it is not feasible to conduct a criteria air pollutant analysis detailing health impacts on a project-level basis because currently available computer modeling tools are not equipped for this task.

In some instances, when a health risk type analysis is required for criteria air pollutants, it is important to understand how the relevant criteria pollutants (ozone and particulate matter) are formed, dispersed and regulated. Ground level ozone (smog) is not directly emitted into the air, but is instead formed when precursor pollutants such as NO_X and ROC are emitted into the atmosphere and undergo complex chemical reactions in the process of sunlight. Once formed, ozone can be transported long distances by wind. Because of the complexity of ozone formation, a specific tonnage amount of NO_X or ROCs emitted in a particular area does not equate to a particular concentration of ozone in that area. Even rural areas that have relatively low tonnages of emissions of NO_X or ROC can have high levels of ozone concentrations simply due to wind transport. Conversely, areas that have substantially more NO_X and ROC emissions could experience lower concentrations of ozone simply because sea breezes disperse the emissions (SJVAPCD 2007). Furthermore, the SJVAPCD states that although emissions of particulate matter can have a localized impact, the tonnage emitted does not always equate to the local PM concentration because local PM concentrations are affected by several factors, including wind transport, meteorology, and complex chemical factors. In addition, secondary PM is formed via a complex process such that the tonnage of PM-forming precursor emissions in a given area and does not necessarily result in an equivalent concentration of secondary PM in that same area.

For ozone and PM, the disconnect between the tonnage of precursor pollutants and the concentration of ozone and secondary PM formed is important because it is not necessarily the tonnage of precursor pollutants that causes human health effects; rather, it is the concentrations of resulting ozone and PM that cause these effects. The NAAQS, which are statutorily required to be set by USEPA at levels that are requisite to protect the public health, are established as concentrations of ozone and PM and not as tonnages of their precursor pollutants. Because the NAAQS are focused on achieving a particular concentration region-wide, the SJVAPCD's tools and plans for attaining the NAAQS are regional in nature.

The computer models used to simulate and predict an attainment date for ozone and PM are based on regional inventories of precursor pollutants and meteorology within the air basin. At a very basic level, the models simulate future ozone and PM levels based on regional inputs, such as regional inventories of precursor pollutants and atmospheric chemistry and meteorology. The computer models are not designed to determine whether the emissions generated by an individual development project will affect the date that the air basin attains the NAAQS. Instead, the models help inform regional planning strategies based on the extent all of the emission-generating sources within the air basin must be controlled in order to reach attainment. For example, according to the BAAQMD's 2017 Clean Air Plan, basin-wide emissions in 2015 included 259 tons per day of ROC emissions and 298 tons per day of NO_X emissions (BAAQMD 2017b). Running the photochemical grid model used for predicting ozone attainment with the emissions solely from this project (which equates to less than one hundredth of one percent for both ROC and NO_X) is not likely to yield valid information given the relatively small scale involved.

Therefore, in summary, given the state of environmental science modeling in use at this time, the correlation between air quality impacts and human health cannot be technically perfect or based on scientific certainty. This detail explains why it is not scientifically feasible at the time of drafting of this report to substantively connect this individual project's air quality impacts to likely health consequences. Hence, the analysis in this report functions to provide detail sufficient to enable those who did not participate in its preparation understand and consider meaningfully the potential air quality impacts associated with the project. In addition, the correlation methodology used herein produces impact analysis that connects the levels of pollutants that would be emitted by the project to potential adverse health effects. This provides the public with an idea of the health consequences that could result when more pollutants are added to the basin, particularly for nonattainment pollutants. Therefore, the analysis herein either informs the public how the analytical results translate to create potential adverse impacts or explains what is known, and why, given existing scientific constraints, it cannot translate potential health impacts further.

Project Impacts

Construction-Related Emissions

The CEQA Guidelines threshold is whether the project would result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard? [Construction]

Table 4 summarizes the estimated maximum daily construction emissions from development of the proposed project. As shown therein, the maximum daily emissions are well below the applicable thresholds and would not exceed any of the BAAQMD project-level thresholds for construction emissions.

Table 4 Estimated Maximum Daily Construction Emissions

	Maximum Emissions (lbs/day)			
	ROG	NO_x	PM_{10} (Exhaust Only)	$PM_{2.5}$ (Exhaust Only)
Maximum (lbs/day)	26.2	40.5	8.5	4.7
BAAQMD Thresholds	54	54	82	54
Threshold Exceeded?	No	No	No	No

Notes: See Appendix B, "Scenario 2 – Total Electrical Demand Supplied by Utilities," Table 2.1, Overall Construction (Maximum Daily Emission_ - Unmitigated Construction for CalEEMod output. Numbers may not add up due to rounding. Winter emissions were used because they are generally higher than summer emission rates and provide a more conservative estimate of maximum daily emissions.

With regard to fugitive dust, the BAAQMD's May 2017 *CEQA Air Quality Guidelines* states that implementation of best construction management practices (further detailed below) would fully address impacts related to fugitive dust ($PM_{2.5}$ and PM_{10} not emitted in exhaust) and does not provide construction or operational-related thresholds of significance for fugitive dust.

Although project-related construction emissions would not exceed BAAQMD thresholds, the BAAQMD recommends implementation of *Basic Construction Mitigation Measures* (BAAQMD 2017c) for all proposed projects to reduce emissions of air pollutants during construction activities.

These basic construction mitigation measures include the following:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

As discussed in Section 1, *Project Description,* the applicant is proposing to implement best practices recommended by BAAQMD to limit emissions of air pollutants during construction. For informational purposes, the analysis below describes how the project's incremental (and less than significant) impacts relate to human health.

As discussed under Methodology, the disconnect between the tonnage of pollutants emitted and the localized concentrations of ozone, $PM_{2.5}$ and PM_{10} is important because it is not necessarily the tonnage of pollutants emitted that causes human health effects; rather, it is the concentrations of ozone and PM that cause these effects. In addition, it is not scientifically feasible to correlate an individual project's air quality emissions to specific health impacts. Therefore, a general description of the adverse health impacts resulting from the pollutants at issue is all that can be provided at this time. The incremental increase in ozone, $PM_{2.5}$ and PM_{10} concentrations in the basin as a result of project construction would contribute to adverse health impacts that are already occurring due to the region's nonattainment status for these pollutants. As discussed in subsection, Air Pollutants of Primary Concern, the health impacts of ozone include respiratory and eye irritation and possible changes in lung functions, and the health impacts of suspended particulates ($PM_{2.5}$ and PM_{10}) include respiratory irritation, reduced lung function, aggravation of cardiovascular disease, and cancer. However, because emissions of ROC, $PM_{2.5}$, PM_{10}, and NO_X during project construction would not exceed the BAAQMD's significance thresholds and the project would incorporate BAAQMD-recommended construction best management practices, the project's incremental contribution to these adverse health impacts would be less than significant.

Operational Emissions

The CEQA Guidelines threshold is whether the project would result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard? [Operational]

Tables 5 and 6 summarize the estimated emissions associated with operation of the project under two scenarios: Scenario 1, Total Electrical Demand Supplied by Cogenerator System, and Scenario 2, Total Electrical Demand Supplied by Utilities. As shown in Table 5, the project would not exceed BAAQMD daily or annual operational thresholds even with inclusion of the cogenerator system, a stationary source (Scenario 1).

As noted under *Methodology* above, the project applicant would be required to obtain an Authority to Construct and Permit to Operate from the BAAQMD, in order to operate the cogenerator system on the project site. As such, stationary source emissions estimates shown in Table 5 include adherence to applicable regulatory compliance measures, as required in BAAQMD Rule 2, New

Source Review, Section 2-2-301, Best Available Control Technology Requirement. Adherence to existing regulations and permit requirements would ensure that the project would not generate stationary source emissions in excess of BAAQMD's thresholds.

As shown in Table 6, in the unlikely event that the project would rely on electricity entirely from PG&E (Scenario 2), the project would not exceed BAAQMD daily or annual operational thresholds.

There is no difference between energy-related criteria pollutant emissions between Scenario 1 and Scenario 2 because CalEEMod only calculates direct emissions of criteria pollutants from energy sources that combust on-site, such as natural gas used in a building (CAPCOA 2017). CalEEMod does not calculate or attribute emissions of criteria pollutants from electricity generation to individual projects because fossil fuel power plants are existing stationary sources permitted by air districts and/or the U.S. EPA, and they are subject to local, state and federal control measures. Criteria pollutant emissions from power plants are associated with the power plants themselves, and not individual projects or electricity users. As discussed in the GHG analysis in Section 3, *Greenhouse Gas Emissions,* of this report, indirect emissions of GHGs due to electricity consumption are calculated in CalEEMod and attributed to individual projects and consumers. For informational purposes, the analysis below describes how the project's incremental (and less than significant) impacts relate to human health.

As discussed under Methodology, the disconnect between the tonnage of pollutants emitted and the localized concentrations of ozone, $PM_{2.5}$ and PM_{10} is important because it is not necessarily the tonnage of pollutants emitted that causes human health effects; rather, it is the concentrations of ozone and PM that cause these effects. In addition, it is not scientifically feasible to correlate an individual project's air quality emissions to specific health impacts. Therefore, a general description of the adverse health impacts resulting from the pollutants at issue is all that can be provided at this time. The incremental increase in ozone, $PM_{2.5}$ and PM_{10} concentrations in the basin as a result of project construction would contribute to adverse health impacts that are already occurring due to the region's nonattainment status for these pollutants. As discussed in subsection, Air Pollutants of Primary Concern, the health impacts of ozone include respiratory and eye irritation and possible changes in lung functions, and the health impacts of suspended particulates ($PM_{2.5}$ and PM_{10}) include respiratory irritation, reduced lung function, aggravation of cardiovascular disease, and cancer. However, because emissions of ROC, $PM_{2.5}$, PM_{10}, and NO_X during project operation would not exceed the BAAQMD's significance thresholds and the project would adherence to applicable regulatory compliance measures, as required in BAAQMD Rule 2, New Source Review, Section 2-2-301, Best Available Control Technology Requirement, the project's incremental contribution to these adverse health impacts would be less than significant.

Table 5 Estimated Operational Emissions: Scenario 1 –Electrical Demand Supplied by Cogenerator System

	Estimated Emissions (lbs/day)					
Emissions Source	**ROG**	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Average Daily Emissions (lb/day)						
Area	2.8	<0.1	<0.1	<0.1	<0.1	<0.1
Energy	2.0	17.8	0.1	0.1	1.4	1.4
Mobile	0.6	3.4	<0.1	<0.1	1.8	0.5
Stationary	29.5	14.3	20.4	NA	NA	NA
Total	**34.9**	**35.5**	**20.5**	**0.1**	**3.2**	**1.9**
BAAQMD Thresholds	*54*	*54*	*NA*	*NA*	*82*	*54*
Threshold Exceeded?	No	No	NA	NA	No	No
Maximum Annual Emissions (tpy)						
Area	0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Energy	0.4	3.3	2.7	<0.1	0.2	0.2
Mobile	0.1	0.6	1.4	<0.1	0.3	0.1
Stationary	5.1	2.5	3.5	NA	NA	NA
Total	**6.1**	**6.4**	**7.6**	**<0.1**	**0.5**	**0.3**
BAAQMD Thresholds	*10*	*10*	*NA*	*NA*	*15*	*10*
Threshold Exceeded?	No	No	NA	NA	No	No

Note: See Appendix B for modeling results for non-stationary sources, and post-catalyst emission factors and manufacturer emissions estimates for stationary equipment. Stationary source emissions estimates include adherence to applicable regulatory compliance measures, as required in BAAQMD Rule 2, New Source Review, Section 2-2-301, Best Available Control Technology Requirement. Numbers may not add up due to rounding. Winter emissions were used for non-stationary sources because they are generally higher than summer emission rates and provide a more conservative estimate of maximum daily emissions.
NA = Not applicable

Table 6 Estimated Operational Emissions: Scenario 2 –Electrical Demand Supplied by Utilities

	Estimated Emissions (lbs/day)					
Emissions Source	**ROG**	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Average Daily Emissions (lb/day)						
Area	2.8	<0.1	<0.1	<0.1	<0.1	<0.1
Energy	2.0	17.8	0.1	0.1	1.4	1.4
Mobile	0.6	3.4	<0.1	<0.1	1.8	0.5
Stationary	0	0	0	NA	NA	NA
Total	**5.3**	**21.2**	**23.0**	**0.1**	**3.2**	**1.9**
BAAQMD Thresholds	*54*	*54*	*NA*	*NA*	*82*	*54*
Threshold Exceeded?	No	No	NA	NA	No	No
Maximum Annual Emissions (tpy)						
Area	0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Energy	0.4	3.3	2.7	<0.1	0.2	0.2
Mobile	0.1	0.6	1.4	<0.1	0.3	0.1
Stationary	0	0	0	NA	NA	NA
Total	**1.0**	**3.9**	**4.1**	**<0.1**	**0.6**	**0.3**
BAAQMD Thresholds	*10*	*10*	*NA*	*NA*	*15*	*10*
Threshold Exceeded?	No	No	NA	NA	No	No

Note: See Appendix B for modeling results for non-stationary sources, and post-catalyst emission factors and manufacturer emissions estimates for stationary equipment. Numbers may not add up due to rounding. Winter emissions were used for non-stationary sources because they are generally higher than summer emission rates and provide a more conservative estimate of maximum daily emissions.
NA = Not applicable

The next CEQA Guidelines threshold inquires whether the project would expose sensitive receptors to substantial pollutant concentrations.

Toxic Air Contaminants

CARB's Air Quality and Land Use Handbook: A Community Health Perspective (2005) provides recommendations regarding the siting of new sensitive land uses near potential sources of air toxic emissions (e.g., freeways, distribution centers, rail yards, ports, refineries, chrome plating facilities, dry cleaners, and gasoline dispensing facilities). The Air Quality and Land Use Handbook does not provide guidance for facilities or stationary equipment that require a permit to operate from a local air district. Instead, toxic air contaminant (TAC) emissions from these sources are directly regulated through the air district rule and permit review process.

Nearby sensitive receptors include residences directly adjacent to the south and southwest of the project site boundary. Common stationary source types of TAC and $PM_{2.5}$ emissions include gasoline stations, dry cleaners, and diesel backup generators, which are subject to BAAQMD permit requirements (BAAQMD 2017c). The project would include a cogenerator system onsite, which is a natural gas combustion engine, and would be a stationary source of TACs. Regulation 2, Rule 5 of the BAAQMD specifies permit requirements for new or modified stationary sources of TAC. The Project Risk Requirement (2-5-302.1) states that the Air Pollution Control Officer shall deny an Authority to Construct or Permit to Operate for any new or modified source of TACs if the project cancer risk exceeds 10.0 in one million. The project applicant would be required to obtain an Authority to Construction and Permit to Operate from the BAAQMD in order to operate the cogenerator system on the project site; therefore, adherence to existing regulations and permit requirements would ensure that the project would not expose sensitive receptors to substantial pollutant concentrations.

Carbon Monoxide Hotspots

The BAAQMD recommends CO “hotspot” analysis for a project if the addition of project traffic would increase traffic volumes at affected intersections to more than 44,000 vehicles per hour. According to the Traffic Impact Analysis Report prepared for the project (Fehr & Peers 2019), no intersections would handle more than 44,000 vehicles per hour due to project-related traffic. Therefore, the project would not result in a CO “hotspot” and no intersection-specific CO modeling is required.

Odors

The May 2017 *CEQA Air Quality Guidelines* identify land uses considered by BAAQMD to have potential for offensive odors. The list includes wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. Although the BAAQMD does not explicitly list cannabis cultivation facilities, odor may present a potential concern to surrounding communities. Malodorous aromas could be emitted by varied strains and species during the growth cycle of cannabis plants. However, the project would include odor controls through various methods such as engineering controls, carbon filtration, neutralization, and oxidation. Specifically, the project would include hydroxyl generators which use water vapor in the atmosphere to create hydroxyl radicals. Once created, the hydroxyl radicals would be dispersed into the air where they would deodorize, oxidize, and deactivate airborne microbials. Additionally, the project applicant would create an Odor Control Plan that would establish a protocol to continuously sample representative effluent air following the carbon absorption system during grow periods. If the carbon filtration system alone is not adequate in obtaining the control efficiency determined under the odor mitigation control plan, then odor control abatement will be enhanced through one of several means. Additional controls may include, but not be limited to, mist eliminators via spray application, oxidation using hydrogen peroxide or ozone and/or other neutralizing agents. All added controls and their guarantee efficiency would be backed by vendor suppliers.

The BAAQMD also regulates odor emissions through Regulation 7, Odorous Substances; this regulation places general limitations on odorous substances and specific emission limitations on certain odorous compounds. The project would be required to comply with Regulation 7 and would be subject to BAAQMD enforcement, in the event of non-compliance. The project’s proposed odor control equipment and plan, as well as compliance with existing regulations would ensure that the project would not create objectionable odors affecting a substantial number of people.

Air Quality Plan Consistency

With regard to the last CEQA Guidelines threshold, it inquires whether the project would conflict with or obstruct implementation of the applicable air quality plan?

According to the May 2017 *CEQA Air Quality Guidelines*, an air quality plan refers to clean air plans, state implementation plans (SIPS), ozone plans, and other potential air quality plans developed by the BAAQMD. To date, the BAAQMD's most current adopted air quality plan is the 2017 Clean Air Plan. The consistency analysis should evaluate whether the project is consistent with the applicable goals, control measures, and strategies outlined in the 2017 Clean Air Plan. If the project is consistent with these components, it would be considered consistent with the 2017 Clean Air Plan. Goals of the Clean Air Plan include: attainment of air quality standards and reduction of population exposure and protecting public health in the Bay Area. The 2017 Clean Air Plan includes 85 individual control measures that describe specific actions to reduce emissions of air and climate pollutants from the full range of emission sources. The control measures are categorized based upon the economic sector framework used by the CARB for the AB 32 Scoping Plan Update. These sectors include: Stationary (Industrial) Sources, Transportation, Energy, Buildings, Agriculture, Natural and Working Lands, Waste Management, Water, and Super-GHG Pollutants (i.e., methane). The BAAQMD encourages project developers and lead agencies to incorporate these measures into project designs and plan elements. If approval of a project would not cause the disruption, delay, or otherwise hinder the implementation of any air quality plan control measure, it would be considered consistent with the 2017 Clean Air Plan.

The project would be consistent with a variety of applicable Clean Air Plan goals and control measures such as the overarching goal of protecting air quality and health at the regional and local scale because project-generated emissions do not exceed the applicable BAAQMD thresholds. Additionally, the project would be consistent with: Measure EN2, *Decrease Electricity Demand*, by utilizing an onsite cogenerator system, which would support local government's energy efficiency programs by providing electricity onsite; Measure TR14, *Cars and Light Trucks*, which encourages the use of purchase and lease of battery-electric and plug-in hybrid electric vehicles, which would be used onsite by the security guards; and Measure WR1, *Limiting GHGs from publicly owned treatment works (POTW)*, which aims to reduce the GHGs emitted directly within POTWs and would be achieved by using recycled water for cannabis cultivation. Additionally, the project would not result in operational or construction emissions that would exceed the BAAQMD's thresholds. Further, the project would not directly increase population, as it does not include a substantial increase in residential or employment, as only 105 employees are anticipated in the Transportation Impact Analysis Report (Fehr & Peers 2019). The project is anticipated to primarily draw employees from the surrounding area and would not result in population or employment growth that would exceed the population projections on which the 2017 Clean Air Plan is based. For these reasons, the project would not conflict with or obstruct continued implementation of the 2017 Clean Air Plan.

3 Greenhouse Gases

3.1 Background

Climate Change and Greenhouse Gases

Gases that absorb and re-emit infrared radiation in the atmosphere are called greenhouse gases (GHGs). The gases that are widely seen as the principal contributors to human-induced climate change include carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O), fluorinated gases such as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Water vapor is excluded from the list of GHGs because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

GHGs are emitted by both natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices and landfills. Observations of CO_2 concentrations, globally-averaged temperature, and sea level rise are generally well within the range of the extent of the earlier IPCC projections. The recently observed increases in CH_4 and N_2O concentrations are smaller than those assumed in the scenarios in the previous assessments. Each IPCC assessment has used new projections of future climate change that have become more detailed as the models have become more advanced.

Man-made GHGs, many of which have greater heat-absorption potential than CO_2, include fluorinated gases and SF_6 (California Environmental Protection Agency [CalEPA] 2006). Different types of GHGs have varying global warming potentials (GWPs). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100 years). Because GHGs absorb different amounts of heat, a common reference gas (CO_2) is used to relate the amount of heat absorbed to the amount of the gas emissions, referred to as “carbon dioxide equivalent” (CO_2e), and is the amount of a GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one. By contrast, methane CH_4 has a GWP of 25, meaning its global warming effect is 25 times greater than carbon dioxide on a molecule per molecule basis (IPCC 2007).

Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. Some of the potential impacts in California of global warming may include loss of snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (CalEPA 2010). While these potential impacts identify the possible effects of climate change at a global and potentially statewide level, in general, scientific modeling tools are currently unable to predict what impacts would occur locally.

Greenhouse Gas Emissions Inventory

Federal Emissions Inventory

Total United States GHG emissions were 6,456.7 million metric tons (MMT or gigatonnes) of CO_2e in 2017 (U.S. EPA 2019). Total United States emissions have increased by 1.3 percent since 1990; emissions decreased by 0.5 percent from 2016 to 2017 (U.S. EPA 2019). The decrease from 2016 to

2017 was a result of multiple factors, including: (1) a continued shift from coal to natural gas and other non-fossil energy sources in the electric power sector and (2) milder weather in 2017 resulting in overall decreased electricity usage (U.S. EPA 2019). Since 1990, U.S. emissions have increased at an average annual rate of 0.05 percent. In 2017, the industrial and transportation end-use sectors accounted for 30 percent and 29 percent, respectively, of GHG emissions (with electricity-related emissions distributed). The residential and commercial end-use sectors accounted for 15 percent and 16 percent of GHG emissions, respectively (U.S. EPA 2019).

California Emissions Inventory

Based on CARB's California Greenhouse Gas Inventory for 2000-2016, California produced 424.1 MMT of CO_2e in 2017 (CARB 2019a). The major source of GHGs in California is associated with transportation, contributing 41 percent of the state's total GHG emissions. The industrial sector is the second largest source, contributing 24 percent of the state's GHG emissions, and electric power accounted for approximately 15 percent (CARB 2019a). California emissions are due in part to its large size and large population compared to other states. However, a factor that reduces California's per capita fuel use and GHG emissions, as compared to other states, is its relatively mild climate. In 2016, the State of California achieved its 2020 GHG emission reduction targets as emissions fell below 431 MMT of CO_2e (CARB 2018a). The annual 2030 statewide target emissions level is 260 MMT of CO_2e (CARB 2017). With implementation of the 2017 Scoping Plan, regulated GHG emissions are projected to decline to 260 MMT of CO_2e per year by 2030. Per Executive Order (EO) B-55-18, the statewide goal for 2045 is to achieve carbon neutrality and maintain net negative emissions thereafter. This goal supersedes the 2050 goal of an 80 percent reduction in GHG emissions below 1990 levels established by EO S-3-05, and CARB has been tasked with including a pathway toward the EO B-55-18 carbon neutrality goal in the next Scoping Plan update.

Potential Effects of Climate Change.

Globally, climate change has the potential to affect numerous environmental resources through potential impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. Long-term trends have found that each of the past three decades has been warmer than all the previous decades in the instrumental record, and the decade from 2000 through 2010 has been the warmest. The observed global mean surface temperature (GMST) for the decade from 2006 to 2015 was approximately 0.87°C (0.75°C to 0.99°C) higher than the average GMST over the period from 1850 to 1900. Several independently analyzed data records of global and regional Land-Surface Air Temperature (LSAT) obtained from station observations are in agreement that LSAT as well as sea surface temperatures have increased. In addition to these findings, there are identifiable signs that global warming is currently taking place, including substantial ice loss in the Arctic over the past two decades (IPCC 2014 and 2018).

Potential impacts of climate change in California may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (CalEPA 2010). Below is a summary of some of the potential effects that could be experienced in California as a result of climate change.

According to California's Fourth Climate Change Assessment, statewide temperatures from 1986 to 2016 were approximately 1°F to 2°F higher than those recorded from 1901 to 1960. Potential impacts of climate change in California may include loss in water supply from snow pack, sea level rise, more extreme heat days per year, more large forest fires, and more drought years (State of California 2018). While there is growing scientific consensus about the possible effects of climate change at a global and statewide level, current scientific modeling tools are unable to predict what local impacts may occur with a similar degree of accuracy. In addition to statewide projections, California's Fourth Climate Change Assessment includes regional reports that summarize climate impacts and adaptation solutions for nine regions of the state as well as regionally-specific climate change case studies (State of California 2018). Below is a summary of some of the potential effects that could be experienced in California as a result of climate change.

Air Quality

Higher temperatures, which are conducive to air pollution formation, could worsen air quality in many areas of California. Climate change may increase the concentration of ground-level ozone, however the magnitude of the effect, and its indirect effects, are uncertain. As temperatures have increased in recent years, the area burned by wildfires throughout the state has increased, and wildfires have been occurring at higher elevations in the Sierra Nevada Mountains (State of California 2018). If higher temperatures continue to be accompanied by an increase in the incidence and extent of large wildfires, air quality would worsen. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thereby ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state (California Natural Resources Agency 2009).

Water Supply

Analysis of paleoclimatic data (such as tree-ring reconstructions of stream flow and precipitation) indicates a history of naturally and widely varying hydrologic conditions in California, including a pattern of recurring and extended droughts. Although uncertainty remains with respect to the overall impact of climate change on future water supplies in California, the average early spring snowpack in the Sierra Nevada decreased by about 10 percent during the last century, a loss of 1.5 million acre-feet of snowpack storage. During the same period, sea level rose eight inches along California's coast. California's temperature has risen 1°F, mostly at night and during the winter, with higher elevations experiencing the highest increase. Many Southern California cities have experienced their lowest recorded annual precipitation twice within the past decade. In a span of only two years, Los Angeles experienced both its driest and wettest years on record (DWR 2008; CCCC 2009).

This uncertainty regarding future precipitation trends complicates the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood. However, the average early spring snowpack in the western United States, including the Sierra Nevada Mountains, decreased by about 10 percent during the last century. During the same period, sea level rose over 5.9 inches along the central and southern California coast (State of California 2018). The Sierra snowpack provides the majority of California's water supply by accumulating snow during the state's wet winters and releasing it slowly during the state's dry springs and summers. A warmer climate is predicted to reduce the fraction of precipitation falling as snow and result in less snowfall at lower elevations, thereby reducing the total snowpack (DWR 2008; State of California 2018). The State of California projects that average spring snowpack in the Sierra Nevada and other mountain catchments in central and northern

California will decline by approximately 66 percent from its historical average by 2050 (State of California 2018).

Hydrology and Sea Level Rise

As discussed above, climate change could potentially affect: the amount of snowfall, rainfall, and snow pack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for salt water intrusion. According to The Impacts of Sea-Level Rise on the California Coast, prepared by the California Climate Change Center (CCCC 2009), climate change has the potential to induce substantial sea level rise in the coming century. The rising sea level increases the likelihood and risk of flooding. The rate of increase of global mean sea levels over the 2001-2010 decade, as observed by satellites, ocean buoys and land gauges, was approximately 3.2 mm per year, which is double the observed 20th century trend of 1.6 mm per year (WMO 2013). As a result, sea levels averaged over the last decade were about 8 inches higher than those of 1880 (WMO 2013). Sea levels are rising faster now than in the previous two millennia, and the rise is expected to accelerate, even with robust GHG emission control measures. The most recent IPCC report (2014) predicts a mean sea-level rise of 11-38 inches by 2100. This prediction is more than 50 percent higher than earlier projections of 7-23 inches, when comparing the same emissions scenarios and time periods. A rise in sea levels could result in coastal flooding and erosion and could jeopardize California's water supply due to salt water intrusion. In addition, increased CO_2 emissions can cause oceans to acidify due to the carbonic acid it forms. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

Agriculture

California has a $50 billion annual agricultural industry that produces over a third of the country's vegetables and two-thirds of the country's fruits and nuts (California Department of Food and Agriculture 2018). Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, certain regions of agricultural production could experience water shortages of up to 16 percent; water demand could increase as hotter conditions lead to the loss of soil moisture; crop-yield could be threatened by water-induced stress and extreme heat waves; and plants may be susceptible to new and changing pest and disease outbreaks (State of California 2018). In addition, temperature increases could change the time of year certain crops, such as wine grapes, bloom or ripen, and thereby affect their quality (California Climate Change Center 2006).

Ecosystems and Wildlife

Climate change and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. Increasing concentrations of GHGs are likely to accelerate the rate of climate change. Scientists project that the annual average maximum daily temperatures in California could rise by 4.4 to 5.8°F in the next 50 years and by 5.6 to 8.8°F in the next century (State of California 2018). Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. Rising temperatures could have four major impacts on plants and animals related to (1) timing of ecological events; (2) geographic distribution and range; (3) species' composition and the incidence of nonnative species within communities; and (4) ecosystem processes, such as carbon cycling and storage (Parmesan 2006; State of California 2018).

Regulatory Setting

The following regulations address both climate change and GHG emissions.

Federal Regulations

The U.S. Supreme Court in *Massachusetts et al. v. Environmental Protection Agency et al.* ([2007] 549 U.S. 05-1120) held that the U.S. EPA has the authority to regulate motor-vehicle GHG emissions under the federal Clean Air Act. The U.S. EPA issued a Final Rule for mandatory reporting of GHG emissions in October 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and vehicle engines, and requires annual reporting of emissions. In 2012 the U.S. EPA issued a Final Rule that establishes the GHG permitting thresholds that determine when Clean Air Act permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

In 2014, the U.S. Supreme Court in *Utility Air Regulatory Group v. EPA* (134 S. Ct. 2427 [2014]) held that U.S. EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of Best Available Control Technology (BACT).

California Regulations

The State of California considers GHG emissions and the impacts of climate change to be a serious threat to the public health, environment, economic well-being, and natural resources of California and has taken an aggressive stance to mitigate the State's impact on climate change through the adoption of policies and legislation. The California Air Resources Board (CARB) is responsible for the coordination and oversight of State and local air pollution control programs in California. California has a numerous regulations aimed at reducing the state's GHG emissions. These initiatives are summarized below.

Assembly Bill (AB) 1493 (2002), California's Advanced Clean Cars program (referred to as "Pavley"), requires CARB to develop and adopt regulations to achieve "the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." On June 30, 2009, U.S. EPA granted the waiver of Clean Air Act preemption to California for its GHG emission standards for motor vehicles beginning with the 2009 model year. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as "LEV (Low Emission Vehicle) III GHG," will cover 2017 to 2025. Fleet average emission standards would reach 22 percent reduction from 2009 levels by 2012 and 30 percent by 2016. The Advanced Clean Cars program coordinates the goals of the Low Emissions Vehicles (LEV), Zero Emissions Vehicles (ZEV), and Clean Fuels Outlet programs and would provide major reductions in GHG emissions. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions from their model year 2016 levels (CARB 2011b).

California's major initiative for reducing GHG emissions is outlined in Assembly Bill 32 (AB 32), the "California Global Warming Solutions Act of 2006," signed into law in 2006. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020, and requires CARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions. Based on this guidance, CARB approved a 1990 statewide GHG level and

2020 limit of 427 MMT CO_2e. The Scoping Plan was approved by CARB on December 11, 2008, and included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted since approval of the Scoping Plan.

In May 2014, CARB approved the first update to the AB 32 Scoping Plan. The 2013 Scoping Plan update defines CARB's climate change priorities for the next five years and sets the groundwork to reach post-2020 statewide goals. The update highlights California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluates how to align the State's longer-term GHG reduction strategies with other State policy priorities, such as for water, waste, natural resources, clean energy and transportation, and land use (CARB 2014).

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an environmental issue that requires analysis in California Environmental Quality Act (CEQA) documents. In March 2010, the California Resources Agency adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts.

CARB Resolution 07-54 establishes 25,000 MT of GHG emissions as the threshold for identifying the largest stationary emission sources in California for purposes of requiring the annual reporting of emissions. This threshold is just over 0.005 percent of California's total inventory of GHG emissions for 2004.

Senate Bill (SB) 375, signed in August 2008, enhances the state's ability to reach AB 32 goals by directing ARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles for 2020 and 2035. In addition, SB 375 directs each of the state's 18 major Metropolitan Planning Organizations (MPO) to prepare a "sustainable communities strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the Regional Transportation Plan (RTP). The Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC) were assigned targets of a 7 percent reduction in GHGs from transportation sources by 2020 and a 15 percent reduction by 2035. ABAG and MTC adopted a RTP/SCS, called Plan Bay Area, which, when implemented, would meet the assigned targets by achieving a 10 percent per capita GHG emissions reduction in 2020 and a 16 percent reduction in 2035 (CARB 2014b).

In April 2011, the governor signed SB 2X requiring California to generate 33 percent of its electricity from renewable energy by 2020.

On September 8, 2016, the governor signed Senate Bill 32 (SB 32) into law, extending AB 32 by requiring the State to further reduce GHGs to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, as well as implementation of recently adopted policies and policies, such as SB 350 and SB 1383 (see below). The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally-appropriate quantitative thresholds consistent with a statewide per capita goal of six metric tons (MT) CO_2e by 2030 and two

MT CO_2e by 2050 (CARB 2017c). As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, subregional, or regional level), but not for specific individual projects because they include all emissions sectors in the state (CARB 2017).

Adopted on October 7, 2015, SB 350 supports the reduction of GHG emissions from the electricity sector through a number of measures, including requiring electricity providers to achieve a 50 percent renewables portfolio standard by 2030, a cumulative doubling of statewide energy efficiency savings in electricity and natural gas by retail customers by 2030.

Adopted in September 2016, SB 1383 requires the CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants. The bill requires the strategy to achieve the following reduction targets by 2030:

- Methane – 40 percent below 2013 levels
- Hydrofluorocarbons – 40 percent below 2013 levels
- Anthropogenic black carbon – 50 percent below 2013 levels

The bill also requires CalRecycle, in consultation with the State board, to adopt regulations that achieve specified targets for reducing organic waste in landfills.

In September 2018, the governor signed SB 100, which accelerates the state's Renewables Portfolio Standard Program, which was last updated by SB 350 in 2015, and commits to 100 percent clean energy in California by 2045. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 44 percent by 2024, 60 percent by 2030, and 100 percent by 2045.

On September 10, 2018, the governor issued Executive Order B-55-18, which established a new statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter. This goal is in addition to the existing statewide GHG reduction targets established by SB 375, SB 32, SB 1383, and SB 100. EO B-55-18 also tasks CARB with including a pathway toward the EO B-55-18 carbon neutrality goal in the next Scoping Plan update.

For more information on the Senate and Assembly Bills, Executive Orders, and reports discussed above, and to view reports and research referenced above, please refer to the following websites: and .

CALIFORNIA ENVIRONMENTAL QUALITY ACT

Pursuant to the requirements of SB 97, the Resources Agency has adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted CEQA Guidelines provide general regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, while giving lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts. To date, a variety of air districts have adopted quantitative significance thresholds for GHGs.

Local Regulations and Climate Action Plan

In June 2012, Santa Rosa adopted a Climate Action Plan (CAP) to assist the City's efforts to reduce GHG emissions with reduction measures that are consistent with AB 32. The CAP identified GHG emission reduction strategies, actions, and measures that would enable the City to meet its reduction target for 2020 and 2035. To achieve the established 2020 target of reducing GHG emissions by 15 percent below 2007 levels, the CAP proposes measures and recommends continuing to implement, monitor, and evaluate communitywide programs including the "smart" development patterns established in the 2010 General Plan, new Green Building Codes, and Complete Streets program. The CAP proposes quantifiable emissions reduction measures for the City focused on energy, solid waste, transportation, and land use, and the CAP includes measures specific to municipal operations as well as the whole community. The City's progress will be monitored each year, while a full GHG inventory will be performed at least every five years.

The reduction measures included in the CAP are a diverse mix of regulatory and incentive-based programs for both new and existing development. The reduction measures also aim to reduce GHG emissions from each source to avoid reliance on any one strategy or sector to achieve the target. The CAP is being implemented through various department's at the City, which are the primary entities responsible for implementation. Thus, in many instances (even when a CAP measure) may apply to a singular new project) it is the City's obligation, through the implementing department, to ensure CAP compliance. And, in many instances, the GHG reduction strategies are city-based policy or ordinances that may apply to individual projects but are implemented ultimately by City actions. The City periodically provides summary reports to track implementation. The May 2018 Summary of Implementation Report is incorporated by reference herein.

The CAP clearly states that CAP compliance can be used to assess plan-level and project-level impacts and allow a lead agency to determine that a project's impact on GHG emissions is less than significant if it is in compliance. Appendix D of the CAP describes in detail how the City's Climate Action Plan satisfies the BAAQMD's requirements for a Qualified GHG Reduction Strategy and will allow future development projects to determine that a project has a less than significant impact on GHG emissions if it complies with the City's Climate Action Plan.

Furthermore, Appendix D to the CAP explains how the plan meets the criteria for a Qualified Greenhouse Gas Reduction Strategy under the CEQA Air Quality Guidelines adopted by the Bay Area Air Quality Management District (BAAQMD). As explained in Appendix D:

> *The purpose of the BAAQMD CEQA Air Quality Guidelines is to assist lead agencies in evaluating the air quality impacts of proposed projects and plans within the San Francisco Bay Area Air Basin. The guidelines were updated to establish thresholds of significance for impacts related to greenhouse gas (GHG) emissions to be consistent with the requirements of the California Environmental Quality Act. These thresholds can be used to assess plan-level and project-level impacts and allow a lead agency to determine that a project's impact on GHG emissions is less than significant if it is in compliance with a Qualified Greenhouse Gas Reduction Strategy.*
>
> *The City's Climate Action Plan follows both the State CEQA Guidelines and BAAQMD's guidelines by incorporating the standard elements of a Qualified GHG Reduction Strategy into the CAP. The standard elements of a Qualified GHG Reduction Strategy include the following steps:*
>
> 1. *Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic range.*
> 2. *Establish a level, based on substantial evidence below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable.*
> 3. *Identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area.*

4. *Specify measures or a group of measures, including performance standards that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level.*
5. *Monitor the plan's progress.*
6. *Adopt the greenhouse gas reduction strategy in a public process following environmental review.*

Appendix D then details how the City's CAP has been developed to satisfy the standard elements of a Qualified GHG Reduction Strategy and how it will allow future development projects to determine that a project has a less than significant impact on GHG emissions if it complies with the CAP. (See CAP, pp. D-1 to D-9.)

The CAP includes as Appendix E a "New Development Checklist." (See CAP, pp. E-1 to E-2.) Appendix E states that, "to ensure new development projects are compliant with the City's Climate Action Plan, the following checklist has been developed. This checklist should be filled out for each new project, subject to discretionary review, to allow new development to find a less than significant impact for greenhouse gas emissions in the environmental review process." A footnote to the checklist states that "to be in compliance with the CAP, all measures denoted with an asterisk are required in all new development projects unless otherwise specified. If a project cannot meet one or more of the mandatory requirements, substitutions may be made from other measures listed at the discretion of the Community Development Director." As discussed above, demonstrating compliance with the CAP (on a project-specific basis using the checklist) results in a determination that a project has a less than significant impact on GHG emissions.

3.2 Impact Analysis

Methodology and Significance Thresholds

Based on Appendix G of the 2019 *State CEQA Guidelines*, impacts related to GHG emissions from the project would be significant if the project would:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment

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

The vast majority of individual projects do not generate sufficient GHG emissions to directly influence climate change. However, physical changes caused by a project can contribute incrementally to cumulative effects that are significant, even if individual changes resulting from a project are limited. The issue of climate change typically involves an analysis of whether a project's contribution towards an impact would be cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (CEQA Guidelines, Section 15064[h][1]).

According to CEQA Guidelines, projects can tier off of a qualified GHG reduction plan, which allows for project-level evaluation of GHG emissions through the comparison of the project's consistency with the GHG reduction policies included in a qualified GHG reduction plan. This approach is considered by the Association of Environmental Professionals (AEP) in their white paper, *Beyond Newhall and 2020*, to be the most defensible approach presently available under CEQA to determine the significance of a project's GHG emissions (2016). As mentioned above under *Local Regulations*, Santa Rosa adopted a qualified GHG reduction plan and has been implementing the requirements of its CAP for city-wide actions as well as individual projects, when applicable.

To evaluate whether a project may generate a quantity of GHG emissions that may have a significant impact on the environment, a number of operational bright-line significance thresholds have been developed by state agencies. Significance thresholds are numeric mass emissions thresholds which identify the level at which additional analysis of project GHG emissions is necessary. Projects that attain the significance target, with or without mitigation, would result in less than significant GHG emissions. Many significance thresholds have been developed to reflect a 90 percent capture rate tied to the 2020 reduction target established in AB 32. These targets have been identified by numerous lead agencies (including the City of Santa Rosa) as appropriate significance screening tools for residential, commercial, industrial, and public land uses and facilities projects with horizon years before 2020.[1]

To evaluate the questions from Appendix G, the City applies the CEQA thresholds of significance developed by the Bay Area Air Quality Management District (BAAQMD) which has two distinct threshold pathways for operational-related GHG emissions – one for development projects and one for stationary-source projects. In the 2017 BAAQMD *CEQA Air Quality Guidelines*, the BAAQMD outlines an approach to determine the significance of projects. For residential, commercial, industrial, and public land use development projects, the potential thresholds of significance for GHG emissions includes compliance with a qualified GHG Reduction Strategy. Because Santa Rosa has a qualified GHG Reduction Strategy (i.e., the CAP), the compliance threshold applies best to the proposed project and is the chosen threshold of significance for this report. Appendix E of the CAP includes a checklist to determine whether a project is consistent with the identified measures and actions of the CAP and, therefore, complies with the CAP. If a project complies with the CAP, its GHG-related impacts are less than significant. This analysis evaluates the proposed project against the CAP consistency checklist to determine if it has significant GHG-related impacts (Table 7).

For stationary source emissions that would accommodate processes and equipment that emit GHG emissions and would require an Air District permit to operate, such as emissions from the cogenerator system, the recommended BAAQMD threshold is 10,000 MT per year

The Association of Environmental Professionals' (AEP) white paper "Beyond Newhall and 2020" recommends that CEQA GHG analyses evaluate project emissions in light of the trajectory of state climate change legislation and assess their "substantial progress" toward achieving long-term reduction targets identified in available plans, legislation, or EOs. Consistent with the recommendations in this white paper, the project's GHG impacts are analyzed in terms of whether the project would impede "substantial progress" toward meeting the reduction goal identified in SB 32 and EO S-55-18. As SB 32 is considered an interim target toward meeting the 2045 state goal, consistency with SB 32 would be considered contributing substantial progress toward meeting the state's long-term 2045 goals. Avoiding interference with, and making substantial progress toward, these long-term state targets is important as these targets have been set at levels that reduce California's fair share of emissions toward international targets that will stabilize global climate change effects and avoid the adverse environmental consequences described herein. As mentioned above, under *California Regulations*, the 2017 Scoping Plan recommends that local governments target 6 MT of CO_2e per capita per year in 2030 and 2 MT of CO_2e per capita per year in 2050 in their long-range plans, such as CAPs. As shown in Figure D-5 (GHG Emissions Per Service Population) in

[1] The horizon year should be defined by the year in which the project is fully operational.

Appendix D of the City's CAP, with CAP implementation, the projected GHG emissions per capita in Santa Rosa is estimated to be 2.4 MT of CO_2e in 2035. Therefore, implementation of the City's CAPs makes substantial progress towards achieving the state's post-2020 targets.

Project Impacts

Consistency with GHG Reduction Plans and Policies

The second threshold questions from Appendix G or the State CEQA Guidelines is: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

As discussed above, several plans have been adopted to reduce GHG emissions in California generally and in Sonoma County and the region. The project's consistency with the City of Santa Rosa Climate Action Plan, the Association of Bay Area Governments (ABAG) 2017-2040 Regional Transportation Plan/ Sustainable Communities Strategy (RTP/SCS) and the 2017 State Scoping Plan are discussed below.

CITY OF SANTA ROSA CLIMATE ACTION PLAN

The City's CAP includes numerous measures that reduce GHG emissions. For a new development project, only certain measures apply from the CAP. Table 7 summarizes the project's consistency with applicable CAP measures. As summarized therein, the project would be consistent with the applicable measures of the City's CAP. Accordingly, the project would result in less than significant GHG emission impacts.

The City's CAP includes a New Development Checklist (Appendix E of the CAP) for use in evaluating whether new development projects comply with the CAP such that their GHG impacts will be less than significant. Table 7 summarizes the project's consistency with the mandatory items in the New Development Checklist, based on the Project description and incorporated sustainable design features. Each item is further analyzed in the narrative discussion following Table 7.

Table 7 CAP New Development Checklist

#	Description	Complies	Does not Comply	N/A
1.1.1	Comply with CALGreen Tier 1 standards*	X		
1.1.3	After 2020, all new development will utilize zero net electricity*			X
1.3.1	Install real-time energy monitors to track energy use*	X		
1.4.2	Comply with the City's tree preservation ordinance*	X		
1.4.3	Provide public and private trees in compliance with the Zoning Code*	X		
1.5	Install new sidewalks and paving with high solar reflectivity materials*			X
2.1.3	Pre-wire and pre-plumb for solar thermal or PV systems	X		
3.1.2	Support implementation of station plans and corridor plans	X		
3.2.1	Provide on-site services such as ATMS or dry cleaners to site users			X
3.2.2	Improve non-vehicular network to promote walking, biking	X		
3.2.3	Support mixed-use, higher-density development near services			X
3.3.1	Provide affordable housing near transit			X
3.5.1	Unbundle parking from property cost			X

#	Description	Complies	Does not Comply	N/A
3.6.1	Install calming features to improve ped/bike experience	X		
4.1.1	Implement the Bicycle and Pedestrian Master Plan	X		
4.1.2	Install bicycle parking consistent with regulations*	X		
4.1.3	Provide bicycle safety training to residents, employees, motorists			X
4.2.2	Provide safe spaces to wait for bus arrival			X
4.3.2	Work with large employers to provide rideshare programs			X
4.3.3	Consider expanding employee programs promoting transit use			X
4.3.4	Provide awards for employee use of alternative commute options			X
4.3.5	Encourage new employers of 50+ to provide subsidized transit passes*	X		
4.3.7	Provide space for additional park-and-ride lots			X
4.5.1	Include facilities for employees that promote telecommuting			X
5.1.2	Install electric vehicle charging equipment	X		
5.2.1	Provide alternative fuels at new refueling stations*			X
6.1.3	Increase diversion of construction waste*	X		
7.1.1	Reduce potable water use for outdoor landscaping*	X		
7.1.3	Use water meters which track real-time water use*	X		
7.3.2	Meet on-site meter separation requirements in locations with current or future recycled water capabilities*	X		
8.1.3	Establish community gardens and urban farms			X
9.1.2	Provide outdoor electrical outlets for charging lawn equipment	X		
9.1.3	Install low water use landscapes*	X		
9.2.1	Minimize construction idling time to five minutes or less*	X		
9.2.2	Maintain construction equipment per manufacturer's specs*	X		
9.2.3	Limit GHG construction equipment by using electrified equipment or alternative fuels*	X		

Source: Santa Rosa, City of. 2012. Climate Action Plan: City of Santa Rosa. Available at: http://www.ca-ilg.org/sites/main/files/file-attachments/santa_rosa-_climate_action_plan.pdf.

* To be in compliance with the CAP, all measures denoted with an asterisk are required in all new development projects unless otherwise specified. If a project cannot meet one or more of the mandatory requirements, substitutions may be made from other measures listed at the discretion of the Community Development Director.

***1.1.1 Comply with CALGreen Tier 1 standards.**

CALGreen (Title 24 Part 11, California Green Building Standards Code) applies to all new buildings and to additions and alterations of residential and nonresidential buildings. The City has incorporated the requirements of CALGreen into the Building Permit approval process. The 2018 Summary of Implementation report indicates that this item is complete and all new development starting in January 2017 will comply. The project will comply with all Tier 1 standards, pursuant to the 2016 CALGreen Tier 1 Checklist and intervening supplements. Thus, the project will comply with Item 1.1.1.

***1.1.3 After 2020, all new development will utilize zero net electricity.**

Unlike most new development projects, which require energy from the grid, the project would utilize a cogenerator system that results in virtually all electricity to be generated onsite and thus the project would not demand substantial amounts of electricity from the grid. This feature of the project makes it consistent with the City's effort to achieve a net zero electricity goal. Therefore, the project would comply with item 1.1.3. Note also that the 2018 Summary of Implementation reports that full achievement of 1.1.3 has no feasible path at the City level, and such achievement must be part of future policy development in connection with advancement in the California building code. Thus, the project complies with this item to the extent feasible.

***1.3.1 Install real-time energy monitors to track energy use.**

The proposed project includes installation of real-time energy monitors to track energy use. As stated in Section 1, *Project Description*, the project will incorporate PG&E's Smart Meter System for cost and energy savings. Thus, the project will comply with Item 1.3.1.

***1.4.2 Comply with the City's tree preservation ordinance and *1.4.3 Provide public & private trees in compliance with the Zoning Code.**

1) The action required under these two items is to: (1) implement the City's tree preservation ordinance; and (2) require new development to supply an adequate number of street and private trees. The project will comply with the City of Santa Rosa Tree Preservation Ordinance (Santa Rosa City Code Section 17-24). The Tree Preservation Ordinance governs the alteration, removal, and relocation of trees, including heritage trees. "Heritage trees" are defined as trees of certain species native to Sonoma County with trunks exceeding specified diameters or circumferences. The Tree Preservation Ordinances requires a permit for the alteration, removal, or relocation of any trees, including heritage trees, on property proposed for development.

An arborist report and tree inventory was prepared for the proposed project (Horticultural Associates 2017). The inventory includes 78 trees on the project site (numbered 1 through 78), consisting of 65 coast redwood, six black walnut trees, and one each of almond, blue gum, crabapple, English walnut, evergreen ash, honey locust, and valley oak trees.

The project will be required to remove and replace 58 trees, including the three heritage trees, in compliance with the Tree Preservation Ordinance. Compliance with the Tree Preservation Ordinance is mandatory and is enforced through permitting requirements and the development plan approval process (City Code Section 17-24.050). Prior to the removal of the trees, the final landscape plan (as part of the development plan) for the proposed project must be reviewed by the City's Design Board for compliance with the tree ordinance and zoning requirements in the City's Design Guidelines (City Code 20.52.030). The final landscape plan must comply with the replacement and planting requirements of the Tree Preservation Ordinance and must be approved by the City.

Therefore, mandatory compliance with the Tree Preservation Ordinance and Design Guidelines will ensure that the proposed project will not conflict with the Tree Preservation Ordinance and will not have environmental impacts related to the alteration or removal of trees. Thus, the project will comply with Items 1.4.2 and 1.4.3.

***1.5 Install new sidewalks and paving with high solar reflectivity materials.**

The City action to implement item 1.5 is adopt an ordinance that requires and specifies cool paving materials for new parking lots, sidewalks, roofs, and crosswalks and integrates Low Impact Development guidelines for new construction and Capital Improvement Projects. The 2018 Summary of Implementation indicates that the City is in the process of incorporating these type of requirements in the upcoming revision of the City street standards. Thus, this item is not applicable at this time. In addition, the proposed project will not involve the installation of new sidewalks, and instead will provide dedications to the City for the provision of new sidewalks if future roadway improvement programs are implemented. Also note that, as explained in Section 1, *Project Description*, the proposed project includes installation cool paving materials with high solar reflectivity materials, which help achieve this measure to the extent it could apply upon adoption of the city ordinance.

***4.1.2 Install bicycle parking consistent with regulations.**

The City action for this measure is to update bicycle parking regulations for multi-family homes and commercial businesses to increase bicycle parking citywide. The 2018 Summary of Implementation indicates that the City completed this measure. The City's Zoning Code requires the project to provide nine bicycle parking spaces. The project would include bicycle parking spaces as required by code, and therefore would comply with this item. The project will comply with Item 4.1.2.

***4.3.5 Encourage new employers of 50+ to provide subsidized transit passes.**

The City action for this item is to encourage new developments with more than 50 on-site employees to provide subsidized or free. The 2018 Summary of Implementation indicates that the City would implement this measure on a project-by-project basis. The context of this sub-measure is for the City to increase the number of shared trips and transit trips in the City and is included in Measure 4.3: Car Sharing and Transportation Demand Management (TDM) Programs. Thus, the City has the opportunity to encourage the project applicant include such subsidies in its TDM program during the entitlement and project approval phase of the project. The project it is anticipated have more than 50 new employees. Thus, the City may encourage transit subsidy as part of project approvals in connection with other TDM if necessary to achieve TDM goals in the industrial area of the project site. Thus, the project will comply with Item 4.3.5.

***5.2.1 Provide alternative fuels at new refueling stations.**

The City action for this item is to require new refueling stations to provide biodiesel fuel, compressed natural gas, liquefied natural gas, electric vehicle charging stations, or other alternative fuels. This measure does not apply because the proposed project does not include a new refueling station.

***6.1.3 Increase diversion of construction waste.**

Project construction and demolition would be conducted in accordance with the CALGreen Construction Waste Management Requirements (24 CCR 5.408). CALGreen requires that owners of new construction and demolition projects divert 65 percent of non-hazardous construction and demolition waste. The project sponsor will be required to meet the requirements of 24 CCR 5.408 through one of the following methods:

- Develop and submit a waste management plan prior to the start of construction to the City which identifies materials and facilities to be used and document diversion,
- Use a waste management company, approved by the City, that can document 65 percent diversion, or
- Use the disposal reduction alternative, as appropriate for the type of project.

Project construction and demolition activities would generate approximately 500 to 1,000 cubic yards (approximately 200 to 400 tons) of non-hazardous waste. Through implementation of the required CALGreen diversion methods, approximately 325 to 650 cubic yards of demolition waste would be diverted for recycling or reuse, and approximately 175 to 350 cubic yards of demolition waste would be managed for disposal. Thus, the project will comply with Item 6.1.3.

***7.1.1 Reduce potable water use for outdoor landscaping.**

The project will reduce onsite water demand through efficient irrigation of landscaping, use of water-efficient fixtures, and particularly by use of the water reclamation and biowaste recycling system. This system would enable approximately 70 percent to 90 percent of wastewater from cannabis cultivation operations to be reclaimed and reused onsite, thereby reducing water and wastewater demand. In addition, all landscaping plantings would require moderate to very low water use in compliance with the City's Water Efficient Landscape Ordinance (City of Santa Rosa 2007). Thus, the project will comply with Item 7.1.1.

***7.1.3 Use water meters which track real-time water use.**

As explained in Section 1, *Project Description*, the project will include installation of real-time water monitors to track water use. In addition, the project will utilize PG&E's Smart Meter System for cost and energy savings. Thus, the project will comply with Item 7.1.3.

***7.3.2 Meet on-site meter separation requirements in locations with current or future recycled water capabilities.**

The project meet onsite meter separation requirements in locations with current/future recycled water capabilities. Thus, the project will comply with Item 7.3.2.

***9.1.3 Install low water use landscapes.**

The project will be required to install low water use landscaping in compliance with the City's Water Efficient Landscape Ordinance (City of Santa Rosa 2007). Thus, the project will comply with Item 9.1.3.

***9.2.1 Minimize construction equipment idling time to 5 minutes or less.**

As explained in Section 1, *Project Description*, the project applicant will implement construction best practices such that that idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). In addition, clear signage shall be provided for construction workers at all access points. Thus, the project will comply with Item 9.2.1.

***9.2.2 Maintain construction equipment per manufacturer's specs.**

As explained in Section 1, *Project Description*, the project applicant will implement construction best practices such that all construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications. In addition, all equipment will be checked by a certified visible emissions evaluator. Thus, the project will comply with Item 9.2.2.

***9.2.3 Limit GHG construction equipment emissions by using electrified equipment or alternative fuels.**

The City action for item 9.2.3 is to work with project applicants to limit GHG emissions from construction equipment by selecting one of the following measures, at a minimum, as appropriate to the construction project: (a) substitute electrified equipment for diesel- and gasoline-powered equipment where practical; (b) use alternative fuels for construction equipment on-site, where feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel; of (c) avoid the use of on-site generators by connecting to grid electricity or utilizing solar-powered equipment. Here, the project will limit GHG construction equipment emissions by using electric or alternative fuel as available, and work with the City through the approval process to implement the options provided above. Thus, the project will comply with Item 9.2.3.

As shown in Table 7 and in the narrative explanation above, the project would comply with the applicable CAP measures for new development. The project would be consistent with the Santa Rosa CAP and would thereby results in a determination that the project has a less than significant impact on GHG emissions.

Stationary Source Emissions

GHG emissions from the cogenerator units, which are stationary sources, were estimated using emission factors provided by Western Energy Systems for the Avus 500 Plus NG/Agenitor 412, which is a generator unit likely to be used by the project (see Appendix B for emission factors and manufacturer emissions estimates). Exact generator equipment has not been selected for the project, as final selection will be made during the facility design phase; nonetheless, the emissions estimated in this study provide a reasonable estimate of emissions from similarly sized cogenerator units that are likely to be used by the project.

The proposed stationary source would generate an estimated 5,045 MT of CO_2e per year. Therefore, the cogenerator system GHG emissions would not exceed BAAQMD's threshold of 10,000 MT CO_2e per year.

3.3 Conclusion

All GHG emissions impacts related to project construction and operation would be less than significant. The project would be consistent with the City's CAP, the 2017 Scoping Plan, and EO B-55-18, which are regulations adopted to implement a statewide, regional, or local plan to reduce or mitigate greenhouse gas emissions.

4 Energy

4.1 Background

California is one of the lowest per capita energy users in the United States, ranked 48th in the nation, due to its energy efficiency programs and mild climate (U.S. Energy Information Administration [EIA] 2018a). California consumed 292,039 gigawatt-hours (GWh) of electricity and 2,110,829 million cubic feet of natural gas in 2017 (California Energy Commission [CEC] 2019a, EIA 2018b). In addition, Californians consume approximately 18.7 billion gallons of motor vehicle fuels per year (Federal Transit Administration [FTA] 2017). The single largest end-use sector for energy consumption in California is transportation (39.8 percent), followed by industry (23.7 percent), commercial (18.9 percent), and residential (17.7 percent) (EIA 2018a).

Most of California's electricity is generated in-state with approximately 30 percent imported from the Northwest and Southwest in 2017. In addition, approximately 30 percent of California's electricity supply comes from renewable energy sources, such as wind, solar photovoltaic (PV), geothermal, and biomass (CEC 2019b). Adopted on September 10, 2018, Senate Bill (SB) 100 accelerates the state's Renewable Portfolio Standards Program, codified in the Public Utilities Act, by requiring electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

To reduce statewide vehicle emissions, California requires that all motorists use California Reformulated Gasoline (CaRFG), which is sourced almost exclusively from in-state refineries. Gasoline is the most used transportation fuel in California with 15.1 billion gallons sold in 2015 and is used by light-duty cars, pickup trucks, and sport utility vehicles (CEC 2016a). Diesel is the second most used fuel in California with 4.2 billion gallons sold in 2015 and is used primarily by heavy duty-trucks, delivery vehicles, buses, trains, ships, boats and barges, farm equipment, and heavy-duty construction and military vehicles (CEC 2016b). Both gasoline and diesel are primarily petroleum-based, and their consumption releases greenhouse gas (GHG) emissions, including CO_2 and NO_X. The transportation sector is the single largest source of GHG emissions in California, accounting for 41 percent of all inventoried emissions in 2016 (CARB 2018).

4.2 Impact Analysis

The energy analysis evaluates the potential for the project to cause significant impacts related to energy resources. This analysis follows guidance for evaluation of energy impacts contained in Appendix F and Appendix G of the 2019 State CEQA Guidelines. As detailed in the analysis below, the project would not result in the wasteful, inefficient, or unnecessary use of energy and would not conflict with any State or local plans for renewable energy or energy efficiency.

Methodology

Energy consumption is analyzed herein in terms of construction and operational energy. Construction energy demand accounts for anticipated energy consumption during project construction, such as fuel consumed by construction equipment and construction workers' vehicles traveling to and from the project site. Operational energy demand accounts for the anticipated energy consumption during project operation, such as fuel consumed by cars, trucks, and public transit; natural gas consumed for on-site power generation, heating building space, and cooking needs; and electricity consumed for building power needs, including, but not limited to lighting, water conveyance, and air conditioning.

The California Emissions Estimator Model (CalEEMod) version 2016.3.2 was used to estimate emissions resulting from the proposed project. The CalEEMod results provide the average travel distance, vehicle trip numbers, and vehicle fleet mix during construction and operation of the proposed project. The CalEEMod results additionally provide the estimated gross electricity and natural gas consumption by land use during operation of the proposed project. The values contained therein are used in this analysis to determine the anticipated energy consumption during construction and operation of the proposed project.

Significance Thresholds

Based on Appendix G of the 2019 *State CEQA Guidelines*, impacts related to energy from the project would be significant if the project would:

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency

Project Impacts

a) Consumption of Energy Resources

CONSTRUCTION

Project construction would require energy resources primarily in the form of fuel consumption to operate heavy equipment, light-duty vehicles, machinery, and generators. Temporary grid power may also be provided to construction trailers or electric construction equipment. Table 1 summarizes the anticipated energy consumption from construction equipment and vehicles, including construction worker trips to and from the project site.

As shown in Table 8, construction of the project would require approximately 5,042 gallons of gasoline and 40,995 gallons of diesel fuel. Energy use during construction would be temporary in nature, and construction equipment used would be typical of similar-sized construction projects in the region. Electrical power would be consumed to construct the project, and the demand, to the extent required, would be supplied from existing electrical infrastructure in the area. Overall, demolition and construction activities would require minimal electricity consumption and would not be expected to have any adverse impact on available electricity supplies or infrastructure. In addition, per applicable regulatory requirements, the project will comply with construction waste management practices to divert construction and demolition debris. These practices would result in efficient use of energy necessary to construct the project. Furthermore, in the interest of cost efficiency, construction contractors would not utilize fuel in a manner that is wasteful or unnecessary. Therefore, project construction would not result in potentially significant environmental effects due to the wasteful, inefficient, or unnecessary consumption of energy, and impacts would be less than significant.

Table 8 Proposed Project Construction Energy Usage

	Fuel Consumption (Gallons)	
Source	**Gasoline**	**Diesel**
Construction Equipment & Hauling Trips	–	40,995
Construction Worker Vehicle Trips	5,042	–

See Appendix C for energy calculation sheets.

OPERATION

Operational energy demand accounts for two primary sources: vehicle trips and the built environment. Energy demand from project transportation would include fuel consumed by passenger vehicles. Energy demand from the built environment would include natural gas consumed for heating and electricity consumed for lighting, water conveyance, and air conditioning.

Transportation

Once completed, the increase in vehicle trips associated with the project would increase fuel consumption. Vehicle trips associated with the project would require approximately 34,428 gallons of gasoline and 11,664 gallons of diesel fuel, or 1,621 MMBtu annually (see Appendix C for energy calculations). As a light industrial project, mobile fuel consumption would result from employee trips and commutes and per capita fuel consumption and would not be wasteful, inefficient, or unnecessary but would be standard for similar types of facilities.

Built Environment

The proposed project would require either cogeneration power or grid connections for electricity and natural gas. It is the goal of the project to use electricity from a natural gas powered cogenerator system onsite. In the unlikely event that the cogenerator system fails, the project would use electricity from PG&E. These events, by their nature, would be infrequent and temporary. Natural gas and electrical services are available to the property by PG&E. This report analyzes the energy demand from both potential operational scenarios.

The project would increase the amount of electricity and natural gas demand needed to serve the project. As described in the *Methodology* subsection of Section 2, *Air Quality*, in order to provide a conservative analysis of energy demand, two operational electricity source scenarios were evaluated in this study:

- Scenario 1: Total Electrical Demand Supplied by Cogenerator System
- Scenario 2: Total Electrical Demand Supplied by Utilities

As outlined in the Project Description, the electrical power that would be required for the proposed cultivation and ancillary equipment, including lighting, and HVAC, is approximately 5,000 kilowatts (kW). Assuming the facility would be operational 24-hours a day, with the grow lights operational for approximately 12 hours per day, total annual electricity demand would be approximately 21,900,000 kilowatt-hours (kWh) per year.

Assuming five generators operating regularly, the cogenerator system would require approximately 1,918,130 therms per year to operate and would generate approximately 22,825,000 kWh per year. The project would also include a natural gas boiler, which would demand approximately 331,870 therms per year. Therefore, total facility natural gas demand would be approximately 2,250,000 therms per year.

As shown in Table 9, under Scenario 1, the project's electricity consumption would represent approximately 0.008 percent of statewide annual demand, and project natural gas consumption would represent approximately 0.010 percent of statewide annual demand. It is important to note that under Scenario 1, the project would demand 21,900 megawatt hours of electricity; however, that electricity would be generated onsite and the project would not rely on electricity generated by the grid.

Table 9 Project Energy Use Relative to Statewide Energy Use: Scenario 1 – Total Electrical Demand Supplied by Cogenerator System

Form of Energy	Units	Annual Project-Related Energy Use	Annual Statewide Energy Use	Project Percent of Statewide Energy Use
Electricity	Megawatt hours	21,900	292,039,000[2]	0.008%
Natural Gas	Million cubic feet	224.9[1]	2,110,829[3]	0.010%

[1] 1 Therms (US) = approximately 100 Cubic Feet of Natural Gas

[2] California Energy Commission 2019a

[3] U.S. Energy Information Administration [EIA] 2018b

As shown in Table 10, under Scenario 2, the project's electricity consumption would represent approximately 0.008 percent of statewide annual demand, and project natural gas consumption would represent approximately 0.001 percent of statewide annual demand. Natural gas demand for Scenario 2 is lower than Scenario 1 because it would only include natural gas demand needed to operate the proposed boiler.

Table 10 Project Energy Use Relative to Statewide Energy Use: Scenario 2 – Total Electrical Demand Supplied by Utilities

Form of Energy	Units	Annual Project-Related Energy Use	Annual Statewide Energy Use	Project Percent of Statewide Energy Use
Electricity	Megawatt hours	21,900	292,039,000[2]	0.008%
Natural Gas	Million cubic feet	33.2[1]	2,110,829[3]	0.001%

[1] 1 Therms (US) = approximately 100 Cubic Feet Of Natural Gas

[2] California Energy Commission 2019a

[3] U.S. Energy Information Administration [EIA] 2018b

The project would be subject to energy conservation requirements in the California Energy Code (Title 24, Part 6, of the California Code of Regulations, California's Energy Efficiency Standards for Nonresidential Buildings) and CALGreen (Title 24, Part 11 of the California Code of Regulations), as embodied in enforceable conditions of approval. Further, California's use of non-renewable electricity and natural gas are expected to continue to decline as a proportion of overall energy demand due to stringent energy efficiency measures and a mandated increase in renewable energy use that would serve to offset any increase in non-renewable energy use resulting from the project.

b) Renewable Energy and Energy Efficiency Plans

Several measures in the City's CAP are intended to increase energy efficiency and conservation and expanding the use of renewable energy. The voluntary CAP measures applicable to the proposed project include Measure 1.1 (CalGreen Requirements for New Construction), Measure 1.3 (Smart Meter Utilization), Measure 1.5 (Cool Roofs and Pavements), 1.6 (Energy Efficient Appliances), 2.1

(Small-Scale Renewable Energy Installations), Measure 2.3 (Renewable Power Generation) and Measure 5.1 (Electric and Hybrid-Electric Vehicles). The project will comply with CalGreen Building Standards in building construction, and as noted in Section 1.2 *Project Summary* above, would install PG&E smart meters. It would use cool paving materials for increased solar reflectivity and water and energy efficient appliances, and would include pre-wiring and plumbing for future solar thermal or photovoltaic systems. The project would also include electric vehicle charging stations. Therefore, the project would be consistent with the above CAP measures related to renewable energy and energy efficiency. No impact would occur in relation to state and local plans for renewable energy and energy efficiency.

4.3 Conclusion

As detailed in the analysis above, the project would not result in the wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation. In addition, the project would be consistent with all applicable measures related to renewable energy and energy efficiency in the City's CAP.

5 References

Association of Bay Area Governments (ABAG). 2019. Priority Devleopment Areas. https://abag.ca.gov/our-work/land-use/pda-priority-development-areas

Association of Environmental Professionals (AEP). 2016. Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California. https://www.califaep.org/images/climate-change/AEP-2016_Final_White_Paper.pdf

Bay Area Air Quality Management District (BAAQMD). 2009. Options and Justification Report. http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/revised-draft-ceqa-thresholds-justification-report-oct-2009.pdf?la=en.

_____. 2017a. *Air Quality Standards and Attainment Status*. http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status.

_____. 2017b. *2017 Clean Air Plan: Spare the Air, Cool the Climate*. http://www.baaqmd.gov/plans-and-climate/air-quality-plans/current-plans

_____. 2017c. *California Environmental Quality Act: Air Quality Guidelines*. http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.

Brief for South Coast Air Quality Management District as Amicus Curiae Supporting Respondents, Sierra Club, Revive the San Joaquin, and League of Women Voters Fresno v. County of Fresno and Friant Ranch, L.P. (2018), 6 Cal.5th 502, Case No. S219783.

Brief for San Joaquin Valley Unified Air Pollution Control District as Amicus Curiae Supporting Respondents, Sierra Club, Revive the San Joaquin, and League of Women Voters Fresno v. County of Fresno and Friant Ranch, L.P. (2018), 6 Cal.5th 502, Case No. S219783.

California Air Pollution Control Officers Association (CAPCOA). 2008. CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA).

_____. 2017. California Emissions Estimator Model User Guide, Appendix A Calculations Details for CalEEMod. http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6.

California Air Resources Board (CARB). 2005. Air Quality and Land Use Handbook: A Community Health Perspective. https://www.arb.ca.gov/ch/handbook.pdf.

_____. 2011a. Health Effects of Diesel Exhaust. http://www.arb.ca.gov/research/diesel/diesel-health.htm

_____. 2011b. Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Public Hearing to Consider the “LEV III” Amendments to the California Greenhouse Gas and Criteria Pollutant Exhaust and Evaporative Emission Standards and Test Procedures and to the On-Board Diagnostic System Requirements for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, and to the Evaporative Emission Requirements for Heavy-Duty Vehicles.

_____. 2014a. AB 32 Scoping Plan Website. http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm

_____. 2014b. Technical Evaluation of the Greenhouse Gas Emission Reduction Quantification for the Association of Bay Area Governments' and Metropolitan Transportation Commission's SB 375 Sustainable Communities Strategy. https://www.arb.ca.gov/cc/sb375/mtc_scs_tech_eval_final0414.pdf

_____. 2015. Frequently Asked Questions About Executive Order B-30-15. http://www.arb.ca.gov/newsrel/2030_carbon_target_adaptation_faq.pdf

_____. 2016. California Greenhouse Gas Emission Inventory – 2016 Edition. https://www.arb.ca.gov/cc/inventory/data/data.htm

_____. 2017a. California Greenhouse Gas Emission Inventory – 2017 Edition. http://www.arb.ca.gov/cc/inventory/data/data.htm

_____. 2017b. 2020 Business-as-Usual (BAU) Emissions Projection – 2014 Edition. https://www.arb.ca.gov/cc/inventory/data/bau.htm

_____. 2017c. California's 2017 Climate Change Scoping Plan. December 14, 2017. https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf.

_____. 2018. California Greenhouse Gas Emission Inventory - 2018 Edition. [online]: https://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed January 2019.

_____. 2019a. *Air Quality Data Statistics*. https://www.arb.ca.gov/adam/index.html.

____. 2019b. "National Ambient Air Quality Standards." https://ww2.arb.ca.gov/resources/national-ambient-air-quality-standards

____. 2019c. "California Ambient Air Quality Standards." https://ww2.arb.ca.gov/resources/california-ambient-air-quality-standards

____. 2019d. "Air Quality Standards." https://ww2.arb.ca.gov/resources/background-air-quality-standards

California Climate Action Registry (CCAR). 2009. General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1.

California Climate Change Center (CCCC). 2006. Climate Scenarios for California.

_____. 2009. The Impacts of Sea-Level Rise on the California Coast.

California Department of Water Resources (DWR). 2008. Managing an Uncertain Future: Climate Change Adaption Strategies for California's Water.

California Energy Commission (CEC). 2009. Environmental Health and Equity Impacts from Climate Change and Mitigation Policies in California: A Review of the Literature.

_____. 2016a. California Gasoline Data, Facts, and Statistics. [online]: http://www.energy.ca.gov/almanac/transportation_data/gasoline/. Accessed January 2019.

_____. 2016b. Diesel Fuel Data, Facts, and Statistics. [online]: https://www.energy.ca.gov/almanac/transportation_data/diesel.html. Accessed January 2019.

_____. 2019a. Total System Electric Generation. [online]: https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html. Accessed January 2019.

_____. 2019b. “Renewables Portfolio Standard (RPS).” Sacramento, CA. [online]: http://www.energy.ca.gov/portfolio/. Accessed January 2019.

California Environmental Protection Agency (CalEPA). 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature.

_____. 2010. Climate Action Team Biennial Report. Final Report.

California Natural Resources Agency. 2009. 2009 California Climate Adaptation Strategy. March 2009. http://resources.ca.gov/docs/climate/Statewide_Adaptation_Strategy.pdf (accessed September 2019).

Federal Transit Administration (FTA). 2017. Policy and Governmental Affairs: Office of Highway Policy Impacts, Motor Fuel Use – 2016 (1). [online]: https://www.fhwa.dot.gov/policyinformation/statistics/2016/mf21.cfm. Accessed January 2019.

Fehr & Peers. 2019. *800 Yolanda Avenue Transportation Impact Analysis Report.* Prepared for Santa Rosa Farm Group, dated February 27, 2019.

Intergovernmental Panel on Climate Change (IPCC). 2007. Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

_____. 2014. Summary for Policymakers. In: Climate Change 2014, Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

____. 2018. Summary for Policymakers. In: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. https://www.ipcc.ch/sr15/ (accessed September 2019).

Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG). 2019. Plan Bay Area 2040 Final Plan. http://2040.planbayarea.org/strategies-and-performance

Parmesan, C. 2006. Ecological and Evolutionary Responses to Recent Climate Change.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2007. 2007 Ozone Plan. April 30.

Santa Rosa, City of. 2012. *Climate Action Plan: City of Santa Rosa.* Available at: http://www.ca-ilg.org/sites/main/files/file-attachments/santa_rosa-_climate_action_plan.pdf.

_____. 2019. *Santa Rosa General Plan 2035*. Available at https://srcity.org/DocumentCenter/View/24327/Santa-Rosa-General-Plan-2035-PDF---July-2019.

Sendy, Andrew. 2017. *Our Complete Guide to Solar Power in California*. Available at: https://www.solar-estimate.org/solar-panels/california#solar-summary. Solar Power World.

2015. *2015 Renewable energy Handbook.* http://www.myussi.com/pdf_files/solar_handbook/SolarPowerWorld_Handbook_2015.pdf.

South Coast Air Quality Management District (SCAQMD). 2013. Final 2012 Air Quality Management Plan. February.

State of California. 2018. California's Fourth Climate Change Assessment Statewide Summary Report. August 27, 2018. http://www.climateassessment.ca.gov/state/

United States Energy Information Administration (EIA). 2018a. "California - Profile Overview." Last modified: November 15, 2018. [online]: https://www.eia.gov/state/?sid=CA. Accessed January 2019.

_____. 2018b. Natural Gas: Natural Gas Consumption by End Use. December 31, 2018. [online]: https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SCA_a.htm. Accessed January 2019.

United States Environmental Protection Agency (U.S. EPA). 2013. *Policy Assessment for the Review of the Lead National Ambient Air Quality Standards, External Review Draft*. https://www3.epa.gov/ttn/naaqs/standards/pb/data/010913_pb-draft-pa.pdf

____. 2016. "NAAQS Table." https://www.epa.gov/criteria-air-pollutants/naaqs-table

____. 2017. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015. U. S. EPA #430-R-17-001 (April 2017). https://www.epa.gov/sites/production/files/2017-02/documents/2017_complete_report.pdf

World Meteorological Organization (WMO). 2013. A Summary of Current and Climate Change Findings and Figures. https://library.wmo.int/index.php?lvl=notice_display&id=15892#.XZfkp1VKiUk

AQ and GHG Study - Appendix A

Construction Equipment and Schedule

Project Name:		**Santa Rosa Farms**										
	Project Size	**5 acres**		**s.f. Industrial**	**120,000**							
	Total project acres disturbed	**X acres**		**s.f. other (Roads):**	**15,680**							
				s.f. parking lot	**28,800**							
	Construction Hours	**7:00 am to 4:00 pm M-F 8:00 am to 4:00 pm Sat No Work on Sundays**		**spaces in parking lot**	**76**							

Phase	**Qty of each type of equipment**	**Description**	**HP**	**Load Factor**	**Load Factor**	**Hours/day**	**Total Work Days**	**Avg. Hours per day**	**Annual Hours**	**Average Daily Worker trips (roundtrip)**	**Average Daily Truck trips (roundtrip)**	**Comments**
1		**Abatement/Demolition**	**Start Date:**	1/1/2018		**Total days in phase:**	**20**					
		(Demo SF residence & Paving)	**End Date:**	1/29/2018								
	1	Rubber Tired Dozers	255	0.4		7	5	6				Square footage of building(s) to be demolished:
	1	Tractors/Loaders/Backhoes	97	0.37		7	10	6				
	1	Dumpster/Tenders	16	0.38		7	10	6				
	1	Other Material Handling Equipment	171	0.42		7	6	6				
										8	2	
2		**Site Preparation (clearing vegetation, (**	**Start Date:**	1/30/2018		**Total days in phase:**	**15**					
			End Date:	2/20/2018								
		Graders										
		Tractors/Loaders/Backhoes										
		Rubber Tired Dozers										
		Scrapers										
3A		**Grading (mass grading, i.e. cut/fill)**	**Start Date:**	2/21/2018		**Total days in phase:**	**20**					
			End Date:	3/20/2018								
		Rubber Tired Dozers										Total acres disturbed: Total cubic yards imported: Total cubic yards exported:
		Concrete/Industrial Saws										
		Tractors/Loaders/Backhoes										
		Graders										
		Excavators										
		Scrapers										
3B		**Grading (fine grading)**	**Start Date:**	3/21/2018		**Total days in phase:**	**15**					
			End Date:	4/11/2018								
		Rubber Tired Dozers										Total acres disturbed:
		Concrete/Industrial Saws										
		Tractors/Loaders/Backhoes										
		Graders										
		Excavators										
		Scrapers										
4		**Building Construction**	**Start Date:**	4/16/2018		**Total days in phase:**	**105**					
			End Date:	9/10/2018								
	1	Excavators	162	0.38		7	5					
	1	Forklifts	89	0.78		7	40					
	1	Cement and Mortar Mixers	9	0.56		7	10					
	2	Cranes	226	0.29		7	30					120,000 s.f. of (3) story building, concrete slab on grade (first floor) and elevated concrete slabs at upper floors with steel and deck system with Exterior metal finishes.
	2	Welders	46	0.45		7	30					
	1	Tractors/Loaders/Backhoes	97	0.37		7	30					
	1	Pumsp (Concrete)	84	0.74		4	5					
	2	Air Compressors	78	0.48		6	30					
5		**Architectural Finishes**	**Start Date:**	9/11/2018		**Total days in phase:**	**25**					
			End Date:	10/15/2018								
	2	Cranes	226	0.29		7	5					Exterior and Exterior Finishes
	2	Forklifts	89	0.78		7	10					
	2	Pressure Washers	13	0.2		6	5					
	2	Air Compressors	78	0.48		6	5					
6		**Paving**	**Start Date:**	9/11/2018		**Total days in phase:**	**25**					
			End Date:	10/15/2018								
	1	Pavers	125	0.42		8	10					Total square footage to be paved: +/- 56,000 s.f (16,000 s.f roads, 29,000 sf of praking, and 11,000 sf of paved yard)
	1	Cement and Mortar Mixers	9	0.56		6	10					
	1	Rollers	80	0.38		8	10					
	1	Tractors/Loaders/Backhoes	97	0.37		7	5					
	1	Surfacing Equipment	253	0.3		7	5					
	1	Paving Equipment	130	0.36		7	8					
		Landscaping	**Start Date:**	10/16/2018		**Total days in phase:**	**20**					

7			**End Date:**	11/5/2018								
	1	trencher	97	0.37		8	5					Total square footage of landscaped area:
	1	Forklifts	89	0.78		7	5					
	1	Sweepers/Scrubbers	64	0.46		6	5					
Yellow - architect / civil to provide												
Blue - Terraphase will make an estimate if information is not provided.				Blue input	Filled-in by Dorado Design and Construction							
Pink - calculated value												
Equipment types listed in "Equipment Types" worksheet tab.												
Equipment listed in this sheet is to provide an example of inputs												
It is assumed that water trucks would be used during grading												
Add or subtract phases and equipment, as appropriate												
Modify horepower or load factor, as appropriate												

AQ and GHG Study - Appendix B

Air Quality and Greenhouse Gas Modeling Results

800 Yolanda

Sonoma-San Francisco County, Summer

Scenario 1 – Total Electrical Demand Supplied by Cogenerator System

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	120.00	1000sqft	1.64	120,000.00	0
Other Asphalt Surfaces	6.70	1000sqft	0.15	6,700.00	0
Parking Lot	85.00	Space	0.76	51,351.00	0
City Park	0.45	Acre	0.45	19,593.29	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 75

Climate Zone 4 **Operational Year** 2020

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Client provided information

Land Use - From PD and applicant provided construction data, approx 3 acres of site developed

Construction Phase - Client provided construction schedule. Trenching = Landscaping phase.

Off-road Equipment - Applicant provided details.

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Based on applicant provided construction details.

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Phase = Landscaping. Applicant provided construction details

Trips and VMT -

Demolition - Approx area to be demolished

Grading - 70 CY of material expected to be required as fill

Architectural Coating - CALGreen Mandatory Requirements

Vehicle Trips - Source: Fehr and Peers 2017

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Area Coating - CALGreen Building Code requirements

Energy Use - Scenarion 1: All electricity would be provided onsite from Cogen. Natural gas for non-cogen uses included.

Water And Wastewater - Based on applicant provided water estimate.

Construction Off-road Equipment Mitigation - Assumed compliance with BAAQMD recommended measures

Mobile Land Use Mitigation -

Energy Mitigation -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps -

Stationary Sources - Process Boilers -

800 Yolanda - Sonoma-San Francisco County, Summer

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Residential_Interior	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblAreaCoating	Area_EF_Residential_Exterior	150	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	10.00	25.00
tblConstructionPhase	NumDays	220.00	105.00
tblConstructionPhase	NumDays	6.00	35.00
tblConstructionPhase	NumDays	10.00	25.00
tblConstructionPhase	NumDays	3.00	15.00
tblEnergyUse	LightingElect	3.17	0.00
tblEnergyUse	LightingElect	0.88	0.00
tblEnergyUse	NT24E	3.70	0.00
tblEnergyUse	NT24NG	6.67	276.60
tblEnergyUse	T24E	1.55	0.00
tblEnergyUse	T24NG	19.81	276.60
tblGrading	MaterialImported	0.00	70.00
tblLandUse	BuildingSpaceSquareFeet	34,000.00	51,351.00
tblLandUse	GreenSpaceSquareFeet	19,602.00	19,593.29
tblLandUse	LandUseSquareFeet	34,000.00	51,351.00
tblLandUse	LandUseSquareFeet	19,602.00	19,593.29
tblLandUse	LotAcreage	2.75	1.64
tblOffRoadEquipment	HorsePower	231.00	226.00

tblOffRoadEquipment	HorsePower	130.00	125.00
tblOffRoadEquipment	HorsePower	132.00	130.00
tblOffRoadEquipment	HorsePower	247.00	255.00
tblOffRoadEquipment	HorsePower	231.00	226.00
tblOffRoadEquipment	HorsePower	158.00	162.00
tblOffRoadEquipment	HorsePower	168.00	171.00
tblOffRoadEquipment	HorsePower	263.00	253.00
tblOffRoadEquipment	HorsePower	78.00	97.00
tblOffRoadEquipment	LoadFactor	0.20	0.78
tblOffRoadEquipment	LoadFactor	0.20	0.78
tblOffRoadEquipment	LoadFactor	0.20	0.78
tblOffRoadEquipment	LoadFactor	0.40	0.42
tblOffRoadEquipment	LoadFactor	0.30	0.20
tblOffRoadEquipment	LoadFactor	0.50	0.37
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	UsageHours	8.00	7.00

tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	6.00	7.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblProjectCharacteristics	OperationalYear	2018	2020
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	ST_TR	1.32	2.38
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	SU_TR	0.68	2.38
tblVehicleTrips	WD_TR	1.89	0.00
tblVehicleTrips	WD_TR	6.97	2.38
tblWater	IndoorWaterUseRate	27,750,000.00	4,380,000.00
tblWater	OutdoorWaterUseRate	536,166.61	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	26.1532	40.3622	31.3144	0.0596	6.7892	2.1894	8.5451	3.0807	2.0887	4.7148	0.0000	5,838.2591	5,838.2591	1.1063	0.0000	5,863.0772
Maximum	**26.1532**	**40.3622**	**31.3144**	**0.0596**	**6.7892**	**2.1894**	**8.5451**	**3.0807**	**2.0887**	**4.7148**	**0.0000**	**5,838.2591**	**5,838.2591**	**1.1063**	**0.0000**	**5,863.0772**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	26.1532	40.3622	31.3144	0.0596	3.1254	2.1894	4.8812	1.4049	2.0887	3.0391	0.0000	5,838.2591	5,838.2591	1.1063	0.0000	5,863.0772
Maximum	**26.1532**	**40.3622**	**31.3144**	**0.0596**	**3.1254**	**2.1894**	**4.8812**	**1.4049**	**2.0887**	**3.0391**	**0.0000**	**5,838.2591**	**5,838.2591**	**1.1063**	**0.0000**	**5,863.0772**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**53.97**	**0.00**	**42.88**	**54.39**	**0.00**	**35.54**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Energy	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Mobile	0.7043	3.1941	7.8709	0.0230	1.7782	0.0294	1.8075	0.4768	0.0277	0.5045		2,326.7392	2,326.7392	0.0998		2,329.2333
Stationary	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.4163**	**21.0251**	**22.8705**	**0.1300**	**1.7782**	**1.3846**	**3.1628**	**0.4768**	**1.3829**	**1.8597**		**23,723.7235**	**23,723.7235**	**0.5100**	**0.3923**	**23,853.3721**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Energy	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Mobile	0.7043	3.1941	7.8709	0.0230	1.7782	0.0294	1.8075	0.4768	0.0277	0.5045		2,326.7392	2,326.7392	0.0998		2,329.2333
Stationary	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.4163**	**21.0251**	**22.8705**	**0.1300**	**1.7782**	**1.3846**	**3.1628**	**0.4768**	**1.3829**	**1.8597**		**23,723.7235**	**23,723.7235**	**0.5100**	**0.3923**	**23,853.3721**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2018	1/26/2018	5	20	
2	Site Preparation	Site Preparation	1/27/2018	2/16/2018	5	15	
3	Grading	Grading	2/17/2018	4/6/2018	5	35	
4	Trenching	Trenching	4/7/2018	5/4/2018	5	20	
5	Building Construction	Building Construction	5/5/2018	9/28/2018	5	105	
6	Paving	Paving	9/29/2018	11/2/2018	5	25	
7	Architectural Coating	Architectural Coating	11/3/2018	12/7/2018	5	25	

Acres of Grading (Site Preparation Phase): 19.69

Acres of Grading (Grading Phase): 45.94

Acres of Paving: 0.91

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 180,000; Non-Residential Outdoor: 60,000; Striped Parking Area: 3,483 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Dumpers/Tenders	1	7.00	16	0.38
Demolition	Excavators	3	8.00	158	0.38
Demolition	Other Material Handling Equipment	1	7.00	171	0.42
Demolition	Rubber Tired Dozers	1	7.00	255	0.40
Demolition	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Graders	1	7.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Scrapers	1	7.00	367	0.48

Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Concrete/Industrial Saws	1	7.00	81	0.73
Grading	Excavators	1	7.00	158	0.38
Grading	Graders	1	7.00	187	0.41
Grading	Rubber Tired Dozers	1	7.00	247	0.40
Grading	Scrapers	1	7.00	367	0.48
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Trenching	Forklifts	1	7.00	89	0.78
Trenching	Sweepers/Scrubbers	1	6.00	64	0.46
Trenching	Trenchers	1	8.00	97	0.37
Building Construction	Air Compressors	2	6.00	78	0.48
Building Construction	Cement and Mortar Mixers	1	7.00	9	0.56
Building Construction	Cranes	2	7.00	226	0.29
Building Construction	Excavators	1	7.00	162	0.38
Building Construction	Forklifts	1	7.00	89	0.78
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Pumps	1	4.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Welders	2	7.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	8.00	125	0.42
Paving	Paving Equipment	1	7.00	130	0.36
Paving	Rollers	1	8.00	80	0.38
Paving	Surfacing Equipment	1	7.00	253	0.30
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Architectural Coating	Air Compressors	2	6.00	78	0.48
Architectural Coating	Cranes	2	7.00	226	0.29

Architectural Coating	Forklifts	2	7.00	89	0.78
Architectural Coating	Pressure Washers	2	6.00	13	0.20

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	8	20.00	0.00	16.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	9.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	12	83.00	32.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	8	17.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1725	0.0000	0.1725	0.0261	0.0000	0.0261			0.0000			0.0000
Off-Road	2.9873	29.8397	27.2241	0.0383		1.5601	1.5601		1.4579	1.4579		3,806.3558	3,806.3558	1.0355		3,832.2427
Total	**2.9873**	**29.8397**	**27.2241**	**0.0383**	**0.1725**	**1.5601**	**1.7326**	**0.0261**	**1.4579**	**1.4840**		**3,806.3558**	**3,806.3558**	**1.0355**		**3,832.2427**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.9700e-003	0.2696	0.0538	6.5000e-004	0.0138	1.4900e-003	0.0153	3.7700e-003	1.4300e-003	5.2000e-003		69.8157	69.8157	4.3200e-003		69.9237
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1172	0.0794	0.9196	1.8100e-003	0.1643	1.3800e-003	0.1657	0.0436	1.2700e-003	0.0449		180.2043	180.2043	7.8400e-003		180.4003
Total	**0.1251**	**0.3490**	**0.9734**	**2.4600e-003**	**0.1781**	**2.8700e-003**	**0.1810**	**0.0474**	**2.7000e-003**	**0.0501**		**250.0200**	**250.0200**	**0.0122**		**250.3240**

3.2 Demolition - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0776	0.0000	0.0776	0.0118	0.0000	0.0118			0.0000			0.0000
Off-Road	2.9873	29.8397	27.2241	0.0383		1.5601	1.5601		1.4579	1.4579	0.0000	3,806.3558	3,806.3558	1.0355		3,832.2427
Total	**2.9873**	**29.8397**	**27.2241**	**0.0383**	**0.0776**	**1.5601**	**1.6377**	**0.0118**	**1.4579**	**1.4696**	**0.0000**	**3,806.3558**	**3,806.3558**	**1.0355**		**3,832.2427**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.9700e-003	0.2696	0.0538	6.5000e-004	0.0138	1.4900e-003	0.0153	3.7700e-003	1.4300e-003	5.2000e-003		69.8157	69.8157	4.3200e-003		69.9237
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1172	0.0794	0.9196	1.8100e-003	0.1643	1.3800e-003	0.1657	0.0436	1.2700e-003	0.0449		180.2043	180.2043	7.8400e-003		180.4003
Total	**0.1251**	**0.3490**	**0.9734**	**2.4600e-003**	**0.1781**	**2.8700e-003**	**0.1810**	**0.0474**	**2.7000e-003**	**0.0501**		**250.0200**	**250.0200**	**0.0122**		**250.3240**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6614	0.0000	6.6614	3.0468	0.0000	3.0468			0.0000			0.0000
Off-Road	2.7115	31.9452	15.2378	0.0293		1.3894	1.3894		1.2782	1.2782		2,946.7231	2,946.7231	0.9174		2,969.6569
Total	**2.7115**	**31.9452**	**15.2378**	**0.0293**	**6.6614**	**1.3894**	**8.0508**	**3.0468**	**1.2782**	**4.3250**		**2,946.7231**	**2,946.7231**	**0.9174**		**2,969.6569**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0586	0.0397	0.4598	9.1000e-004	0.0822	6.9000e-004	0.0828	0.0218	6.4000e-004	0.0224		90.1021	90.1021	3.9200e-003		90.2002
Total	**0.0586**	**0.0397**	**0.4598**	**9.1000e-004**	**0.0822**	**6.9000e-004**	**0.0828**	**0.0218**	**6.4000e-004**	**0.0224**		**90.1021**	**90.1021**	**3.9200e-003**		**90.2002**

3.3 Site Preparation - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9976	0.0000	2.9976	1.3710	0.0000	1.3710			0.0000			0.0000
Off-Road	2.7115	31.9452	15.2378	0.0293		1.3894	1.3894		1.2782	1.2782	0.0000	2,946.723 1	2,946.723 1	0.9174		2,969.656 9
Total	**2.7115**	**31.9452**	**15.2378**	**0.0293**	**2.9976**	**1.3894**	**4.3870**	**1.3710**	**1.2782**	**2.6493**	**0.0000**	**2,946.723 1**	**2,946.723 1**	**0.9174**		**2,969.656 9**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0586	0.0397	0.4598	9.1000e-004	0.0822	6.9000e-004	0.0828	0.0218	6.4000e-004	0.0224		90.1021	90.1021	3.9200e-003		90.2002
Total	**0.0586**	**0.0397**	**0.4598**	**9.1000e-004**	**0.0822**	**6.9000e-004**	**0.0828**	**0.0218**	**6.4000e-004**	**0.0224**		**90.1021**	**90.1021**	**3.9200e-003**		**90.2002**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6615	0.0000	6.6615	3.0468	0.0000	3.0468			0.0000			0.0000
Off-Road	3.4189	38.0796	21.3626	0.0393		1.7544	1.7544		1.6327	1.6327		3,919.941 5	3,919.941 5	1.0990		3,947.417 5
Total	**3.4189**	**38.0796**	**21.3626**	**0.0393**	**6.6615**	**1.7544**	**8.4159**	**3.0468**	**1.6327**	**4.6795**		**3,919.941 5**	**3,919.941 5**	**1.0990**		**3,947.417 5**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.5600e-003	0.0867	0.0173	2.1000e-004	4.4400e-003	4.8000e-004	4.9200e-003	1.2100e-003	4.6000e-004	1.6700e-003		22.4408	22.4408	1.3900e-003		22.4755
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0879	0.0596	0.6897	1.3600e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		135.1532	135.1532	5.8800e-003		135.3003
Total	**0.0904**	**0.1462**	**0.7070**	**1.5700e-003**	**0.1277**	**1.5100e-003**	**0.1292**	**0.0339**	**1.4200e-003**	**0.0353**		**157.5940**	**157.5940**	**7.2700e-003**		**157.7757**

3.4 Grading - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9977	0.0000	2.9977	1.3711	0.0000	1.3711			0.0000			0.0000
Off-Road	3.4189	38.0796	21.3626	0.0393		1.7544	1.7544		1.6327	1.6327	0.0000	3,919.941 5	3,919.941 5	1.0990		3,947.417 5
Total	**3.4189**	**38.0796**	**21.3626**	**0.0393**	**2.9977**	**1.7544**	**4.7521**	**1.3711**	**1.6327**	**3.0038**	**0.0000**	**3,919.941 5**	**3,919.941 5**	**1.0990**		**3,947.417 5**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.5600e-003	0.0867	0.0173	2.1000e-004	4.4400e-003	4.8000e-004	4.9200e-003	1.2100e-003	4.6000e-004	1.6700e-003		22.4408	22.4408	1.3900e-003		22.4755
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0879	0.0596	0.6897	1.3600e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		135.1532	135.1532	5.8800e-003		135.3003
Total	**0.0904**	**0.1462**	**0.7070**	**1.5700e-003**	**0.1277**	**1.5100e-003**	**0.1292**	**0.0339**	**1.4200e-003**	**0.0353**		**157.5940**	**157.5940**	**7.2700e-003**		**157.7757**

3.5 Trenching - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2579	11.1174	8.0851	0.0102		0.8804	0.8804		0.8100	0.8100		1,029.129 9	1,029.129 9	0.3204		1,037.139 4
Total	**1.2579**	**11.1174**	**8.0851**	**0.0102**		**0.8804**	**0.8804**		**0.8100**	**0.8100**		**1,029.129 9**	**1,029.129 9**	**0.3204**		**1,037.139 4**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0469	0.0318	0.3679	7.3000e-004	0.0657	5.5000e-004	0.0663	0.0174	5.1000e-004	0.0179		72.0817	72.0817	3.1400e-003		72.1601
Total	**0.0469**	**0.0318**	**0.3679**	**7.3000e-004**	**0.0657**	**5.5000e-004**	**0.0663**	**0.0174**	**5.1000e-004**	**0.0179**		**72.0817**	**72.0817**	**3.1400e-003**		**72.1601**

3.5 Trenching - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2579	11.1174	8.0851	0.0102		0.8804	0.8804		0.8100	0.8100	0.0000	1,029.1299	1,029.1299	0.3204		1,037.1394
Total	**1.2579**	**11.1174**	**8.0851**	**0.0102**		**0.8804**	**0.8804**		**0.8100**	**0.8100**	**0.0000**	**1,029.1299**	**1,029.1299**	**0.3204**		**1,037.1394**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0469	0.0318	0.3679	7.3000e-004	0.0657	5.5000e-004	0.0663	0.0174	5.1000e-004	0.0179		72.0817	72.0817	3.1400e-003		72.1601
Total	**0.0469**	**0.0318**	**0.3679**	**7.3000e-004**	**0.0657**	**5.5000e-004**	**0.0663**	**0.0174**	**5.1000e-004**	**0.0179**		**72.0817**	**72.0817**	**3.1400e-003**		**72.1601**

3.6 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.2703	35.6073	26.3158	0.0433		2.1446	2.1446		2.0460	2.0460		4,163.4166	4,163.4166	0.8994		4,185.9014
Total	**4.2703**	**35.6073**	**26.3158**	**0.0433**		**2.1446**	**2.1446**		**2.0460**	**2.0460**		**4,163.4166**	**4,163.4166**	**0.8994**		**4,185.9014**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1792	4.4253	1.1821	8.7300e-003	0.2155	0.0391	0.2545	0.0619	0.0374	0.0993		926.9948	926.9948	0.0608		928.5143
Worker	0.4862	0.3296	3.8165	7.5300e-003	0.6818	5.7300e-003	0.6876	0.1809	5.2900e-003	0.1861		747.8478	747.8478	0.0326		748.6614
Total	**0.6654**	**4.7549**	**4.9986**	**0.0163**	**0.8973**	**0.0448**	**0.9421**	**0.2428**	**0.0427**	**0.2855**		**1,674.8425**	**1,674.8425**	**0.0933**		**1,677.1758**

3.6 Building Construction - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.2703	35.6073	26.3158	0.0433		2.1446	2.1446		2.0460	2.0460	0.0000	4,163.4166	4,163.4166	0.8994		4,185.9014
Total	**4.2703**	**35.6073**	**26.3158**	**0.0433**		**2.1446**	**2.1446**		**2.0460**	**2.0460**	**0.0000**	**4,163.4166**	**4,163.4166**	**0.8994**		**4,185.9014**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1792	4.4253	1.1821	8.7300e-003	0.2155	0.0391	0.2545	0.0619	0.0374	0.0993		926.9948	926.9948	0.0608		928.5143
Worker	0.4862	0.3296	3.8165	7.5300e-003	0.6818	5.7300e-003	0.6876	0.1809	5.2900e-003	0.1861		747.8478	747.8478	0.0326		748.6614
Total	**0.6654**	**4.7549**	**4.9986**	**0.0163**	**0.8973**	**0.0448**	**0.9421**	**0.2428**	**0.0427**	**0.2855**		**1,674.8425**	**1,674.8425**	**0.0933**		**1,677.1758**

3.7 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2377	13.4127	10.6464	0.0196		0.7163	0.7163		0.6598	0.6598		1,955.1793	1,955.1793	0.6008		1,970.1997
Paving	0.0954					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3331**	**13.4127**	**10.6464**	**0.0196**		**0.7163**	**0.7163**		**0.6598**	**0.6598**		**1,955.1793**	**1,955.1793**	**0.6008**		**1,970.1997**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0879	0.0596	0.6897	1.3600e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		135.1532	135.1532	5.8800e-003		135.3003
Total	**0.0879**	**0.0596**	**0.6897**	**1.3600e-003**	**0.1232**	**1.0300e-003**	**0.1243**	**0.0327**	**9.6000e-004**	**0.0336**		**135.1532**	**135.1532**	**5.8800e-003**		**135.3003**

3.7 Paving - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2377	13.4127	10.6464	0.0196		0.7163	0.7163		0.6598	0.6598	0.0000	1,955.1793	1,955.1793	0.6008		1,970.1996
Paving	0.0954					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3331**	**13.4127**	**10.6464**	**0.0196**		**0.7163**	**0.7163**		**0.6598**	**0.6598**	**0.0000**	**1,955.1793**	**1,955.1793**	**0.6008**		**1,970.1996**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0879	0.0596	0.6897	1.3600e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		135.1532	135.1532	5.8800e-003		135.3003
Total	**0.0879**	**0.0596**	**0.6897**	**1.3600e-003**	**0.1232**	**1.0300e-003**	**0.1243**	**0.0327**	**9.6000e-004**	**0.0336**		**135.1532**	**135.1532**	**5.8800e-003**		**135.3003**

3.8 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	23.2166					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	2.8370	26.7607	16.5390	0.0268		1.6804	1.6804		1.5714	1.5714		2,645.641 4	2,645.641 4	0.6939		2,662.988 9
Total	**26.0536**	**26.7607**	**16.5390**	**0.0268**		**1.6804**	**1.6804**		**1.5714**	**1.5714**		**2,645.641 4**	**2,645.641 4**	**0.6939**		**2,662.988 9**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0996	0.0675	0.7817	1.5400e-003	0.1397	1.1700e-003	0.1408	0.0370	1.0800e-003	0.0381		153.1736	153.1736	6.6700e-003		153.3403
Total	**0.0996**	**0.0675**	**0.7817**	**1.5400e-003**	**0.1397**	**1.1700e-003**	**0.1408**	**0.0370**	**1.0800e-003**	**0.0381**		**153.1736**	**153.1736**	**6.6700e-003**		**153.3403**

3.8 Architectural Coating - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	23.2166					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	2.8370	26.7607	16.5390	0.0268		1.6804	1.6804		1.5714	1.5714	0.0000	2,645.6414	2,645.6414	0.6939		2,662.9889
Total	**26.0536**	**26.7607**	**16.5390**	**0.0268**		**1.6804**	**1.6804**		**1.5714**	**1.5714**	**0.0000**	**2,645.6414**	**2,645.6414**	**0.6939**		**2,662.9889**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0996	0.0675	0.7817	1.5400e-003	0.1397	1.1700e-003	0.1408	0.0370	1.0800e-003	0.0381		153.1736	153.1736	6.6700e-003		153.3403
Total	**0.0996**	**0.0675**	**0.7817**	**1.5400e-003**	**0.1397**	**1.1700e-003**	**0.1408**	**0.0370**	**1.0800e-003**	**0.0381**		**153.1736**	**153.1736**	**6.6700e-003**		**153.3403**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.7043	3.1941	7.8709	0.0230	1.7782	0.0294	1.8075	0.4768	0.0277	0.5045		2,326.7392	2,326.7392	0.0998		2,329.2333
Unmitigated	0.7043	3.1941	7.8709	0.0230	1.7782	0.0294	1.8075	0.4768	0.0277	0.5045		2,326.7392	2,326.7392	0.0998		2,329.2333

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
General Light Industry	285.60	285.60	285.60	833,812	833,812
Other Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	285.60	285.60	285.60	833,812	833,812

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190
Other Asphalt Surfaces	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190
Parking Lot	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190
City Park	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
NaturalGas Unmitigated	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Light Industry	181874	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9614**	**17.8308**	**14.9779**	**0.1070**		**1.3551**	**1.3551**		**1.3551**	**1.3551**		**21,396.9380**	**21,396.9380**	**0.4101**	**0.3923**	**21,524.0893**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Light Industry	181.874	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9614**	**17.8308**	**14.9779**	**0.1070**		**1.3551**	**1.3551**		**1.3551**	**1.3551**		**21,396.9380**	**21,396.9380**	**0.4101**	**0.3923**	**21,524.0893**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Unmitigated	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1590					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5896					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0500e-003	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Total	**2.7506**	**2.0000e-004**	**0.0218**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**		**0.0464**	**0.0464**	**1.2000e-004**		**0.0495**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1590					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5896					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0500e-003	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Total	**2.7506**	**2.0000e-004**	**0.0218**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**		**0.0464**	**0.0464**	**1.2000e-004**		**0.0495**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
Boiler	0	0	0	0	CNG

User Defined Equipment

Equipment Type	Number

10.1 Stationary Sources

Unmitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Boiler - CNG (0 - 2 MMBTU)	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

11.0 Vegetation

800 Yolanda

Sonoma-San Francisco County, Winter

Scenario 1 – Total Electrical Demand Supplied by Cogenerator System

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	120.00	1000sqft	1.64	120,000.00	0
Other Asphalt Surfaces	6.70	1000sqft	0.15	6,700.00	0
Parking Lot	85.00	Space	0.76	51,351.00	0
City Park	0.45	Acre	0.45	19,593.29	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	75
Climate Zone	4			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Client provided information

Land Use - From PD and applicant provided construction data, approx 3 acres of site developed

Construction Phase - Client provided construction schedule. Trenching = Landscaping phase.

Off-road Equipment - Applicant provided details.

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Based on applicant provided construction details.

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Phase = Landscaping. Applicant provided construction details

Trips and VMT -

Demolition - Approx area to be demolished

Grading - 70 CY of material expected to be required as fill

Architectural Coating - CALGreen Mandatory Requirements

Vehicle Trips - Source: Fehr and Peers 2017

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Area Coating - CALGreen Building Code requirements

Energy Use - Scenarion 1: All electricity would be provided onsite from Cogen. Natural gas for non-cogen uses included.

Water And Wastewater - Based on applicant provided water estimate.

Construction Off-road Equipment Mitigation - Assumed compliance with BAAQMD recommended measures

Mobile Land Use Mitigation -

Energy Mitigation -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps -

Stationary Sources - Process Boilers -

800 Yolanda - Sonoma-San Francisco County, Winter

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Residential_Interior	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblAreaCoating	Area_EF_Residential_Exterior	150	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	10.00	25.00
tblConstructionPhase	NumDays	220.00	105.00
tblConstructionPhase	NumDays	6.00	35.00
tblConstructionPhase	NumDays	10.00	25.00
tblConstructionPhase	NumDays	3.00	15.00
tblEnergyUse	LightingElect	3.17	0.00
tblEnergyUse	LightingElect	0.88	0.00
tblEnergyUse	NT24E	3.70	0.00
tblEnergyUse	NT24NG	6.67	276.60
tblEnergyUse	T24E	1.55	0.00
tblEnergyUse	T24NG	19.81	276.60
tblGrading	MaterialImported	0.00	70.00
tblLandUse	BuildingSpaceSquareFeet	34,000.00	51,351.00
tblLandUse	GreenSpaceSquareFeet	19,602.00	19,593.29
tblLandUse	LandUseSquareFeet	34,000.00	51,351.00
tblLandUse	LandUseSquareFeet	19,602.00	19,593.29
tblLandUse	LotAcreage	2.75	1.64
tblOffRoadEquipment	HorsePower	231.00	226.00

tblOffRoadEquipment	HorsePower	130.00	125.00
tblOffRoadEquipment	HorsePower	132.00	130.00
tblOffRoadEquipment	HorsePower	247.00	255.00
tblOffRoadEquipment	HorsePower	231.00	226.00
tblOffRoadEquipment	HorsePower	158.00	162.00
tblOffRoadEquipment	HorsePower	168.00	171.00
tblOffRoadEquipment	HorsePower	263.00	253.00
tblOffRoadEquipment	HorsePower	78.00	97.00
tblOffRoadEquipment	LoadFactor	0.20	0.78
tblOffRoadEquipment	LoadFactor	0.20	0.78
tblOffRoadEquipment	LoadFactor	0.20	0.78
tblOffRoadEquipment	LoadFactor	0.40	0.42
tblOffRoadEquipment	LoadFactor	0.30	0.20
tblOffRoadEquipment	LoadFactor	0.50	0.37
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	UsageHours	8.00	7.00

tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	6.00	7.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblProjectCharacteristics	OperationalYear	2018	2020
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	ST_TR	1.32	2.38
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	SU_TR	0.68	2.38
tblVehicleTrips	WD_TR	1.89	0.00
tblVehicleTrips	WD_TR	6.97	2.38
tblWater	IndoorWaterUseRate	27,750,000.00	4,380,000.00
tblWater	OutdoorWaterUseRate	536,166.61	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	26.1612	40.5107	31.4224	0.0589	6.7892	2.1902	8.5451	3.0807	2.0895	4.7148	0.0000	5,766.7638	5,766.7638	1.1062	0.0000	5,791.6824
Maximum	**26.1612**	**40.5107**	**31.4224**	**0.0589**	**6.7892**	**2.1902**	**8.5451**	**3.0807**	**2.0895**	**4.7148**	**0.0000**	**5,766.7638**	**5,766.7638**	**1.1062**	**0.0000**	**5,791.6824**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	26.1612	40.5107	31.4224	0.0589	3.1254	2.1902	4.8812	1.4049	2.0895	3.0391	0.0000	5,766.7638	5,766.7638	1.1062	0.0000	5,791.6824
Maximum	**26.1612**	**40.5107**	**31.4224**	**0.0589**	**3.1254**	**2.1902**	**4.8812**	**1.4049**	**2.0895**	**3.0391**	**0.0000**	**5,766.7638**	**5,766.7638**	**1.1062**	**0.0000**	**5,791.6824**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**53.97**	**0.00**	**42.88**	**54.39**	**0.00**	**35.54**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Energy	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Mobile	0.6360	3.4022	8.0147	0.0218	1.7782	0.0296	1.8078	0.4768	0.0279	0.5047		2,200.4050	2,200.4050	0.1011		2,202.9335
Stationary	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.3481**	**21.2332**	**23.0143**	**0.1288**	**1.7782**	**1.3848**	**3.1630**	**0.4768**	**1.3831**	**1.8599**		**23,597.3894**	**23,597.3894**	**0.5114**	**0.3923**	**23,727.0723**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Energy	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Mobile	0.6360	3.4022	8.0147	0.0218	1.7782	0.0296	1.8078	0.4768	0.0279	0.5047		2,200.4050	2,200.4050	0.1011		2,202.9335
Stationary	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.3481**	**21.2332**	**23.0143**	**0.1288**	**1.7782**	**1.3848**	**3.1630**	**0.4768**	**1.3831**	**1.8599**		**23,597.3894**	**23,597.3894**	**0.5114**	**0.3923**	**23,727.0723**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2018	1/26/2018	5	20	
2	Site Preparation	Site Preparation	1/27/2018	2/16/2018	5	15	
3	Grading	Grading	2/17/2018	4/6/2018	5	35	
4	Trenching	Trenching	4/7/2018	5/4/2018	5	20	
5	Building Construction	Building Construction	5/5/2018	9/28/2018	5	105	
6	Paving	Paving	9/29/2018	11/2/2018	5	25	
7	Architectural Coating	Architectural Coating	11/3/2018	12/7/2018	5	25	

Acres of Grading (Site Preparation Phase): 19.69

Acres of Grading (Grading Phase): 45.94

Acres of Paving: 0.91

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 180,000; Non-Residential Outdoor: 60,000; Striped Parking Area: 3,483 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Dumpers/Tenders	1	7.00	16	0.38
Demolition	Excavators	3	8.00	158	0.38
Demolition	Other Material Handling Equipment	1	7.00	171	0.42
Demolition	Rubber Tired Dozers	1	7.00	255	0.40
Demolition	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Graders	1	7.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Scrapers	1	7.00	367	0.48

Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Concrete/Industrial Saws	1	7.00	81	0.73
Grading	Excavators	1	7.00	158	0.38
Grading	Graders	1	7.00	187	0.41
Grading	Rubber Tired Dozers	1	7.00	247	0.40
Grading	Scrapers	1	7.00	367	0.48
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Trenching	Forklifts	1	7.00	89	0.78
Trenching	Sweepers/Scrubbers	1	6.00	64	0.46
Trenching	Trenchers	1	8.00	97	0.37
Building Construction	Air Compressors	2	6.00	78	0.48
Building Construction	Cement and Mortar Mixers	1	7.00	9	0.56
Building Construction	Cranes	2	7.00	226	0.29
Building Construction	Excavators	1	7.00	162	0.38
Building Construction	Forklifts	1	7.00	89	0.78
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Pumps	1	4.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Welders	2	7.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	8.00	125	0.42
Paving	Paving Equipment	1	7.00	130	0.36
Paving	Rollers	1	8.00	80	0.38
Paving	Surfacing Equipment	1	7.00	253	0.30
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Architectural Coating	Air Compressors	2	6.00	78	0.48
Architectural Coating	Cranes	2	7.00	226	0.29

Architectural Coating	Forklifts	2	7.00	89	0.78
Architectural Coating	Pressure Washers	2	6.00	13	0.20

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	8	20.00	0.00	16.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	9.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	12	83.00	32.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	8	17.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1725	0.0000	0.1725	0.0261	0.0000	0.0261			0.0000			0.0000
Off-Road	2.9873	29.8397	27.2241	0.0383		1.5601	1.5601		1.4579	1.4579		3,806.3558	3,806.3558	1.0355		3,832.2427
Total	**2.9873**	**29.8397**	**27.2241**	**0.0383**	**0.1725**	**1.5601**	**1.7326**	**0.0261**	**1.4579**	**1.4840**		**3,806.3558**	**3,806.3558**	**1.0355**		**3,832.2427**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	8.2000e-003	0.2768	0.0581	6.4000e-004	0.0138	1.5300e-003	0.0154	3.7700e-003	1.4600e-003	5.2400e-003		68.9209	68.9209	4.5400e-003		69.0344
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1267	0.0984	0.9063	1.6900e-003	0.1643	1.3800e-003	0.1657	0.0436	1.2700e-003	0.0449		167.5073	167.5073	7.6100e-003		167.6976
Total	**0.1349**	**0.3752**	**0.9645**	**2.3300e-003**	**0.1781**	**2.9100e-003**	**0.1810**	**0.0474**	**2.7300e-003**	**0.0501**		**236.4282**	**236.4282**	**0.0122**		**236.7320**

3.2 Demolition - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0776	0.0000	0.0776	0.0118	0.0000	0.0118			0.0000			0.0000
Off-Road	2.9873	29.8397	27.2241	0.0383		1.5601	1.5601		1.4579	1.4579	0.0000	3,806.3558	3,806.3558	1.0355		3,832.2427
Total	**2.9873**	**29.8397**	**27.2241**	**0.0383**	**0.0776**	**1.5601**	**1.6377**	**0.0118**	**1.4579**	**1.4696**	**0.0000**	**3,806.3558**	**3,806.3558**	**1.0355**		**3,832.2427**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	8.2000e-003	0.2768	0.0581	6.4000e-004	0.0138	1.5300e-003	0.0154	3.7700e-003	1.4600e-003	5.2400e-003		68.9209	68.9209	4.5400e-003		69.0344
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1267	0.0984	0.9063	1.6900e-003	0.1643	1.3800e-003	0.1657	0.0436	1.2700e-003	0.0449		167.5073	167.5073	7.6100e-003		167.6976
Total	**0.1349**	**0.3752**	**0.9645**	**2.3300e-003**	**0.1781**	**2.9100e-003**	**0.1810**	**0.0474**	**2.7300e-003**	**0.0501**		**236.4282**	**236.4282**	**0.0122**		**236.7320**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6614	0.0000	6.6614	3.0468	0.0000	3.0468			0.0000			0.0000
Off-Road	2.7115	31.9452	15.2378	0.0293		1.3894	1.3894		1.2782	1.2782		2,946.7231	2,946.7231	0.9174		2,969.6569
Total	**2.7115**	**31.9452**	**15.2378**	**0.0293**	**6.6614**	**1.3894**	**8.0508**	**3.0468**	**1.2782**	**4.3250**		**2,946.7231**	**2,946.7231**	**0.9174**		**2,969.6569**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0633	0.0492	0.4532	8.4000e-004	0.0822	6.9000e-004	0.0828	0.0218	6.4000e-004	0.0224		83.7536	83.7536	3.8100e-003		83.8488
Total	**0.0633**	**0.0492**	**0.4532**	**8.4000e-004**	**0.0822**	**6.9000e-004**	**0.0828**	**0.0218**	**6.4000e-004**	**0.0224**		**83.7536**	**83.7536**	**3.8100e-003**		**83.8488**

3.3 Site Preparation - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Fugitive Dust					2.9976	0.0000	2.9976	1.3710	0.0000	1.3710			0.0000			0.0000
Off-Road	2.7115	31.9452	15.2378	0.0293		1.3894	1.3894		1.2782	1.2782	0.0000	2,946.7231	2,946.7231	0.9174		2,969.6569
Total	**2.7115**	**31.9452**	**15.2378**	**0.0293**	**2.9976**	**1.3894**	**4.3870**	**1.3710**	**1.2782**	**2.6493**	**0.0000**	**2,946.7231**	**2,946.7231**	**0.9174**		**2,969.6569**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0633	0.0492	0.4532	8.4000e-004	0.0822	6.9000e-004	0.0828	0.0218	6.4000e-004	0.0224		83.7536	83.7536	3.8100e-003		83.8488
Total	**0.0633**	**0.0492**	**0.4532**	**8.4000e-004**	**0.0822**	**6.9000e-004**	**0.0828**	**0.0218**	**6.4000e-004**	**0.0224**		**83.7536**	**83.7536**	**3.8100e-003**		**83.8488**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6615	0.0000	6.6615	3.0468	0.0000	3.0468			0.0000			0.0000
Off-Road	3.4189	38.0796	21.3626	0.0393		1.7544	1.7544		1.6327	1.6327		3,919.941 5	3,919.941 5	1.0990		3,947.417 5
Total	**3.4189**	**38.0796**	**21.3626**	**0.0393**	**6.6615**	**1.7544**	**8.4159**	**3.0468**	**1.6327**	**4.6795**		**3,919.941 5**	**3,919.941 5**	**1.0990**		**3,947.417 5**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.6400e-003	0.0890	0.0187	2.1000e-004	4.4400e-003	4.9000e-004	4.9300e-003	1.2100e-003	4.7000e-004	1.6800e-003		22.1532	22.1532	1.4600e-003		22.1896
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0950	0.0738	0.6797	1.2700e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		125.6305	125.6305	5.7100e-003		125.7732
Total	**0.0976**	**0.1628**	**0.6984**	**1.4800e-003**	**0.1277**	**1.5200e-003**	**0.1292**	**0.0339**	**1.4300e-003**	**0.0353**		**147.7836**	**147.7836**	**7.1700e-003**		**147.9628**

3.4 Grading - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9977	0.0000	2.9977	1.3711	0.0000	1.3711			0.0000			0.0000
Off-Road	3.4189	38.0796	21.3626	0.0393		1.7544	1.7544		1.6327	1.6327	0.0000	3,919.941 5	3,919.941 5	1.0990		3,947.417 5
Total	**3.4189**	**38.0796**	**21.3626**	**0.0393**	**2.9977**	**1.7544**	**4.7521**	**1.3711**	**1.6327**	**3.0038**	**0.0000**	**3,919.941 5**	**3,919.941 5**	**1.0990**		**3,947.417 5**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.6400e-003	0.0890	0.0187	2.1000e-004	4.4400e-003	4.9000e-004	4.9300e-003	1.2100e-003	4.7000e-004	1.6800e-003		22.1532	22.1532	1.4600e-003		22.1896
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0950	0.0738	0.6797	1.2700e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		125.6305	125.6305	5.7100e-003		125.7732
Total	**0.0976**	**0.1628**	**0.6984**	**1.4800e-003**	**0.1277**	**1.5200e-003**	**0.1292**	**0.0339**	**1.4300e-003**	**0.0353**		**147.7836**	**147.7836**	**7.1700e-003**		**147.9628**

3.5 Trenching - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2579	11.1174	8.0851	0.0102		0.8804	0.8804		0.8100	0.8100		1,029.1299	1,029.1299	0.3204		1,037.1394
Total	**1.2579**	**11.1174**	**8.0851**	**0.0102**		**0.8804**	**0.8804**		**0.8100**	**0.8100**		**1,029.1299**	**1,029.1299**	**0.3204**		**1,037.1394**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0507	0.0394	0.3625	6.7000e-004	0.0657	5.5000e-004	0.0663	0.0174	5.1000e-004	0.0179		67.0029	67.0029	3.0400e-003		67.0790
Total	**0.0507**	**0.0394**	**0.3625**	**6.7000e-004**	**0.0657**	**5.5000e-004**	**0.0663**	**0.0174**	**5.1000e-004**	**0.0179**		**67.0029**	**67.0029**	**3.0400e-003**		**67.0790**

3.5 Trenching - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2579	11.1174	8.0851	0.0102		0.8804	0.8804		0.8100	0.8100	0.0000	1,029.1299	1,029.1299	0.3204		1,037.1394
Total	**1.2579**	**11.1174**	**8.0851**	**0.0102**		**0.8804**	**0.8804**		**0.8100**	**0.8100**	**0.0000**	**1,029.1299**	**1,029.1299**	**0.3204**		**1,037.1394**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0507	0.0394	0.3625	6.7000e-004	0.0657	5.5000e-004	0.0663	0.0174	5.1000e-004	0.0179		67.0029	67.0029	3.0400e-003		67.0790
Total	**0.0507**	**0.0394**	**0.3625**	**6.7000e-004**	**0.0657**	**5.5000e-004**	**0.0663**	**0.0174**	**5.1000e-004**	**0.0179**		**67.0029**	**67.0029**	**3.0400e-003**		**67.0790**

3.6 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.2703	35.6073	26.3158	0.0433		2.1446	2.1446		2.0460	2.0460		4,163.4166	4,163.4166	0.8994		4,185.9014
Total	**4.2703**	**35.6073**	**26.3158**	**0.0433**		**2.1446**	**2.1446**		**2.0460**	**2.0460**		**4,163.4166**	**4,163.4166**	**0.8994**		**4,185.9014**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1884	4.4952	1.3454	8.5600e-003	0.2155	0.0399	0.2554	0.0619	0.0382	0.1001		908.1921	908.1921	0.0658		909.8361
Worker	0.5256	0.4082	3.7612	7.0000e-003	0.6818	5.7300e-003	0.6876	0.1809	5.2900e-003	0.1861		695.1552	695.1552	0.0316		695.9449
Total	**0.7140**	**4.9034**	**5.1066**	**0.0156**	**0.8973**	**0.0457**	**0.9429**	**0.2428**	**0.0435**	**0.2863**		**1,603.3473**	**1,603.3473**	**0.0974**		**1,605.7810**

3.6 Building Construction - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.2703	35.6073	26.3158	0.0433		2.1446	2.1446		2.0460	2.0460	0.0000	4,163.4166	4,163.4166	0.8994		4,185.9014
Total	**4.2703**	**35.6073**	**26.3158**	**0.0433**		**2.1446**	**2.1446**		**2.0460**	**2.0460**	**0.0000**	**4,163.4166**	**4,163.4166**	**0.8994**		**4,185.9014**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1884	4.4952	1.3454	8.5600e-003	0.2155	0.0399	0.2554	0.0619	0.0382	0.1001		908.1921	908.1921	0.0658		909.8361
Worker	0.5256	0.4082	3.7612	7.0000e-003	0.6818	5.7300e-003	0.6876	0.1809	5.2900e-003	0.1861		695.1552	695.1552	0.0316		695.9449
Total	**0.7140**	**4.9034**	**5.1066**	**0.0156**	**0.8973**	**0.0457**	**0.9429**	**0.2428**	**0.0435**	**0.2863**		**1,603.3473**	**1,603.3473**	**0.0974**		**1,605.7810**

3.7 Paving - 2018

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Off-Road	1.2377	13.4127	10.6464	0.0196		0.7163	0.7163		0.6598	0.6598		1,955.1793	1,955.1793	0.6008		1,970.1997
Paving	0.0954					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3331**	**13.4127**	**10.6464**	**0.0196**		**0.7163**	**0.7163**		**0.6598**	**0.6598**		**1,955.1793**	**1,955.1793**	**0.6008**		**1,970.1997**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0950	0.0738	0.6797	1.2700e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		125.6305	125.6305	5.7100e-003		125.7732
Total	**0.0950**	**0.0738**	**0.6797**	**1.2700e-003**	**0.1232**	**1.0300e-003**	**0.1243**	**0.0327**	**9.6000e-004**	**0.0336**		**125.6305**	**125.6305**	**5.7100e-003**		**125.7732**

3.7 Paving - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2377	13.4127	10.6464	0.0196		0.7163	0.7163		0.6598	0.6598	0.0000	1,955.179 3	1,955.179 3	0.6008		1,970.199 6
Paving	0.0954					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3331**	**13.4127**	**10.6464**	**0.0196**		**0.7163**	**0.7163**		**0.6598**	**0.6598**	**0.0000**	**1,955.179 3**	**1,955.179 3**	**0.6008**		**1,970.199 6**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0950	0.0738	0.6797	1.2700e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		125.6305	125.6305	5.7100e-003		125.7732
Total	**0.0950**	**0.0738**	**0.6797**	**1.2700e-003**	**0.1232**	**1.0300e-003**	**0.1243**	**0.0327**	**9.6000e-004**	**0.0336**		**125.6305**	**125.6305**	**5.7100e-003**		**125.7732**

3.8 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	23.2166					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	2.8370	26.7607	16.5390	0.0268		1.6804	1.6804		1.5714	1.5714		2,645.6414	2,645.6414	0.6939		2,662.9889
Total	**26.0536**	**26.7607**	**16.5390**	**0.0268**		**1.6804**	**1.6804**		**1.5714**	**1.5714**		**2,645.6414**	**2,645.6414**	**0.6939**		**2,662.9889**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1077	0.0836	0.7704	1.4300e-003	0.1397	1.1700e-003	0.1408	0.0370	1.0800e-003	0.0381		142.3812	142.3812	6.4700e-003		142.5429
Total	**0.1077**	**0.0836**	**0.7704**	**1.4300e-003**	**0.1397**	**1.1700e-003**	**0.1408**	**0.0370**	**1.0800e-003**	**0.0381**		**142.3812**	**142.3812**	**6.4700e-003**		**142.5429**

3.8 Architectural Coating - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	23.2166					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	2.8370	26.7607	16.5390	0.0268		1.6804	1.6804		1.5714	1.5714	0.0000	2,645.6414	2,645.6414	0.6939		2,662.9889
Total	**26.0536**	**26.7607**	**16.5390**	**0.0268**		**1.6804**	**1.6804**		**1.5714**	**1.5714**	**0.0000**	**2,645.6414**	**2,645.6414**	**0.6939**		**2,662.9889**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1077	0.0836	0.7704	1.4300e-003	0.1397	1.1700e-003	0.1408	0.0370	1.0800e-003	0.0381		142.3812	142.3812	6.4700e-003		142.5429
Total	**0.1077**	**0.0836**	**0.7704**	**1.4300e-003**	**0.1397**	**1.1700e-003**	**0.1408**	**0.0370**	**1.0800e-003**	**0.0381**		**142.3812**	**142.3812**	**6.4700e-003**		**142.5429**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.6360	3.4022	8.0147	0.0218	1.7782	0.0296	1.8078	0.4768	0.0279	0.5047		2,200.405 0	2,200.405 0	0.1011		2,202.933 5
Unmitigated	0.6360	3.4022	8.0147	0.0218	1.7782	0.0296	1.8078	0.4768	0.0279	0.5047		2,200.405 0	2,200.405 0	0.1011		2,202.933 5

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
General Light Industry	285.60	285.60	285.60	833,812	833,812
Other Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	285.60	285.60	285.60	833,812	833,812

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190
Other Asphalt Surfaces	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190
Parking Lot	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190
City Park	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.93 80	21,396.93 80	0.4101	0.3923	21,524.08 93
NaturalGas Unmitigated	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.93 80	21,396.93 80	0.4101	0.3923	21,524.08 93

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Light Industry	181874	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.93 80	21,396.93 80	0.4101	0.3923	21,524.08 93
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9614**	**17.8308**	**14.9779**	**0.1070**		**1.3551**	**1.3551**		**1.3551**	**1.3551**		**21,396.93 80**	**21,396.93 80**	**0.4101**	**0.3923**	**21,524.08 93**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Light Industry	181.874	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9614**	**17.8308**	**14.9779**	**0.1070**		**1.3551**	**1.3551**		**1.3551**	**1.3551**		**21,396.9380**	**21,396.9380**	**0.4101**	**0.3923**	**21,524.0893**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Unmitigated	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1590					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5896					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0500e-003	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Total	**2.7506**	**2.0000e-004**	**0.0218**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**		**0.0464**	**0.0464**	**1.2000e-004**		**0.0495**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1590					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5896					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0500e-003	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Total	**2.7506**	**2.0000e-004**	**0.0218**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**		**0.0464**	**0.0464**	**1.2000e-004**		**0.0495**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
Boiler	0	0	0	0	CNG

User Defined Equipment

Equipment Type	Number

10.1 Stationary Sources

Unmitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Boiler - CNG (0 - 2 MMBTU)	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

11.0 Vegetation

800 Yolanda

Sonoma-San Francisco County, Summer

Scenario 2 – Total Electrical Demand Supplied by Utilities

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	120.00	1000sqft	1.64	120,000.00	0
Other Asphalt Surfaces	6.70	1000sqft	0.15	6,700.00	0
Parking Lot	85.00	Space	0.76	51,351.00	0
City Park	0.45	Acre	0.45	19,593.29	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 75

Climate Zone 4 **Operational Year** 2020

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Client provided information

Land Use - From PD and applicant provided construction data, approx 3 acres of site developed

Construction Phase - Client provided construction schedule. Trenching = Landscaping phase.

Off-road Equipment - Applicant provided details.

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Based on applicant provided construction details.

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Phase = Landscaping. Applicant provided construction details

Trips and VMT -

Demolition - Approx area to be demolished

Grading - 70 CY of material expected to be required as fill

Architectural Coating - CALGreen Mandatory Requirements

Vehicle Trips - Source: Fehr and Peers 2017

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Area Coating - CALGreen Building Code requirements

Energy Use - Scenarion 2: All electricity would be provided from grid. Natural gas for non-cogen uses included.

Water And Wastewater - Based on applicant provided water estimate.

Construction Off-road Equipment Mitigation - Assumed compliance with BAAQMD recommended measures

Mobile Land Use Mitigation -

Energy Mitigation -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps -

Stationary Sources - Process Boilers -

800 Yolanda - Sonoma-San Francisco County, Summer

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Residential_Interior	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblAreaCoating	Area_EF_Residential_Exterior	150	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	10.00	25.00
tblConstructionPhase	NumDays	220.00	105.00
tblConstructionPhase	NumDays	6.00	35.00
tblConstructionPhase	NumDays	10.00	25.00
tblConstructionPhase	NumDays	3.00	15.00
tblEnergyUse	LightingElect	3.17	0.00
tblEnergyUse	LightingElect	0.88	0.00
tblEnergyUse	NT24E	3.70	182.50
tblEnergyUse	NT24NG	6.67	276.60
tblEnergyUse	T24E	1.55	182.50
tblEnergyUse	T24NG	19.81	276.60
tblGrading	MaterialImported	0.00	70.00
tblLandUse	BuildingSpaceSquareFeet	34,000.00	51,351.00
tblLandUse	GreenSpaceSquareFeet	19,602.00	19,593.29
tblLandUse	LandUseSquareFeet	34,000.00	51,351.00
tblLandUse	LandUseSquareFeet	19,602.00	19,593.29
tblLandUse	LotAcreage	2.75	1.64
tblOffRoadEquipment	HorsePower	231.00	226.00

tblOffRoadEquipment	HorsePower	130.00	125.00
tblOffRoadEquipment	HorsePower	132.00	130.00
tblOffRoadEquipment	HorsePower	247.00	255.00
tblOffRoadEquipment	HorsePower	231.00	226.00
tblOffRoadEquipment	HorsePower	158.00	162.00
tblOffRoadEquipment	HorsePower	168.00	171.00
tblOffRoadEquipment	HorsePower	263.00	253.00
tblOffRoadEquipment	HorsePower	78.00	97.00
tblOffRoadEquipment	LoadFactor	0.20	0.78
tblOffRoadEquipment	LoadFactor	0.20	0.78
tblOffRoadEquipment	LoadFactor	0.20	0.78
tblOffRoadEquipment	LoadFactor	0.40	0.42
tblOffRoadEquipment	LoadFactor	0.30	0.20
tblOffRoadEquipment	LoadFactor	0.50	0.37
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	UsageHours	8.00	7.00

tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	6.00	7.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblProjectCharacteristics	OperationalYear	2018	2020
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	ST_TR	1.32	2.38
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	SU_TR	0.68	2.38
tblVehicleTrips	WD_TR	1.89	0.00
tblVehicleTrips	WD_TR	6.97	2.38
tblWater	IndoorWaterUseRate	27,750,000.00	4,380,000.00
tblWater	OutdoorWaterUseRate	536,166.61	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	26.1532	40.3622	31.3144	0.0596	6.7892	2.1894	8.5451	3.0807	2.0887	4.7148	0.0000	5,838.2591	5,838.2591	1.1063	0.0000	5,863.0772
Maximum	**26.1532**	**40.3622**	**31.3144**	**0.0596**	**6.7892**	**2.1894**	**8.5451**	**3.0807**	**2.0887**	**4.7148**	**0.0000**	**5,838.2591**	**5,838.2591**	**1.1063**	**0.0000**	**5,863.0772**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	26.1532	40.3622	31.3144	0.0596	3.1254	2.1894	4.8812	1.4049	2.0887	3.0391	0.0000	5,838.2591	5,838.2591	1.1063	0.0000	5,863.0772
Maximum	**26.1532**	**40.3622**	**31.3144**	**0.0596**	**3.1254**	**2.1894**	**4.8812**	**1.4049**	**2.0887**	**3.0391**	**0.0000**	**5,838.2591**	**5,838.2591**	**1.1063**	**0.0000**	**5,863.0772**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**53.97**	**0.00**	**42.88**	**54.39**	**0.00**	**35.54**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Energy	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Mobile	0.7043	3.1941	7.8709	0.0230	1.7782	0.0294	1.8075	0.4768	0.0277	0.5045		2,326.7392	2,326.7392	0.0998		2,329.2333
Stationary	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.4163**	**21.0251**	**22.8705**	**0.1300**	**1.7782**	**1.3846**	**3.1628**	**0.4768**	**1.3829**	**1.8597**		**23,723.7235**	**23,723.7235**	**0.5100**	**0.3923**	**23,853.3721**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Energy	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Mobile	0.7043	3.1941	7.8709	0.0230	1.7782	0.0294	1.8075	0.4768	0.0277	0.5045		2,326.7392	2,326.7392	0.0998		2,329.2333
Stationary	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.4163**	**21.0251**	**22.8705**	**0.1300**	**1.7782**	**1.3846**	**3.1628**	**0.4768**	**1.3829**	**1.8597**		**23,723.7235**	**23,723.7235**	**0.5100**	**0.3923**	**23,853.3721**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2018	1/26/2018	5	20	
2	Site Preparation	Site Preparation	1/27/2018	2/16/2018	5	15	
3	Grading	Grading	2/17/2018	4/6/2018	5	35	
4	Trenching	Trenching	4/7/2018	5/4/2018	5	20	
5	Building Construction	Building Construction	5/5/2018	9/28/2018	5	105	
6	Paving	Paving	9/29/2018	11/2/2018	5	25	
7	Architectural Coating	Architectural Coating	11/3/2018	12/7/2018	5	25	

Acres of Grading (Site Preparation Phase): 19.69

Acres of Grading (Grading Phase): 45.94

Acres of Paving: 0.91

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 180,000; Non-Residential Outdoor: 60,000; Striped Parking Area: 3,483 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Dumpers/Tenders	1	7.00	16	0.38
Demolition	Excavators	3	8.00	158	0.38
Demolition	Other Material Handling Equipment	1	7.00	171	0.42
Demolition	Rubber Tired Dozers	1	7.00	255	0.40
Demolition	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Graders	1	7.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Scrapers	1	7.00	367	0.48

Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Concrete/Industrial Saws	1	7.00	81	0.73
Grading	Excavators	1	7.00	158	0.38
Grading	Graders	1	7.00	187	0.41
Grading	Rubber Tired Dozers	1	7.00	247	0.40
Grading	Scrapers	1	7.00	367	0.48
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Trenching	Forklifts	1	7.00	89	0.78
Trenching	Sweepers/Scrubbers	1	6.00	64	0.46
Trenching	Trenchers	1	8.00	97	0.37
Building Construction	Air Compressors	2	6.00	78	0.48
Building Construction	Cement and Mortar Mixers	1	7.00	9	0.56
Building Construction	Cranes	2	7.00	226	0.29
Building Construction	Excavators	1	7.00	162	0.38
Building Construction	Forklifts	1	7.00	89	0.78
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Pumps	1	4.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Welders	2	7.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	8.00	125	0.42
Paving	Paving Equipment	1	7.00	130	0.36
Paving	Rollers	1	8.00	80	0.38
Paving	Surfacing Equipment	1	7.00	253	0.30
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Architectural Coating	Air Compressors	2	6.00	78	0.48
Architectural Coating	Cranes	2	7.00	226	0.29

Architectural Coating	Forklifts	2	7.00	89	0.78
Architectural Coating	Pressure Washers	2	6.00	13	0.20

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	8	20.00	0.00	16.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	9.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	12	83.00	32.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	8	17.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1725	0.0000	0.1725	0.0261	0.0000	0.0261			0.0000			0.0000
Off-Road	2.9873	29.8397	27.2241	0.0383		1.5601	1.5601		1.4579	1.4579		3,806.3558	3,806.3558	1.0355		3,832.2427
Total	**2.9873**	**29.8397**	**27.2241**	**0.0383**	**0.1725**	**1.5601**	**1.7326**	**0.0261**	**1.4579**	**1.4840**		**3,806.3558**	**3,806.3558**	**1.0355**		**3,832.2427**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.9700e-003	0.2696	0.0538	6.5000e-004	0.0138	1.4900e-003	0.0153	3.7700e-003	1.4300e-003	5.2000e-003		69.8157	69.8157	4.3200e-003		69.9237
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1172	0.0794	0.9196	1.8100e-003	0.1643	1.3800e-003	0.1657	0.0436	1.2700e-003	0.0449		180.2043	180.2043	7.8400e-003		180.4003
Total	**0.1251**	**0.3490**	**0.9734**	**2.4600e-003**	**0.1781**	**2.8700e-003**	**0.1810**	**0.0474**	**2.7000e-003**	**0.0501**		**250.0200**	**250.0200**	**0.0122**		**250.3240**

3.2 Demolition - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0776	0.0000	0.0776	0.0118	0.0000	0.0118			0.0000			0.0000
Off-Road	2.9873	29.8397	27.2241	0.0383		1.5601	1.5601		1.4579	1.4579	0.0000	3,806.355 8	3,806.355 8	1.0355		3,832.242 7
Total	**2.9873**	**29.8397**	**27.2241**	**0.0383**	**0.0776**	**1.5601**	**1.6377**	**0.0118**	**1.4579**	**1.4696**	**0.0000**	**3,806.355 8**	**3,806.355 8**	**1.0355**		**3,832.242 7**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.9700e-003	0.2696	0.0538	6.5000e-004	0.0138	1.4900e-003	0.0153	3.7700e-003	1.4300e-003	5.2000e-003		69.8157	69.8157	4.3200e-003		69.9237
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1172	0.0794	0.9196	1.8100e-003	0.1643	1.3800e-003	0.1657	0.0436	1.2700e-003	0.0449		180.2043	180.2043	7.8400e-003		180.4003
Total	**0.1251**	**0.3490**	**0.9734**	**2.4600e-003**	**0.1781**	**2.8700e-003**	**0.1810**	**0.0474**	**2.7000e-003**	**0.0501**		**250.0200**	**250.0200**	**0.0122**		**250.3240**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6614	0.0000	6.6614	3.0468	0.0000	3.0468			0.0000			0.0000
Off-Road	2.7115	31.9452	15.2378	0.0293		1.3894	1.3894		1.2782	1.2782		2,946.7231	2,946.7231	0.9174		2,969.6569
Total	**2.7115**	**31.9452**	**15.2378**	**0.0293**	**6.6614**	**1.3894**	**8.0508**	**3.0468**	**1.2782**	**4.3250**		**2,946.7231**	**2,946.7231**	**0.9174**		**2,969.6569**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0586	0.0397	0.4598	9.1000e-004	0.0822	6.9000e-004	0.0828	0.0218	6.4000e-004	0.0224		90.1021	90.1021	3.9200e-003		90.2002
Total	**0.0586**	**0.0397**	**0.4598**	**9.1000e-004**	**0.0822**	**6.9000e-004**	**0.0828**	**0.0218**	**6.4000e-004**	**0.0224**		**90.1021**	**90.1021**	**3.9200e-003**		**90.2002**

3.3 Site Preparation - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9976	0.0000	2.9976	1.3710	0.0000	1.3710			0.0000			0.0000
Off-Road	2.7115	31.9452	15.2378	0.0293		1.3894	1.3894		1.2782	1.2782	0.0000	2,946.7231	2,946.7231	0.9174		2,969.6569
Total	**2.7115**	**31.9452**	**15.2378**	**0.0293**	**2.9976**	**1.3894**	**4.3870**	**1.3710**	**1.2782**	**2.6493**	**0.0000**	**2,946.7231**	**2,946.7231**	**0.9174**		**2,969.6569**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0586	0.0397	0.4598	9.1000e-004	0.0822	6.9000e-004	0.0828	0.0218	6.4000e-004	0.0224		90.1021	90.1021	3.9200e-003		90.2002
Total	**0.0586**	**0.0397**	**0.4598**	**9.1000e-004**	**0.0822**	**6.9000e-004**	**0.0828**	**0.0218**	**6.4000e-004**	**0.0224**		**90.1021**	**90.1021**	**3.9200e-003**		**90.2002**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day									lb/day		
Fugitive Dust					6.6615	0.0000	6.6615	3.0468	0.0000	3.0468			0.0000			0.0000
Off-Road	3.4189	38.0796	21.3626	0.0393		1.7544	1.7544		1.6327	1.6327		3,919.9415	3,919.9415	1.0990		3,947.4175
Total	**3.4189**	**38.0796**	**21.3626**	**0.0393**	**6.6615**	**1.7544**	**8.4159**	**3.0468**	**1.6327**	**4.6795**		**3,919.9415**	**3,919.9415**	**1.0990**		**3,947.4175**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day									lb/day		
Hauling	2.5600e-003	0.0867	0.0173	2.1000e-004	4.4400e-003	4.8000e-004	4.9200e-003	1.2100e-003	4.6000e-004	1.6700e-003		22.4408	22.4408	1.3900e-003		22.4755
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0879	0.0596	0.6897	1.3600e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		135.1532	135.1532	5.8800e-003		135.3003
Total	**0.0904**	**0.1462**	**0.7070**	**1.5700e-003**	**0.1277**	**1.5100e-003**	**0.1292**	**0.0339**	**1.4200e-003**	**0.0353**		**157.5940**	**157.5940**	**7.2700e-003**		**157.7757**

3.4 Grading - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9977	0.0000	2.9977	1.3711	0.0000	1.3711			0.0000			0.0000
Off-Road	3.4189	38.0796	21.3626	0.0393		1.7544	1.7544		1.6327	1.6327	0.0000	3,919.941 5	3,919.941 5	1.0990		3,947.417 5
Total	**3.4189**	**38.0796**	**21.3626**	**0.0393**	**2.9977**	**1.7544**	**4.7521**	**1.3711**	**1.6327**	**3.0038**	**0.0000**	**3,919.941 5**	**3,919.941 5**	**1.0990**		**3,947.417 5**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.5600e-003	0.0867	0.0173	2.1000e-004	4.4400e-003	4.8000e-004	4.9200e-003	1.2100e-003	4.6000e-004	1.6700e-003		22.4408	22.4408	1.3900e-003		22.4755
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0879	0.0596	0.6897	1.3600e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		135.1532	135.1532	5.8800e-003		135.3003
Total	**0.0904**	**0.1462**	**0.7070**	**1.5700e-003**	**0.1277**	**1.5100e-003**	**0.1292**	**0.0339**	**1.4200e-003**	**0.0353**		**157.5940**	**157.5940**	**7.2700e-003**		**157.7757**

3.5 Trenching - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2579	11.1174	8.0851	0.0102		0.8804	0.8804		0.8100	0.8100		1,029.1299	1,029.1299	0.3204		1,037.1394
Total	**1.2579**	**11.1174**	**8.0851**	**0.0102**		**0.8804**	**0.8804**		**0.8100**	**0.8100**		**1,029.1299**	**1,029.1299**	**0.3204**		**1,037.1394**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0469	0.0318	0.3679	7.3000e-004	0.0657	5.5000e-004	0.0663	0.0174	5.1000e-004	0.0179		72.0817	72.0817	3.1400e-003		72.1601
Total	**0.0469**	**0.0318**	**0.3679**	**7.3000e-004**	**0.0657**	**5.5000e-004**	**0.0663**	**0.0174**	**5.1000e-004**	**0.0179**		**72.0817**	**72.0817**	**3.1400e-003**		**72.1601**

3.5 Trenching - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2579	11.1174	8.0851	0.0102		0.8804	0.8804		0.8100	0.8100	0.0000	1,029.1299	1,029.1299	0.3204		1,037.1394
Total	**1.2579**	**11.1174**	**8.0851**	**0.0102**		**0.8804**	**0.8804**		**0.8100**	**0.8100**	**0.0000**	**1,029.1299**	**1,029.1299**	**0.3204**		**1,037.1394**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0469	0.0318	0.3679	7.3000e-004	0.0657	5.5000e-004	0.0663	0.0174	5.1000e-004	0.0179		72.0817	72.0817	3.1400e-003		72.1601
Total	**0.0469**	**0.0318**	**0.3679**	**7.3000e-004**	**0.0657**	**5.5000e-004**	**0.0663**	**0.0174**	**5.1000e-004**	**0.0179**		**72.0817**	**72.0817**	**3.1400e-003**		**72.1601**

3.6 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.2703	35.6073	26.3158	0.0433		2.1446	2.1446		2.0460	2.0460		4,163.416 6	4,163.416 6	0.8994		4,185.901 4
Total	**4.2703**	**35.6073**	**26.3158**	**0.0433**		**2.1446**	**2.1446**		**2.0460**	**2.0460**		**4,163.416 6**	**4,163.416 6**	**0.8994**		**4,185.901 4**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1792	4.4253	1.1821	8.7300e-003	0.2155	0.0391	0.2545	0.0619	0.0374	0.0993		926.9948	926.9948	0.0608		928.5143
Worker	0.4862	0.3296	3.8165	7.5300e-003	0.6818	5.7300e-003	0.6876	0.1809	5.2900e-003	0.1861		747.8478	747.8478	0.0326		748.6614
Total	**0.6654**	**4.7549**	**4.9986**	**0.0163**	**0.8973**	**0.0448**	**0.9421**	**0.2428**	**0.0427**	**0.2855**		**1,674.842 5**	**1,674.842 5**	**0.0933**		**1,677.175 8**

3.6 Building Construction - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.2703	35.6073	26.3158	0.0433		2.1446	2.1446		2.0460	2.0460	0.0000	4,163.416 6	4,163.416 6	0.8994		4,185.901 4
Total	**4.2703**	**35.6073**	**26.3158**	**0.0433**		**2.1446**	**2.1446**		**2.0460**	**2.0460**	**0.0000**	**4,163.416 6**	**4,163.416 6**	**0.8994**		**4,185.901 4**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1792	4.4253	1.1821	8.7300e-003	0.2155	0.0391	0.2545	0.0619	0.0374	0.0993		926.9948	926.9948	0.0608		928.5143
Worker	0.4862	0.3296	3.8165	7.5300e-003	0.6818	5.7300e-003	0.6876	0.1809	5.2900e-003	0.1861		747.8478	747.8478	0.0326		748.6614
Total	**0.6654**	**4.7549**	**4.9986**	**0.0163**	**0.8973**	**0.0448**	**0.9421**	**0.2428**	**0.0427**	**0.2855**		**1,674.842 5**	**1,674.842 5**	**0.0933**		**1,677.175 8**

3.7 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2377	13.4127	10.6464	0.0196		0.7163	0.7163		0.6598	0.6598		1,955.1793	1,955.1793	0.6008		1,970.1997
Paving	0.0954					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3331**	**13.4127**	**10.6464**	**0.0196**		**0.7163**	**0.7163**		**0.6598**	**0.6598**		**1,955.1793**	**1,955.1793**	**0.6008**		**1,970.1997**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0879	0.0596	0.6897	1.3600e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		135.1532	135.1532	5.8800e-003		135.3003
Total	**0.0879**	**0.0596**	**0.6897**	**1.3600e-003**	**0.1232**	**1.0300e-003**	**0.1243**	**0.0327**	**9.6000e-004**	**0.0336**		**135.1532**	**135.1532**	**5.8800e-003**		**135.3003**

3.7 Paving - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2377	13.4127	10.6464	0.0196		0.7163	0.7163		0.6598	0.6598	0.0000	1,955.1793	1,955.1793	0.6008		1,970.1996
Paving	0.0954					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3331**	**13.4127**	**10.6464**	**0.0196**		**0.7163**	**0.7163**		**0.6598**	**0.6598**	**0.0000**	**1,955.1793**	**1,955.1793**	**0.6008**		**1,970.1996**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0879	0.0596	0.6897	1.3600e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		135.1532	135.1532	5.8800e-003		135.3003
Total	**0.0879**	**0.0596**	**0.6897**	**1.3600e-003**	**0.1232**	**1.0300e-003**	**0.1243**	**0.0327**	**9.6000e-004**	**0.0336**		**135.1532**	**135.1532**	**5.8800e-003**		**135.3003**

3.8 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	23.2166					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	2.8370	26.7607	16.5390	0.0268		1.6804	1.6804		1.5714	1.5714		2,645.641 4	2,645.641 4	0.6939		2,662.988 9
Total	**26.0536**	**26.7607**	**16.5390**	**0.0268**		**1.6804**	**1.6804**		**1.5714**	**1.5714**		**2,645.641 4**	**2,645.641 4**	**0.6939**		**2,662.988 9**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0996	0.0675	0.7817	1.5400e-003	0.1397	1.1700e-003	0.1408	0.0370	1.0800e-003	0.0381		153.1736	153.1736	6.6700e-003		153.3403
Total	**0.0996**	**0.0675**	**0.7817**	**1.5400e-003**	**0.1397**	**1.1700e-003**	**0.1408**	**0.0370**	**1.0800e-003**	**0.0381**		**153.1736**	**153.1736**	**6.6700e-003**		**153.3403**

3.8 Architectural Coating - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	23.2166					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	2.8370	26.7607	16.5390	0.0268		1.6804	1.6804		1.5714	1.5714	0.0000	2,645.6414	2,645.6414	0.6939		2,662.9889
Total	**26.0536**	**26.7607**	**16.5390**	**0.0268**		**1.6804**	**1.6804**		**1.5714**	**1.5714**	**0.0000**	**2,645.6414**	**2,645.6414**	**0.6939**		**2,662.9889**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0996	0.0675	0.7817	1.5400e-003	0.1397	1.1700e-003	0.1408	0.0370	1.0800e-003	0.0381		153.1736	153.1736	6.6700e-003		153.3403
Total	**0.0996**	**0.0675**	**0.7817**	**1.5400e-003**	**0.1397**	**1.1700e-003**	**0.1408**	**0.0370**	**1.0800e-003**	**0.0381**		**153.1736**	**153.1736**	**6.6700e-003**		**153.3403**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Mitigated	0.7043	3.1941	7.8709	0.0230	1.7782	0.0294	1.8075	0.4768	0.0277	0.5045		2,326.739 2	2,326.739 2	0.0998		2,329.233 3
Unmitigated	0.7043	3.1941	7.8709	0.0230	1.7782	0.0294	1.8075	0.4768	0.0277	0.5045		2,326.739 2	2,326.739 2	0.0998		2,329.233 3

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
General Light Industry	285.60	285.60	285.60	833,812	833,812
Other Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	285.60	285.60	285.60	833,812	833,812

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190
Other Asphalt Surfaces	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190
Parking Lot	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190
City Park	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
NaturalGas Mitigated	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
NaturalGas Unmitigated	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893

5.2 Energy by Land Use - NaturalGas

Unmitigated

Land Use	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Light Industry	181874	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9614**	**17.8308**	**14.9779**	**0.1070**		**1.3551**	**1.3551**		**1.3551**	**1.3551**		**21,396.9380**	**21,396.9380**	**0.4101**	**0.3923**	**21,524.0893**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Light Industry	181.874	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9614**	**17.8308**	**14.9779**	**0.1070**		**1.3551**	**1.3551**		**1.3551**	**1.3551**		**21,396.9380**	**21,396.9380**	**0.4101**	**0.3923**	**21,524.0893**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Mitigated	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Unmitigated	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory						lb/day								lb/day		
Architectural Coating	0.1590					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5896					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0500e-003	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Total	**2.7506**	**2.0000e-004**	**0.0218**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**		**0.0464**	**0.0464**	**1.2000e-004**		**0.0495**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1590					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5896					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0500e-003	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Total	**2.7506**	**2.0000e-004**	**0.0218**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**		**0.0464**	**0.0464**	**1.2000e-004**		**0.0495**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
Boiler	0	0	0	0	CNG

User Defined Equipment

Equipment Type	Number

10.1 Stationary Sources

Unmitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Boiler - CNG (0 - 2 MMBTU)	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

11.0 Vegetation

800 Yolanda

Sonoma-San Francisco County, Winter

Scenario 2 – Total Electrical Demand Supplied by Utilities

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	120.00	1000sqft	1.64	120,000.00	0
Other Asphalt Surfaces	6.70	1000sqft	0.15	6,700.00	0
Parking Lot	85.00	Space	0.76	51,351.00	0
City Park	0.45	Acre	0.45	19,593.29	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	75
Climate Zone	4			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Client provided information

Land Use - From PD and applicant provided construction data, approx 3 acres of site developed

Construction Phase - Client provided construction schedule. Trenching = Landscaping phase.

Off-road Equipment - Applicant provided details.

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Based on applicant provided construction details.

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Applicant provided construction details

Off-road Equipment - Phase = Landscaping. Applicant provided construction details

Trips and VMT -

Demolition - Approx area to be demolished

Grading - 70 CY of material expected to be required as fill

Architectural Coating - CALGreen Mandatory Requirements

Vehicle Trips - Source: Fehr and Peers 2017

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Area Coating - CALGreen Building Code requirements

Energy Use - Scenarion 2: All electricity would be provided from grid. Natural gas for non-cogen uses included.

Water And Wastewater - Based on applicant provided water estimate.

Construction Off-road Equipment Mitigation - Assumed compliance with BAAQMD recommended measures

Mobile Land Use Mitigation -

Energy Mitigation -

Fleet Mix -

Stationary Sources - Emergency Generators and Fire Pumps -

Stationary Sources - Process Boilers -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Residential_Interior	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblAreaCoating	Area_EF_Residential_Exterior	150	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	15
tblConstructionPhase	NumDays	10.00	25.00
tblConstructionPhase	NumDays	220.00	105.00
tblConstructionPhase	NumDays	6.00	35.00
tblConstructionPhase	NumDays	10.00	25.00
tblConstructionPhase	NumDays	3.00	15.00
tblEnergyUse	LightingElect	3.17	0.00
tblEnergyUse	LightingElect	0.88	0.00
tblEnergyUse	NT24E	3.70	182.50
tblEnergyUse	NT24NG	6.67	276.60
tblEnergyUse	T24E	1.55	182.50
tblEnergyUse	T24NG	19.81	276.60
tblGrading	MaterialImported	0.00	70.00
tblLandUse	BuildingSpaceSquareFeet	34,000.00	51,351.00
tblLandUse	GreenSpaceSquareFeet	19,602.00	19,593.29
tblLandUse	LandUseSquareFeet	34,000.00	51,351.00
tblLandUse	LandUseSquareFeet	19,602.00	19,593.29
tblLandUse	LotAcreage	2.75	1.64
tblOffRoadEquipment	HorsePower	231.00	226.00

tblOffRoadEquipment	HorsePower	130.00	125.00
tblOffRoadEquipment	HorsePower	132.00	130.00
tblOffRoadEquipment	HorsePower	247.00	255.00
tblOffRoadEquipment	HorsePower	231.00	226.00
tblOffRoadEquipment	HorsePower	158.00	162.00
tblOffRoadEquipment	HorsePower	168.00	171.00
tblOffRoadEquipment	HorsePower	263.00	253.00
tblOffRoadEquipment	HorsePower	78.00	97.00
tblOffRoadEquipment	LoadFactor	0.20	0.78
tblOffRoadEquipment	LoadFactor	0.20	0.78
tblOffRoadEquipment	LoadFactor	0.20	0.78
tblOffRoadEquipment	LoadFactor	0.40	0.42
tblOffRoadEquipment	LoadFactor	0.30	0.20
tblOffRoadEquipment	LoadFactor	0.50	0.37
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	UsageHours	8.00	7.00

tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	6.00	7.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblProjectCharacteristics	OperationalYear	2018	2020
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	ST_TR	1.32	2.38
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	SU_TR	0.68	2.38
tblVehicleTrips	WD_TR	1.89	0.00
tblVehicleTrips	WD_TR	6.97	2.38
tblWater	IndoorWaterUseRate	27,750,000.00	4,380,000.00
tblWater	OutdoorWaterUseRate	536,166.61	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	26.1612	40.5107	31.4224	0.0589	6.7892	2.1902	8.5451	3.0807	2.0895	4.7148	0.0000	5,766.7638	5,766.7638	1.1062	0.0000	5,791.6824
Maximum	**26.1612**	**40.5107**	**31.4224**	**0.0589**	**6.7892**	**2.1902**	**8.5451**	**3.0807**	**2.0895**	**4.7148**	**0.0000**	**5,766.7638**	**5,766.7638**	**1.1062**	**0.0000**	**5,791.6824**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	26.1612	40.5107	31.4224	0.0589	3.1254	2.1902	4.8812	1.4049	2.0895	3.0391	0.0000	5,766.7638	5,766.7638	1.1062	0.0000	5,791.6824
Maximum	**26.1612**	**40.5107**	**31.4224**	**0.0589**	**3.1254**	**2.1902**	**4.8812**	**1.4049**	**2.0895**	**3.0391**	**0.0000**	**5,766.7638**	**5,766.7638**	**1.1062**	**0.0000**	**5,791.6824**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**53.97**	**0.00**	**42.88**	**54.39**	**0.00**	**35.54**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Energy	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Mobile	0.6360	3.4022	8.0147	0.0218	1.7782	0.0296	1.8078	0.4768	0.0279	0.5047		2,200.4050	2,200.4050	0.1011		2,202.9335
Stationary	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.3481**	**21.2332**	**23.0143**	**0.1288**	**1.7782**	**1.3848**	**3.1630**	**0.4768**	**1.3831**	**1.8599**		**23,597.3894**	**23,597.3894**	**0.5114**	**0.3923**	**23,727.0723**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Energy	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Mobile	0.6360	3.4022	8.0147	0.0218	1.7782	0.0296	1.8078	0.4768	0.0279	0.5047		2,200.4050	2,200.4050	0.1011		2,202.9335
Stationary	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.3481**	**21.2332**	**23.0143**	**0.1288**	**1.7782**	**1.3848**	**3.1630**	**0.4768**	**1.3831**	**1.8599**		**23,597.3894**	**23,597.3894**	**0.5114**	**0.3923**	**23,727.0723**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2018	1/26/2018	5	20	
2	Site Preparation	Site Preparation	1/27/2018	2/16/2018	5	15	
3	Grading	Grading	2/17/2018	4/6/2018	5	35	
4	Trenching	Trenching	4/7/2018	5/4/2018	5	20	
5	Building Construction	Building Construction	5/5/2018	9/28/2018	5	105	
6	Paving	Paving	9/29/2018	11/2/2018	5	25	
7	Architectural Coating	Architectural Coating	11/3/2018	12/7/2018	5	25	

Acres of Grading (Site Preparation Phase): 19.69

Acres of Grading (Grading Phase): 45.94

Acres of Paving: 0.91

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 180,000; Non-Residential Outdoor: 60,000; Striped Parking Area: 3,483 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Dumpers/Tenders	1	7.00	16	0.38
Demolition	Excavators	3	8.00	158	0.38
Demolition	Other Material Handling Equipment	1	7.00	171	0.42
Demolition	Rubber Tired Dozers	1	7.00	255	0.40
Demolition	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Graders	1	7.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Scrapers	1	7.00	367	0.48

Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Concrete/Industrial Saws	1	7.00	81	0.73
Grading	Excavators	1	7.00	158	0.38
Grading	Graders	1	7.00	187	0.41
Grading	Rubber Tired Dozers	1	7.00	247	0.40
Grading	Scrapers	1	7.00	367	0.48
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Trenching	Forklifts	1	7.00	89	0.78
Trenching	Sweepers/Scrubbers	1	6.00	64	0.46
Trenching	Trenchers	1	8.00	97	0.37
Building Construction	Air Compressors	2	6.00	78	0.48
Building Construction	Cement and Mortar Mixers	1	7.00	9	0.56
Building Construction	Cranes	2	7.00	226	0.29
Building Construction	Excavators	1	7.00	162	0.38
Building Construction	Forklifts	1	7.00	89	0.78
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Pumps	1	4.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Welders	2	7.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	8.00	125	0.42
Paving	Paving Equipment	1	7.00	130	0.36
Paving	Rollers	1	8.00	80	0.38
Paving	Surfacing Equipment	1	7.00	253	0.30
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Architectural Coating	Air Compressors	2	6.00	78	0.48
Architectural Coating	Cranes	2	7.00	226	0.29

Architectural Coating	Forklifts	2	7.00	89	0.78
Architectural Coating	Pressure Washers	2	6.00	13	0.20

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	8	20.00	0.00	16.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	9.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	12	83.00	32.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	8	17.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1725	0.0000	0.1725	0.0261	0.0000	0.0261			0.0000			0.0000
Off-Road	2.9873	29.8397	27.2241	0.0383		1.5601	1.5601		1.4579	1.4579		3,806.3558	3,806.3558	1.0355		3,832.2427
Total	**2.9873**	**29.8397**	**27.2241**	**0.0383**	**0.1725**	**1.5601**	**1.7326**	**0.0261**	**1.4579**	**1.4840**		**3,806.3558**	**3,806.3558**	**1.0355**		**3,832.2427**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	8.2000e-003	0.2768	0.0581	6.4000e-004	0.0138	1.5300e-003	0.0154	3.7700e-003	1.4600e-003	5.2400e-003		68.9209	68.9209	4.5400e-003		69.0344
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1267	0.0984	0.9063	1.6900e-003	0.1643	1.3800e-003	0.1657	0.0436	1.2700e-003	0.0449		167.5073	167.5073	7.6100e-003		167.6976
Total	**0.1349**	**0.3752**	**0.9645**	**2.3300e-003**	**0.1781**	**2.9100e-003**	**0.1810**	**0.0474**	**2.7300e-003**	**0.0501**		**236.4282**	**236.4282**	**0.0122**		**236.7320**

3.2 Demolition - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Fugitive Dust					0.0776	0.0000	0.0776	0.0118	0.0000	0.0118			0.0000			0.0000
Off-Road	2.9873	29.8397	27.2241	0.0383		1.5601	1.5601		1.4579	1.4579	0.0000	3,806.355 8	3,806.355 8	1.0355		3,832.242 7
Total	**2.9873**	**29.8397**	**27.2241**	**0.0383**	**0.0776**	**1.5601**	**1.6377**	**0.0118**	**1.4579**	**1.4696**	**0.0000**	**3,806.355 8**	**3,806.355 8**	**1.0355**		**3,832.242 7**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Hauling	8.2000e-003	0.2768	0.0581	6.4000e-004	0.0138	1.5300e-003	0.0154	3.7700e-003	1.4600e-003	5.2400e-003		68.9209	68.9209	4.5400e-003		69.0344
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1267	0.0984	0.9063	1.6900e-003	0.1643	1.3800e-003	0.1657	0.0436	1.2700e-003	0.0449		167.5073	167.5073	7.6100e-003		167.6976
Total	**0.1349**	**0.3752**	**0.9645**	**2.3300e-003**	**0.1781**	**2.9100e-003**	**0.1810**	**0.0474**	**2.7300e-003**	**0.0501**		**236.4282**	**236.4282**	**0.0122**		**236.7320**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6614	0.0000	6.6614	3.0468	0.0000	3.0468			0.0000			0.0000
Off-Road	2.7115	31.9452	15.2378	0.0293		1.3894	1.3894		1.2782	1.2782		2,946.7231	2,946.7231	0.9174		2,969.6569
Total	**2.7115**	**31.9452**	**15.2378**	**0.0293**	**6.6614**	**1.3894**	**8.0508**	**3.0468**	**1.2782**	**4.3250**		**2,946.7231**	**2,946.7231**	**0.9174**		**2,969.6569**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0633	0.0492	0.4532	8.4000e-004	0.0822	6.9000e-004	0.0828	0.0218	6.4000e-004	0.0224		83.7536	83.7536	3.8100e-003		83.8488
Total	**0.0633**	**0.0492**	**0.4532**	**8.4000e-004**	**0.0822**	**6.9000e-004**	**0.0828**	**0.0218**	**6.4000e-004**	**0.0224**		**83.7536**	**83.7536**	**3.8100e-003**		**83.8488**

3.3 Site Preparation - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9976	0.0000	2.9976	1.3710	0.0000	1.3710			0.0000			0.0000
Off-Road	2.7115	31.9452	15.2378	0.0293		1.3894	1.3894		1.2782	1.2782	0.0000	2,946.723 1	2,946.723 1	0.9174		2,969.656 9
Total	**2.7115**	**31.9452**	**15.2378**	**0.0293**	**2.9976**	**1.3894**	**4.3870**	**1.3710**	**1.2782**	**2.6493**	**0.0000**	**2,946.723 1**	**2,946.723 1**	**0.9174**		**2,969.656 9**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0633	0.0492	0.4532	8.4000e-004	0.0822	6.9000e-004	0.0828	0.0218	6.4000e-004	0.0224		83.7536	83.7536	3.8100e-003		83.8488
Total	**0.0633**	**0.0492**	**0.4532**	**8.4000e-004**	**0.0822**	**6.9000e-004**	**0.0828**	**0.0218**	**6.4000e-004**	**0.0224**		**83.7536**	**83.7536**	**3.8100e-003**		**83.8488**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6615	0.0000	6.6615	3.0468	0.0000	3.0468			0.0000			0.0000
Off-Road	3.4189	38.0796	21.3626	0.0393		1.7544	1.7544		1.6327	1.6327		3,919.941 5	3,919.941 5	1.0990		3,947.417 5
Total	**3.4189**	**38.0796**	**21.3626**	**0.0393**	**6.6615**	**1.7544**	**8.4159**	**3.0468**	**1.6327**	**4.6795**		**3,919.941 5**	**3,919.941 5**	**1.0990**		**3,947.417 5**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.6400e-003	0.0890	0.0187	2.1000e-004	4.4400e-003	4.9000e-004	4.9300e-003	1.2100e-003	4.7000e-004	1.6800e-003		22.1532	22.1532	1.4600e-003		22.1896
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0950	0.0738	0.6797	1.2700e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		125.6305	125.6305	5.7100e-003		125.7732
Total	**0.0976**	**0.1628**	**0.6984**	**1.4800e-003**	**0.1277**	**1.5200e-003**	**0.1292**	**0.0339**	**1.4300e-003**	**0.0353**		**147.7836**	**147.7836**	**7.1700e-003**		**147.9628**

3.4 Grading - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9977	0.0000	2.9977	1.3711	0.0000	1.3711			0.0000			0.0000
Off-Road	3.4189	38.0796	21.3626	0.0393		1.7544	1.7544		1.6327	1.6327	0.0000	3,919.9415	3,919.9415	1.0990		3,947.4175
Total	**3.4189**	**38.0796**	**21.3626**	**0.0393**	**2.9977**	**1.7544**	**4.7521**	**1.3711**	**1.6327**	**3.0038**	**0.0000**	**3,919.9415**	**3,919.9415**	**1.0990**		**3,947.4175**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.6400e-003	0.0890	0.0187	2.1000e-004	4.4400e-003	4.9000e-004	4.9300e-003	1.2100e-003	4.7000e-004	1.6800e-003		22.1532	22.1532	1.4600e-003		22.1896
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0950	0.0738	0.6797	1.2700e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		125.6305	125.6305	5.7100e-003		125.7732
Total	**0.0976**	**0.1628**	**0.6984**	**1.4800e-003**	**0.1277**	**1.5200e-003**	**0.1292**	**0.0339**	**1.4300e-003**	**0.0353**		**147.7836**	**147.7836**	**7.1700e-003**		**147.9628**

3.5 Trenching - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2579	11.1174	8.0851	0.0102		0.8804	0.8804		0.8100	0.8100		1,029.1299	1,029.1299	0.3204		1,037.1394
Total	**1.2579**	**11.1174**	**8.0851**	**0.0102**		**0.8804**	**0.8804**		**0.8100**	**0.8100**		**1,029.1299**	**1,029.1299**	**0.3204**		**1,037.1394**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0507	0.0394	0.3625	6.7000e-004	0.0657	5.5000e-004	0.0663	0.0174	5.1000e-004	0.0179		67.0029	67.0029	3.0400e-003		67.0790
Total	**0.0507**	**0.0394**	**0.3625**	**6.7000e-004**	**0.0657**	**5.5000e-004**	**0.0663**	**0.0174**	**5.1000e-004**	**0.0179**		**67.0029**	**67.0029**	**3.0400e-003**		**67.0790**

3.5 Trenching - 2018

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Off-Road	1.2579	11.1174	8.0851	0.0102		0.8804	0.8804		0.8100	0.8100	0.0000	1,029.1299	1,029.1299	0.3204		1,037.1394
Total	**1.2579**	**11.1174**	**8.0851**	**0.0102**		**0.8804**	**0.8804**		**0.8100**	**0.8100**	**0.0000**	**1,029.1299**	**1,029.1299**	**0.3204**		**1,037.1394**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0507	0.0394	0.3625	6.7000e-004	0.0657	5.5000e-004	0.0663	0.0174	5.1000e-004	0.0179		67.0029	67.0029	3.0400e-003		67.0790
Total	**0.0507**	**0.0394**	**0.3625**	**6.7000e-004**	**0.0657**	**5.5000e-004**	**0.0663**	**0.0174**	**5.1000e-004**	**0.0179**		**67.0029**	**67.0029**	**3.0400e-003**		**67.0790**

3.6 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.2703	35.6073	26.3158	0.0433		2.1446	2.1446		2.0460	2.0460		4,163.4166	4,163.4166	0.8994		4,185.9014
Total	**4.2703**	**35.6073**	**26.3158**	**0.0433**		**2.1446**	**2.1446**		**2.0460**	**2.0460**		**4,163.4166**	**4,163.4166**	**0.8994**		**4,185.9014**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1884	4.4952	1.3454	8.5600e-003	0.2155	0.0399	0.2554	0.0619	0.0382	0.1001		908.1921	908.1921	0.0658		909.8361
Worker	0.5256	0.4082	3.7612	7.0000e-003	0.6818	5.7300e-003	0.6876	0.1809	5.2900e-003	0.1861		695.1552	695.1552	0.0316		695.9449
Total	**0.7140**	**4.9034**	**5.1066**	**0.0156**	**0.8973**	**0.0457**	**0.9429**	**0.2428**	**0.0435**	**0.2863**		**1,603.3473**	**1,603.3473**	**0.0974**		**1,605.7810**

3.6 Building Construction - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.2703	35.6073	26.3158	0.0433		2.1446	2.1446		2.0460	2.0460	0.0000	4,163.4166	4,163.4166	0.8994		4,185.9014
Total	**4.2703**	**35.6073**	**26.3158**	**0.0433**		**2.1446**	**2.1446**		**2.0460**	**2.0460**	**0.0000**	**4,163.4166**	**4,163.4166**	**0.8994**		**4,185.9014**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1884	4.4952	1.3454	8.5600e-003	0.2155	0.0399	0.2554	0.0619	0.0382	0.1001		908.1921	908.1921	0.0658		909.8361
Worker	0.5256	0.4082	3.7612	7.0000e-003	0.6818	5.7300e-003	0.6876	0.1809	5.2900e-003	0.1861		695.1552	695.1552	0.0316		695.9449
Total	**0.7140**	**4.9034**	**5.1066**	**0.0156**	**0.8973**	**0.0457**	**0.9429**	**0.2428**	**0.0435**	**0.2863**		**1,603.3473**	**1,603.3473**	**0.0974**		**1,605.7810**

3.7 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2377	13.4127	10.6464	0.0196		0.7163	0.7163		0.6598	0.6598		1,955.179 3	1,955.179 3	0.6008		1,970.199 7
Paving	0.0954					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3331**	**13.4127**	**10.6464**	**0.0196**		**0.7163**	**0.7163**		**0.6598**	**0.6598**		**1,955.179 3**	**1,955.179 3**	**0.6008**		**1,970.199 7**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0950	0.0738	0.6797	1.2700e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		125.6305	125.6305	5.7100e-003		125.7732
Total	**0.0950**	**0.0738**	**0.6797**	**1.2700e-003**	**0.1232**	**1.0300e-003**	**0.1243**	**0.0327**	**9.6000e-004**	**0.0336**		**125.6305**	**125.6305**	**5.7100e-003**		**125.7732**

3.7 Paving - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2377	13.4127	10.6464	0.0196		0.7163	0.7163		0.6598	0.6598	0.0000	1,955.1793	1,955.1793	0.6008		1,970.1996
Paving	0.0954					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.3331**	**13.4127**	**10.6464**	**0.0196**		**0.7163**	**0.7163**		**0.6598**	**0.6598**	**0.0000**	**1,955.1793**	**1,955.1793**	**0.6008**		**1,970.1996**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0950	0.0738	0.6797	1.2700e-003	0.1232	1.0300e-003	0.1243	0.0327	9.6000e-004	0.0336		125.6305	125.6305	5.7100e-003		125.7732
Total	**0.0950**	**0.0738**	**0.6797**	**1.2700e-003**	**0.1232**	**1.0300e-003**	**0.1243**	**0.0327**	**9.6000e-004**	**0.0336**		**125.6305**	**125.6305**	**5.7100e-003**		**125.7732**

3.8 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	23.2166					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	2.8370	26.7607	16.5390	0.0268		1.6804	1.6804		1.5714	1.5714		2,645.6414	2,645.6414	0.6939		2,662.9889
Total	**26.0536**	**26.7607**	**16.5390**	**0.0268**		**1.6804**	**1.6804**		**1.5714**	**1.5714**		**2,645.6414**	**2,645.6414**	**0.6939**		**2,662.9889**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1077	0.0836	0.7704	1.4300e-003	0.1397	1.1700e-003	0.1408	0.0370	1.0800e-003	0.0381		142.3812	142.3812	6.4700e-003		142.5429
Total	**0.1077**	**0.0836**	**0.7704**	**1.4300e-003**	**0.1397**	**1.1700e-003**	**0.1408**	**0.0370**	**1.0800e-003**	**0.0381**		**142.3812**	**142.3812**	**6.4700e-003**		**142.5429**

3.8 Architectural Coating - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	23.2166					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	2.8370	26.7607	16.5390	0.0268		1.6804	1.6804		1.5714	1.5714	0.0000	2,645.6414	2,645.6414	0.6939		2,662.9889
Total	**26.0536**	**26.7607**	**16.5390**	**0.0268**		**1.6804**	**1.6804**		**1.5714**	**1.5714**	**0.0000**	**2,645.6414**	**2,645.6414**	**0.6939**		**2,662.9889**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1077	0.0836	0.7704	1.4300e-003	0.1397	1.1700e-003	0.1408	0.0370	1.0800e-003	0.0381		142.3812	142.3812	6.4700e-003		142.5429
Total	**0.1077**	**0.0836**	**0.7704**	**1.4300e-003**	**0.1397**	**1.1700e-003**	**0.1408**	**0.0370**	**1.0800e-003**	**0.0381**		**142.3812**	**142.3812**	**6.4700e-003**		**142.5429**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Mitigated	0.6360	3.4022	8.0147	0.0218	1.7782	0.0296	1.8078	0.4768	0.0279	0.5047		2,200.4050	2,200.4050	0.1011		2,202.9335
Unmitigated	0.6360	3.4022	8.0147	0.0218	1.7782	0.0296	1.8078	0.4768	0.0279	0.5047		2,200.4050	2,200.4050	0.1011		2,202.9335

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
General Light Industry	285.60	285.60	285.60	833,812	833,812
Other Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	285.60	285.60	285.60	833,812	833,812

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190
Other Asphalt Surfaces	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190
Parking Lot	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190
City Park	0.568926	0.041373	0.172015	0.112977	0.030659	0.007080	0.028564	0.025868	0.003029	0.001930	0.005517	0.000872	0.001190

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
NaturalGas Unmitigated	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Light Industry	181874	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9614**	**17.8308**	**14.9779**	**0.1070**		**1.3551**	**1.3551**		**1.3551**	**1.3551**		**21,396.9380**	**21,396.9380**	**0.4101**	**0.3923**	**21,524.0893**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Light Industry	181.874	1.9614	17.8308	14.9779	0.1070		1.3551	1.3551		1.3551	1.3551		21,396.9380	21,396.9380	0.4101	0.3923	21,524.0893
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**1.9614**	**17.8308**	**14.9779**	**0.1070**		**1.3551**	**1.3551**		**1.3551**	**1.3551**		**21,396.9380**	**21,396.9380**	**0.4101**	**0.3923**	**21,524.0893**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Unmitigated	2.7506	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1590					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5896					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0500e-003	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Total	**2.7506**	**2.0000e-004**	**0.0218**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**		**0.0464**	**0.0464**	**1.2000e-004**		**0.0495**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1590					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5896					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0500e-003	2.0000e-004	0.0218	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005		0.0464	0.0464	1.2000e-004		0.0495
Total	**2.7506**	**2.0000e-004**	**0.0218**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**		**0.0464**	**0.0464**	**1.2000e-004**		**0.0495**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
Boiler	0	0	0	0	CNG

User Defined Equipment

Equipment Type	Number

10.1 Stationary Sources

Unmitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Boiler - CNG (0 - 2 MMBTU)	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

11.0 Vegetation

Greenhouse Gas Emission Worksheet
N20 Mobile Emissions

From CalEEMod Vehicle Fleet Mix Output:

Annual VMT: 1,058,031

Vehicle Type	Percent Type	CH4 Emission Factor (g/mile)*	CH4 Emission (g/mile)**	N2O Emission Factor (g/mile)*	N2O Emission (g/mile)**
Light Auto	55.8%	0.04	0.0223318	0.04	0.022332
Light Truck < 3750 lbs	4.4%	0.05	0.0021807	0.06	0.002617
Light Truck 3751-5750 lbs	17.4%	0.05	0.0087135	0.06	0.010456
Med Truck 5751-8500 lbs	11.7%	0.12	0.0140582	0.2	0.02343
Lite-Heavy Truck 8501-10,000 lbs	3.3%	0.12	0.0039786	0.2	0.006631
Lite-Heavy Truck 10,001-14,000 lbs	0.7%	0.09	0.0006718	0.125	0.000933
Med-Heavy Truck 14,001-33,000 lbs	2.8%	0.06	0.0016817	0.05	0.001401
Heavy-Heavy Truck 33,001-60,000 lbs	2.5%	0.06	0.001509	0.05	0.001258
Other Bus	0.3%	0.06	0.000179	0.05	0.000149
Urban Bus	0.2%	0.06	0.0001212	0.05	0.000101
Motorcycle	0.6%	0.09	0.0005153	0.01	5.73E-05
School Bus	0.1%	0.06	5.214E-05	0.05	4.35E-05
Motor Home	0.1%	0.09	0.0001148	0.125	0.00016
Total	**100.0%**		**0.0561077**		**0.069568**

Total Emissions (metric tons) =
Emission Factor by Vehicle Mix (g/mi) x Annual VMT(mi) x 0.000001 metric tons/g

Conversion to Carbon Dioxide Equivalency (CO2e) Units based on Global Warming Potential (GWP)

CH4	21	GWP
N2O	310	GWP
1 ton (short, US) =	0.90718474	metric ton

Annual Mobile Emissions:

	Total Emissions		Total CO2e units	
N20 Emissions:	0.0736	metric tons N2O	**22.82**	metric tons CO2e
		Project Total:	***22.82***	***metric tons CO2e***

References

* from Table C.4: Methane and Nitrous Oxide Emission Factors for Mobile Sources by Vehicle and Fuel Type (g/mile).
in California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.
Assume Model year 2000-present, gasoline fueled.

** Source: California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.

SCR/Oxidation Catalyst System - For NOx/CO/VOC Reduction

Customer:	WES	**Notes:**	**SCR/OXYCAT Blocks**
Attention:	Tom Marihart	**Ref. No:**	
Job Ref:	Calif	**Date:**	02/26/18

Engine Mfg:	MAN			**Model No:**	Avus 500 PlusNG/Agenitor 412
BHP (KW):	550	**Cycle:**	4	**RPM:**	1800
Fuel Type :	Natural Gas	**Load:**	100%	**Hours/Year:**	8,300

SCR Model	**HUG or JM**	**Nbr Units:**	1	**SCR Controls:**	**Closed Loop**

Item Description	English	Units	Metric	Units
Engine Output	**769**	BHP	**574**	BKW
Exhaust Gas Mass Flow	**6,703**	Lbs/Hour	**3,040**	Kg/Hour
Exhaust Gas Temperature	**863.0**	°F	**461.7**	°C
Exhaust Flow - Standard Units	**92,948**	SCFH	**2,490**	SCMH
Pre-Catalyst NOx Emissions	**1.00**	G/BHP/Hr	**1.34**	G/BKW/Hr
Pre-Catalyst NOx Emissions	**1.7**	Lbs/Hr/Eng	**0.8**	Kg/Hour
Pre-Catalyst NOx Emissions	**7.0**	TPY/Engine	**6.4**	Met-Tons/Year
Pre-Catalyst NOx Emissions	**0.0**			
Post-Catalyst NOx Emissions	**0.070**	G/BHP/Hr	**0.09**	G/BKW/Hr
Post-Catalyst NOx Emissions	**0.207**	Lbs/MW/Hr		
Post-Catalyst NOx Emissions	**5**	**PPMV@15% O2**	**5**	PPMV@15% O2
Post-Catalyst NOx Emissions	**0.12**	Lbs/Hr/Eng	**0.05**	Kg/Hour
Post-Catalyst NOx Emissions	**2.85**	**Lbs per day**		
Post-Catalyst NOx Emissions	**0.49**	TPY/Engine	**0.45**	Met-Tons/Year
Percentage NOx Reduction	**93.0**	%	**93.0**	%
Pre-Catalyst CO Emissions	**2.20**	G/BHP/Hr	**2.95**	G/BKW/Hr
Pre-Catalyst CO Emissions	**3.7**	Lbs/Hr/Eng	**1.7**	Kg/Hour
Pre-Catalyst CO Emissions	**15.5**	TPY/Engine	**14.0**	Met-Tons/Year
Post-Catalyst CO Emissions	**0.10**	G/BHP/Hr	**0.13**	G/BKW/Hr
Post-Catalyst CO Emissions	**0.30**	Lbs/MW/Hr		
Post-Catalyst CO Emissions	**12**	**PPMV@15% O2**	**12**	PPMV@15% O2
Post-Catalyst CO Emissions	**0.17**	Lbs/Hr/Eng	**0.08**	Kg/Hour
Post-Catalyst CO Emissions	**4.07**	**Lbs per day**		
Post-Catalyst CO Emissions	**0.70**	TPY/Engine	**0.64**	Met-Tons/Year
Percentage CO Reduction	**95.5**	%	**95.5**	%
Pre-Catalyst NMEHC Emissions (VOC)	**0.70**	G/BHP/Hr	**0.94**	G/BKW/Hr
Pre-Catalyst NMEHC Emissions	**1.2**	Lbs/Hr/Eng	**0.5**	Kg/Hour
Pre-Catalyst NMEHC Emissions	**4.9**	TPY/Engine	**4.5**	Met-Tons/Year
Post-Catalyst NMEHC Emissions	**0.145**	G/BHP/Hr	**0.19**	G/BKW/Hr
Post-Catalyst NMEHC Emissions	**0.428**	Lbs/MW/Hr		
Post-Catalyst NMEHC Emissions	**32**	**PPMV@15% O2**	**32**	PPMV@15% O2
Post-Catalyst NMEHC Emissions	**0.25**	Lbs/Hr/Eng	**0.11**	Kg/Hour
Post-Catalyst NMEHC Emissions	**5.90**	**Lbs per day**		
Post-Catalyst NMEHC Emissions	**1.02**	TPY/Engine	**0.93**	Met-Tons/Year
Percentage NMEHC Reduction	**79.3**	%	**79.3**	%
Pressure Drop Across Catalyst/Mixer	**6.0**	In. H20	**15.0**	mbar
Maximum SCR System Ammonia Slip	**10.0**	PPMV		PPMV
40%/60% Urea/H2O Consumption Rate	**0.4**	Gal/Hour	**1.4**	Liter/Hr

	input .5042 without LT and .5421 with LT			
Thermal heat used	0.5042			
	CO2 Emissions estimate and available to PLANTS for Greenhouse use			
		Exhaust mass flow wet/lbs/hr		
Exhaust based farm calc	0.08	6703	536.24	lbs/hr CO2 available to plants
Fuel use based calc	116.98	4.622	540.68	lbs/hr CO2 available to plants
Heat credit (no 20% BC)	58.981			
Fuel based CHP@90%+*	57.999	4.622	268.07	CO2 emissions CHP, no CO2 Credit from plant fertilization
Recovering 50% as waste heat				
		50.00%	% lost to air?	
If only X	% CO2 used for Plants?	50.00%	270.34	CO2 Credit for Greenhouse use?
THEN	Net GHG emissions of TriGen with CO2?		-2.27	lbs of CO2/MWH Caveat*

On other criteria emissions?	Daily Lbs/Day	Annual TPY
NOx	2.85	0.49
CO	4.07	0.70
VOC	5.90	1.02

175207 LT heat BTU/hr or 3.79% 4.43 lbs /hr not included, but available

2/23/2018

2/23/2018

Spoke with Houwelings greenhouse by phone to verify
reasonablness of metrics for at least 50% use of CO2.
In enclosed greenhouses where venting to release seasonal heat
is less, greater CO2 use closer to 60% can be assumed.
~50% is reasonable for most greenhouses as a base metric.

Source Category

Source:	***IC Engine – Spark Ignition, Natural Gas Fired Lean Burn Engine***	Revision:	***1***
		Document #:	***96.3.3***
Class:	***>= 50 HP***	Date:	***5/7/03***

Determination

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice	TYPICAL TECHNOLOGY
POC	*1. n/d* *2. 0.15 g/bhp-hr[b]* *(32 ppmvd @ 15% oxygen)*	*1. n/d* *2. oxidation catalyst[b]*
NOx	*1. 0.07 g/bhp-hr[a]* *(6 ppmvd @ 15% oxygen)* *2. 0.15 g/bhp-hr[b]* *(12 ppmvd @ 15% oxygen)*	*1. SCR[a]* *2. SCR[b]*
SO_2	*1.n/d* *2.n/s*	*1. n/d* *2. natural gas[b]*
CO	*1. 0.10 g/bhp-hr[a]* *(12 ppmvd @ 15% oxygen)* *2. 0.60 g/bhp-hr[b]* *(74 ppmvd @ 15% oxygen)*	*1. oxidation catalyst[a]* *2. oxidation catalyst[b]*
PM_{10}	*1. n/d* *2. n/s*	*1. n/d* *2. natural gas[b]*
NPOC	*1. n/a* *2. n/a*	*1. n/a* *2. n/a*

References

a. Tehama County Air Pollution Control District: NEO California Power, LLC – Red Bluff, California (ammonia slip limited to 10 ppmvd @ 15% oxygen)
b. CARB "Guidance for the Permitting of Electrical Generation Technologies", September 2001

Energy Study - Appendix C

Construction and Operational Energy Calculations

800 Yolanda Project Energy Study

Last Updated: 10/2019

Compression-Ignition Engine Brake-Specific Fuel Consumption (BSFC) Factors **[1]**:

HP: 0 to 100	0.0588	HP: Greater than 100	0.0529

Values above are expressed in gallons per horsepower-hour/BSFC.

CONSTRUCTION EQUIPMENT						
Construction Equipment	**#**	**Hours per Day**	**Horsepower**	**Load Factor**	**Construction Phase**	**Fuel Used (gallons)**
Concrete/Industrial Saws	1	8	81	0.73	Demolition	555.96
Dumpers/Tenders	1	7	16	0.38	Demolition	50.02
Excavators	3	8	158	0.38	Demolition	1,523.35
Other Material Handling Equipm	1	7	171	0.42	Demolition	531.49
Rubber Tired Dozers	1	7	255	0.4	Demolition	754.83
Tractors/Loaders/Backhoes	1	7	97	0.37	Demolition	295.27
Graders	1	7	187	0.41	Site Preparation	425.53
Rubber Tired Dozers	1	7	247	0.4	Site Preparation	548.36
Scrapers	1	7	367	0.48	Site Preparation	977.72
Tractors/Loaders/Backhoes	1	7	97	0.37	Site Preparation	221.45
Concrete/Industrial Saws	1	7	81	0.73	Grading	851.31
Excavators	1	7	158	0.38	Grading	777.55
Graders	1	7	187	0.41	Grading	992.91
Rubber Tired Dozers	1	7	247	0.4	Grading	1,279.50
Scrapers	1	7	367	0.48	Grading	2,281.35
Tractors/Loaders/Backhoes	1	7	97	0.37	Grading	516.72
Forklifts	1	7	89	0.78	Trenching	571.12
Sweepers/Scrubbers	1	6	64	0.46	Trenching	207.60
Trenchers	1	8	97	0.37	Trenching	337.45
Air Compressors	2	6	78	0.48	Building Constructi	2,772.17
Cement and Mortar Mixers	1	7	9	0.56	Building Constructi	217.69
Cranes	2	7	226	0.29	Building Constructi	5,092.64
Excavators	1	7	162	0.38	Building Constructi	2,391.69
Forklifts	1	7	89	0.78	Building Constructi	2,998.37
Generator Sets	1	8	84	0.74	Building Constructi	3,068.34
Pumps	1	4	84	0.74	Building Constructi	1,534.17
Tractors/Loaders/Backhoes	1	7	97	0.37	Building Constructi	1,550.15
Welders	2	7	46	0.45	Building Constructi	1,788.14
Cement and Mortar Mixers	1	6	9	0.56	Paving	44.43
Pavers	1	8	125	0.42	Paving	555.02
Paving Equipment	1	7	130	0.36	Paving	432.92
Rollers	1	8	80	0.38	Paving	357.29
Surfacing Equipment	1	7	253	0.3	Paving	702.10
Tractors/Loaders/Backhoes	1	7	97	0.37	Paving	369.08
Air Compressors	2	6	78	0.48	Architectural Coati	660.04
Cranes	2	7	226	0.29	Architectural Coati	1,212.53
Forklifts	2	7	89	0.78	Architectural Coati	1,427.79

Pressure Washers	2	6	13	0.2	Architectural Coati	45.84
					Total Fuel Used	**40,919.86**
						(Gallons)

Construction Phase	Days of Operation
Demolition	20
Site Preparation	15
Grading	35
Trenching	20
Building Construction	105
Paving	25
Architectural Coating	25
Total Days	245

WORKER TRIPS

Constuction Phase	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
Demolition	24.0	20	10.8	180.00
Site Prep Phase	24.0	10	10.8	67.50
Grading Phase	24.0	15	10.8	135.00
Trenching	24.0	8	10.8	378.00
Building Phase	24.0	83	10.8	3921.75
Paving Phase	24.0	15	10.8	168.75
Architectural Coating Phase	24.0	17	10.8	191.25
			Total	**5,042.25**

HAULING AND VENDOR TRIPS

Trip Class	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
HAULING TRIPS				
Demolition	7.4	16	20.0	43.24
Site Prep Phase	7.4	0	20.0	0.00
Trenching	7.4	0	20.0	0.00
Grading Phase	7.4	9	20.0	24.32
Building Phase	7.4	0	20.0	0.00
Paving Phase	7.4	0	20.0	0.00
Architectural Coating Phase	7.4	0	20.0	0.00
			Total	**67.57**
VENDOR TRIPS				
Demolition	7.4	0	10.8	0.00
Site Prep Phase	7.4	0	10.8	0.00
Grading Phase	7.4	0	10.8	0.00
Building Phase	7.4	32	10.8	4903.78
Paving Phase	7.4	0	10.8	0.00
Architectural Coating Phase	7.4	0	10.8	0.00
			Total	**8.00**

Total Gasoline Consumption (gallons)	**5,042.25**
Total Diesel Consumption (gallons)	**40,995.42**

Sources:

[1] United States Environmental Protection Agency. 2018. *Exhaust and Crankcase Emission Factors for Nonroad Compression-Ignition Engines in MOVES2014b* . July 2018. Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100UXEN.pdf.

[2] United States Department of Transportation, Bureau of Transportation Statistics. 2018. *National Transportation Statistics 2018* . Available at: https://www.bts.gov/sites/bts.dot.gov/files/docs/browse-statistical-products-and-data/national-transportation-statistics/223001/ntsentire2018q4.pdf.

800 Yolanda Project Energy Study

Last Updated: 10/2019

Populate one of the following tables (Leave the other blank):

Annual VMT	**OR**	**Daily Vehicle Trips**	
Annual VMT: 833,812		Daily Vehicle Trips:	
		Average Trip Distance:	

Fleet Class	**Fleet Mix**
Light Duty Auto (LDA)	0.568926
Light Duty Truck 1 (LDT1)	0.041373
Light Duty Truck 2 (LDT2)	0.172015
Medium Duty Vehicle (MDV)	0.112977
Light Heavy Duty 1 (LHD1)	0.030659
Light Heavy Duty 2 (LHD2)	0.00708
Medium Heavy Duty (MHD)	0.028564
Heavy Heavy Duty (HHD)	0.025868
Other Bus (OBUS)	0.003029
Urban Bus (UBUS)	0.00193
School Bus (SBUS)	0.005517
Motorhome (MH)	0.000872
Motorcycle (MCY)	0.00119

Fuel Economy (MPG)	
Passenger Vehicles	24.0
Light-Med Duty Trucks	17.4
Heavy Trucks/Other	7.4
Motorcycles	43.9

Fleet Mix

Vehicle Type	**Percent**	**Fuel Type**	**Annual VMT: VMT**	**Vehicle Trips: VMT**	**Fuel Consumption (Gallons)**
Passenger Vehicles	*56.89%*	*Gasoline*	474377	0.00	19765.72
Light-Medium Duty Trucks	*32.64%*	*Gasoline*	272127	0.00	15639.49
Heavy Trucks/Other	*10.35%*	*Diesel*	86315	0.00	11664.24
Motorcycle	*0.12%*	*Gasoline*	992	0.00	22.60

Total Gasoline Consumption (gallons)	**35427.81**
Total Diesel Consumption (gallons)	**11664.24**
Total Diesel Consumption (MMBtu)	**1621.33**

APPENDIX E
BIOLOGICAL ASSESSMENT PREPARED BY
WIEMEYER ECOLOGICAL SCIENCES, MARCH 2018
AND
CALIFORNIA TIGER SALAMANDER IMPACT ANALYSIS
PREPARED BY MONK & ASSOCIATES ENVIRONMENTAL
CONSULTANTS, APRIL 1, 2020

BIOLOGICAL ASSESSMENT

SANTA ROSA FARM GROUP
800 YOLANDA AVENUE
SANTA ROSA, CA

Prepared For:

800 Yolanda, LLC
Santa Rosa Farm Group

Prepared By:

Darren Wiemeyer
Wiemeyer Ecological Sciences
4000 Montgomery Drive, Suite L-5
Santa Rosa, CA 95405

March 7, 2018

TABLE OF CONTENTS

FIGURES

PROVIDED AT REAR OF REPORT

APPENDICES

1 SUMMARY

This Biological Assessment presents the findings of surveys and habitat assessments for special-status species and sensitive natural communities and a biological impact evaluation of the proposed development project for site located at 800 Yolanda Avenue in Santa Rosa, CA (referred to as the "site") (Figure 1). The parcel is 5.53-acres in size and the Assessor Parcel Number is 044-091-063.

Darren Wiemeyer performed site visits on January 23 and April 12, 2017 to map habitat types, perform special-status animal species habitat assessment, perform special-status plant species surveys and compile a plant and animal species list. Mr. Wiemeyer also performed a special-status plant species survey on July 1, 2012.

Past biological resource documents have been prepared for the site. These documents include a Jurisdictional Waters Delineation, prepared by SCS Engineers dated July 17, 2009 (SCS Engineers, 2009), a Biological Assessment, prepared by SCS Engineers dated February 24, 2010 (SCS Engineers, 2010a), a Botanical Survey Report, prepared by SCS Engineers dated February 24, 2010 (SCS Engineers, 2010b), a Botanical Survey Letter, prepared by SCS Engineers dated June 17, 2011 (SCS Engineers, 2011) and a Site Assessment for California Tiger Salamander, prepared by Fawcett Environmental Consulting dated March 30, 2012 (Fawcett Environmental Consulting, 2012), which is included as Appendix D. A Tree Preservation and Mitigation Report has been prepared for the proposed project and is included as Appendix F.

Habitat types at the site consist of non-native annual grassland, ruderal (disturbed) habitat and landscaped areas around the residences and structures and a small seasonal drainage with minimal riparian scrub habitat (Figure 4). There are several areas around the residences with planted coast redwood trees, walnut trees and a large blue gum tree (Figure 4).

The proposed project has been designed to avoid impacts to the non-native annual grassland, seasonal drainage and riparian scrub habitat at the site. The project has been situated on the western portion of the site where site developments will be confined to the compacted gravel areas and the ruderal (disturbed) and landscaped areas around the residences and structures (See Site Plan in Figures Section).

The project is proposed to be developed entirely on compacted gravel (hardscape) and ruderal (disturbed) habitats and landscaped areas surrounding the residences, which is not suitable habitat for California tiger salamander (CTS). Only the non-native annual grassland, the seasonal drainage and the riparian scrub habitat at the site could be considered potentially suitable upland aestivation habitat for CTS, which will be avoided and will not be impacted as a result of site developments. Furthermore, given the project site's isolation and distance from the nearest known CTS location (1.8 miles), the site is highly unlikely to be occupied by CTS at the present time and is unlikely to contribute to the survival or recovery of the species (Fawcett, 2012). Based on the evaluation contained in this report, in addition to the detailed CTS Site Assessment (Fawcett, 2012), it has been determined that there will be no impact to California tiger salamander as a result of the proposed project.

The proposed project will result in the loss of all of the trees on the site, except the trees within the riparian scrub habitat (Appendix F). Tree removal and construction activities have the potential to impact native nesting birds if construction activities are initiated during bird nesting season (February 1 – August 31). Tree removal has the potential to impact roosting bat species if tree removal is proposed during active bat roosting time periods. Recommended mitigation measures are proposed in Section 8.3 of this report to reduce impacts to nesting birds and roosting bats to a less than significant level.

2 SITE DESCRIPTION

The site is located at 800 Yolanda Avenue in Santa Rosa, CA (referred to as the "site") (Figure 1). The parcel is 5.53-acres in size and the Assessor Parcel Number is 044-091-063. The site consists of a primary single-family residence, two secondary single-family residences, a barn, a storage shed and landscaped areas. The western portion of the site is entirely compacted gravel and was the location of a former landscape contractor's yard. The eastern portion of the site contains pasture land that has been annually disked and mowed. There is a small seasonal drainage with a small area of riparian scrub habitat at the far southeast corner of the site (Figure 4). Photographs of the site are included as Photo Plate A in the Figures Section.

2.1 TOPOGRAPHY

The majority of the parcel is flat and is slightly slope to the south. Elevations range from approximately 146-157 feet above sea level (Figure 2).

2.2 HYDROLOGY

The site is located within the North Coast Hydrologic Region, Russian River Hydrologic Unit, Middle Russian River Hydrologic Area, Santa Rosa Hydrologic Sub-Area, Laguna Super Planning Watershed and Laguna de Santa Rosa Planning Watershed (CERES, 2009).

Surface water runoff from the site flows in a southerly direction and appears to sheet flow into the seasonal drainage at the southeast end of the site. Portions of the site along the northern site boundary appear to flow north into the roadside drainage ditch along Yolanda Avenue. There are storm drain inlets in the gravel area of the western portion of the site that connect to the roadside drainage ditch along Yolanda Avenue. It does not appear that any surface water flows onto the site from off-site properties.

The unnamed seasonal drainage at the southeast corner of the site flows in a southerly direction where is appears to connect to an underground storm drain system under the residential subdivision south of the site. It is assumed that this underground storm drain system that connects to the Bellevue Channel on the west side of Highway 101. The Bellevue Channel generally flows west into the Laguna de Santa Rosa, then into the Russian River and eventually the Pacific Ocean.

2.3 SOIL TYPES

The Clear Lake series consists of clays that formed under poorly drained conditions. These soils are underlain by alluvium from basic and sedimentary rock. They are on plains and flat basin areas. The Goulding series consists of well-drained clay loams. These soils are underlain at a depth of 12 to 24 inches by metamorphosed basic igneous and weathered andesitic basalt of old volcanic formations. These soils are on Mountainous uplands (Miller, 1972).

2.4 HABITATS

Habitat types at the site consist of non-native annual grassland, ruderal (disturbed) habitat and landscaped areas around the residences and structures and a small seasonal drainage with minimal riparian scrub habitat (Figure 4). There are several areas around the residences with planted coast redwood trees, walnut trees and a large blue gum tree (Figure 4).

2.5 SURROUNDING LANDS

Surrounding lands consist of commercial and industrial properties to the west and north, a large agricultural property used as a cattle/dairy operation to the east and a rural residence with pasture land to the south.

3 PROJECT DESCRIPTION

The Santa Rosa Farm Group proposes to occupy and develop the developed portions of an industrially-zoned parcel and obtain a Conditional Use Permit for indoor cannabis cultivation. An application for manufacturing, distribution and laboratory testing has been filed simultaneously. The existing building is currently in use as a residence, which will be vacated by the previous owner. The site is a corner lot at the southwest corner of Yolanda Avenue and Petaluma Hill Road. The eastern half of the parcel is undeveloped except for an access route from Petaluma Hill Road. The western half of the parcel includes the developed residence and ancillary buildings, as well as roughly 2-acres of gravel paving. The proposed project will not develop any of the currently undeveloped areas at the site (See Site Plan in Figures Section).

The residence will be demolished and replaced by a two-story distribution building, of which 12,000 square feet will be dedicated to the distribution uses. To the south of the distribution building, a single-story power plant building will be erected. Along the southwestern property line, a three-story cultivation building will be erected, of which 86,000 square feet will be dedicated to the various aspects of cultivation (cloning, mother/vegetation, cultivation/bloom/drying, storage, nursery, circulation and equipment areas). Along the northwest property line, a three-story processing building is proposed, of which 17,000 square feet will be dedicated to processing.

The floor plan shows the layout of the interior of the facilities along with square footages of the various uses. In addition to the above square footage breakdowns, 2,000 square feet will be devoted to office uses, and 5,000 square feet will be designated for service including restrooms, break rooms, and lobby. All work will be in conformance to the requirements of the California Building Code and other adopted codes and ordinances.

The project will result in the loss of all of the trees on the site, except the trees within the riparian scrub habitat. A Tree Preservation and Mitigation Report has been prepared by Horticultural Associates dated December 1, 2017 (Appendix F). The project will avoid any disturbance or impacts to the non-native annual grassland habitat at the site.

4 REGULATORY CONTEXT

4.1 UNITED STATES FISH AND WILDLIFE SERVICE

The United States Fish and Wildlife Service (USFWS) administers the federal Endangered Species Act (ESA). Listed threatened and endangered species are protected from take, defined as direct or indirect harm, unless a Section 10 permit is granted to an entity other than a federal agency or a Biological Opinion with incidental take provisions is rendered to a federal lead agency via ESA Section 7 consultation. Pursuant to the requirements of ESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed species may be present in the study area and determine whether the proposed federal action will jeopardize the continued existence of the species.

Under ESA, habitat loss is considered to be an adverse effect to a species. In addition, the action agency is required to determine whether its action is likely to jeopardize the continued existence of any species that is proposed for listing under ESA or to result in the destruction or adverse modification of critical habitat proposed to be designated for such species. The USFWS also administers the federal Migratory Bird Treaty Act of 1918. Under this legislation, it is unlawful to destroy active nests, eggs, and young.

4.2 UNITED STATES ARMY CORPS OF ENGINEERS

The United States Army Corps of Engineers (USACE) administers the federal Clean Water Act (CWA). Section 404 of the CWA requires approval prior to discharging dredged or fill material into the waters of the United States. Waters of the United States includes essentially all surface waters such as all navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters. "Wetlands" are areas characterized by growth of wetland vegetation where the soil is saturated during a portion of the growing season or the surface is flooded during some part of most years. Wetlands generally include seasonally inundated wetlands, swamps, marshes, bogs and similar areas.

4.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

The California Department of Fish and Wildlife (CDFW) administers the California Endangered Species Act (CESA). It is state policy to conserve, protect, restore and enhance any endangered or threatened species and its habitat. The CDFW has jurisdiction over species that are formally listed as threatened or endangered under the CESA. The CESA provides broad protection for species of fish, wildlife and plants that are listed as threatened or endangered in the state. In addition to CESA, the California Native Plant Protection Act (NPPA) provides protection to endangered and rare plant species. The CDFW also maintains a list of species of special concern to be considered during CEQA review.

Pursuant to the requirements of CESA, a state or local agency reviewing a proposed project within its jurisdiction must determine whether any state-listed species may be present in the project area and determine whether the proposed project will have a potentially significant impact upon such species. If significant impacts to state listed species are identified, the state lead agency must adopt reasonable and prudent alternatives as specified by CDFW to prevent or mitigate for impacts. CDFW can authorize take of a state-listed species if an incidental take permit is issued by the Secretary of the Interior or Commerce in compliance with the federal ESA, or if the director of CDFW issues a permit under Section 2080 in those cases where it is demonstrated that the impacts are minimized and mitigated.

CDFW also administers the California Fish and Game Code. California Fish and Game Code Section 3503.5 makes it unlawful to take, possess or destroy birds in the Falconiformes (birds of prey, vultures, eagles, falcons) and Strigiformes (owls) families, which can include nest disturbance from construction and other activities.

4.4 STATE WATER RESOURCES CONTROL BOARD

The State Water Resources Control Board (SWRCB) administers the state CWA. Under Section 401 of the CWA, projects that apply for a USACE permit for discharge of dredge or fill material, and projects that qualify for a Nationwide Permit, must obtain water quality certification from the RWQCB that the project will uphold state water quality standards. The SWRCB also administers the National Pollutant Discharge Elimination System (NPDES) which includes the General Permit for Storm Water Discharges from Construction Activities.

4.5 CALIFORNIA NATIVE PLANT SOCIETY

The California Native Plant Society (CNPS) is a non-profit group dedicated to preserving the state's native flora. It has developed lists of plants of special concern in California (Skinner and Pavlik 1994). In the spring of 2011, CNPS officially changed the name "CNPS List" to "California Rare Plant Rank" (CRPR). The definitions of the ranks and the ranking system have not changed, and the ranks are still used to categorize the same degrees of concern, which are described as follows:

CRPR 1A: The plants with a California Rare Plant Rank of 1A are presumed extinct because they have not been seen or collected in the wild in California for many years. This rank includes plants that are both presumed extinct as well as those plants which are presumed extirpated in California. A plant is extinct if it no longer occurs anywhere. A plant that is extirpated from California has been eliminated from California, but may still occur elsewhere in its range. All of the plants constituting California Rare Plant Rank 1A meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. Should these taxa be rediscovered, it is mandatory that they be fully considered during preparation of environmental documents relating to the California Environmental Quality Act (CEQA).

CRPR 1B: Plants with a California Rare Plant Rank of 1B are rare throughout their range with the majority of them endemic to California. Most of the plants that are ranked 1B have declined significantly over the last century. California Rare Plant Rank 1B plants constitute the majority of taxa in the CNPS *Inventory*, with more than 1,000 plants assigned to this category of rarity. All of the plants constituting California Rare Plant Rank 1B meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. It is mandatory that they be fully considered during preparation of environmental documents relating to CEQA.

CRPR 2: Except for being common beyond the boundaries of California, plants with a California Rare Plant Rank of 2 would have been ranked 1B. From the federal perspective, plants common in other states or countries are not eligible for consideration under the provisions of the Endangered Species Act. Until 1979, a similar policy was followed in California. However, after the passage of the Native Plant Protection Act in 1979, plants were considered for protection without regard to their distribution outside the state. With California Rare Plant Rank 2, we recognize the importance of protecting the geographic range of widespread species. In this way we protect the diversity of our own state's flora and help maintain evolutionary processes and genetic diversity within species. All of the plants constituting California Rare Plant Rank 2 meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. It is mandatory that they be fully considered during preparation of environmental documents relating to CEQA.

CRPR 3: The plants that comprise California Rare Plant Rank 3 are united by one common theme - we lack the necessary information to assign them to one of the other ranks or to reject them. Nearly all of the plants constituting California Rare Plant Rank 3 are taxonomically problematic. For each California Rare Plant Rank 3 plant we have provided the known information and indicated in the “Notes” section of the CNPS *Inventory* record where assistance is needed. Data regarding distribution, endangerment, ecology, and taxonomic validity are welcomed and can be submitted by emailing the Rare Plant Botanist at asims□cnps.org or (916) 324-3816. Some of the plants constituting California Rare Plant Rank 3 meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. We strongly recommend that California Rare Plant Rank 3 plants be evaluated for consideration during preparation of environmental documents relating to CEQA.

CRPR 4: The plants in this category are of limited distribution or infrequent throughout a broader area in California. While we cannot call these plants "rare" from a statewide perspective, they are uncommon enough that their status should be monitored regularly. Should the degree of endangerment or rarity of a California Rare Plant Rank 4 plant change, we will transfer it to a more appropriate rank. Very few of the plants constituting California Rare Plant Rank 4 meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and we strongly recommend that California Rare Plant Rank 4 plants be evaluated for consideration during preparation of environmental documents relating to CEQA.

5 LITERATURE REVIEW

The CDFW California Natural Diversity Data Base (CNDDB, February 2018) was queried for a list of all plant and animal species reported from the *Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker* USGS 7.5-minute quadrangles (nine quad search). The Electronic Inventory of Rare and Endangered Vascular

Plants of California (CNPS, February 2018) was queried for a list of all plant species reported from the *Santa Rosa*, *Healdsburg*, *Calistoga*, *Cotati*, *Sonoma*, *Mark West Springs*, *Glen Ellen, Kenwood, Sebastopol, Camp Meeker* USGS 7.5-minute quadrangles.

The following table (Table 1) is a list of special-status plant species that have the potential to occur only within the study area based on the general habitat type(s) that each species is known to occur in and not based on species known proximity to the site or an evaluation of habitat quality. A full list of special-status plant species compiled is provided in Appendix A.

Table 1. Special-Status Plant Species With The Potential To Occur In The Study Area.

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Rare Plant Rank	Habitats
Allium peninsulare var. franciscanum	Franciscan onion	None	None	G5T1	S1	1B.2	Cismontane woodland | Valley & foothill grassland
Alopecurus aequalis var. sonomensis	Sonoma alopecurus	Endangered	None	G5T1Q	S1	1B.1	Freshwater marsh | Marsh & swamp | Riparian scrub | Wetland
Amsinckia lunaris	bent-flowered fiddleneck	None	None	G2?	S2?	1B.2	Cismontane woodland | Valley & foothill grassland
Astragalus breweri	Brewer's milk-vetch	None	None	G3	S3	4.2	Chaparral | Cismontane woodland | Meadows and seeps | Valley & foothill grassland
Astragalus claranus	Clara Hunt's milk-vetch	Endangered	Threatened	G1	S1	1B.1	Chaparral | Cismontane woodland | Valley & foothill grassland
Balsamorhiza macrolepis	big-scale balsamroot	None	None	G2	S2	1B.2	Chaparral | Cismontane woodland | Ultramafic | Valley & foothill grassland
Blennosperma bakeri	Sonoma sunshine	Endangered	Endangered	G1	S1	1B.1	Valley & foothill grassland | Vernal pool | Wetland
Brodiaea leptandra	narrow-anthered brodiaea	None	None	G3?	S3?	1B.2	Broadleaved upland forest | Chaparral | Cismontane woodland | Lower montane coniferous forest | Valley & foothill grassland
Calamagrostis ophitidis	serpentine reed grass	None	None	G3	S3.3	4.3	Chaparral | Lower montane coniferous forest | Meadows and seeps | Valley and Foothill grassland
Castilleja ambigua var. ambigua	johnny-nip	None	None	G4T3T4	S3	4.2	Coastal bluff scrub | Coastal prairie | Coastal scrub | Marshes and swamps | Valley and foothill grassland | Vernal pools margins
Centromadia parryi ssp. parryi	pappose tarplant	None	None	G3T1	S1	1B.2	Coastal prairie | Marsh & swamp | Meadow & seep | Valley & foothill grassland
Downingia pusilla	dwarf downingia	None	None	G1	S2	2B.2	Valley & foothill grassland | Vernal pool | Wetland
Fritillaria liliacea	fragrant fritillary	None	None	G2	S2	1B.2	Coastal prairie | Coastal scrub | Ultramafic | Valley & foothill grassland
Gilia capitata spp. tomentosa	wolly-headed gilia	None	None	G5T2T3	S2	1B.1	Serpentinite, rocky outcrops | Coastal bluff scrub | Valley and foothill grassland
Hemizonia congesta ssp. congesta	congested-headed hayfield tarplant	None	None	G5T2T3	S2S3	1B.2	Coastal scrub | Valley & foothill grassland

Scientific Name	**Common Name**	**Federal List**	**California List**	**Global Rank**	**State Rank**	**Rare Plant Rank**	**Habitats**
Hesperevax caulescens	hogwallow starfish	None	None	G3	S3	4.2	Valley and foohill grassland | Vernal pools
Hosackia gracilis	harlequin lotus	None	None	G4	S3	4.2	Broadleafed upland forest | Coastal bluff scrub | Closed-cone coniferous forest | Cismontane woodland | Coastal prairie | Coastal scrub | Meadows and seeps | Marshes and swamps | North Coast coniferous forest | Valley and foothill grassland
Lasthenia conjugens	Contra Costa goldfields	Endangered	None	G1	S1	1B.1	Cismontane woodland | Playas | Valley and foothill grassland | Vernal pools
Layia serpentrional is	Colusa layia	None	None	G2	S2	1B.2	Chaparral | Cismontane woodland | Valley and foothill grassland
Leptosiphon acicularis	bristly leptosiphon	None	None	G3	S3.2?	4.2	Chaparral | Cismontane woodland | Coastal prairie | Valley and foothill grassland
Leptosiphon jepsonii	Jepson's leptosiphon	None	None	G2	S2	1B.2	Chaparral | Cismontane woodland | Ultramafic
Lessingia arachnoidea	Crystal Springs lessingia	None	None	G1	S1	1B.2	Cismontane woodland | Coastal scrub | Ultramafic | Valley & foothill grassland
Lessingia holoeuca	wolly-headed lessingia	None	None	G3	S3.2?	3	Broadleafed upland forest | Coastal scrub | Lower montane coniferous forest | Valley and foothill grassland
Limnanthes vinculans	Sebastopol meadowfoam	Endangered	Endangered	G1	S1	1B.1	Meadow & seep | Valley & foothill grassland | Vernal pool | Wetland
Micropus amphibolus	Mt. Diablo cottonweed	None	None	G3	S3.2?	3.2	rocky | Broadleafed uppload forest | Chaparral | Cismontane woodland | Valley and foothill grassland
Microseris paludosa	marsh microseris	None	None	G2	S2.2	1B.2	Cismontane woodland | Closed-cone coniferous forest | Coastal scrub | Valley & foothill grassland
Navarretia cotulofilia	cotula navarretia	None	None	G3	S3.2	4.2	Chaparral | Cismontane woodland | Valley and foothill grassland
Navarretia heterandra	Tehama navarretia	None	None	G3	S3.3	4.3	Valley and foothill grassland | Vernal pools
Navarretia leucocephala ssp. bakeri	Baker's navarretia	None	None	G4T2	S2	1B.1	Cismontane woodland | Lower montane coniferous forest | Meadow & seep | Valley & foothill grassland | Vernal pool | Wetland
Perideridia gairdneri spp. gairdneri	Gairdner's yampah	None	None	G5T4	S4	4.2	Broadleafed upalnd forest | Chaparral | Coastal prairie | Valley and foothill grassland | Vernal pools
Plagiobothry s strictus	Calistoga popcorn flower	Endangered	Threatened	G1	S1	1B.1	Meadows and seeps | Valley and foothill grassland | Vernal pools
Poa napensis	Napa blue grass	Endangered	Endangered	G1	S1	1B.1	Meadows and seeps | Valley and foothill grassland
Ranunculus lobbii	Lobb's aquatic buttercup	None	None	G4	S3.2	4.2	Cismontane woodland | North Coast coniferous forest | Valley and foothill grassland | Vernal pools

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Rare Plant Rank	Habitats
Trifolium amoenum	showy rancheria (two-fork) clover	Endangered	None	G1	S1	1B.1	Coastal bluff scrub | Ultramafic | Valley & foothill grassland
Trifolium hydrophilum	saline clover	None	None	G2	S2	1B.2	Marsh & swamp | Valley & foothill grassland | Vernal pool | Wetland
Triquetrella californica	coastal triquetrella	None	None	G1	S1	1B.2	Coastal bluff scrub | Coastal scrub | Valley & foothill grassland

The following table (Table 2) is a list of special-status animal species that have the potential to occur in habitats within or adjacent to the study based on the general habitat type(s) that each species is known to occur in and not based on species known proximity to the site or an evaluation of habitat quality. A full list of special-animal species is provided in Appendix B.

Table 2. Special-Status Animal Species With The Potential To Occur In Or Adjacent To The Study Area.

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Habitats
Ambystoma californiense	California tiger salamander	Endangered	Threatened	G2G3	S2S3	Cismontane woodland | Meadow & seep | Riparian woodland | Valley & foothill grassland | Vernal pool | Wetland
Antrozous pallidus	pallid bat	None	None	G5	S3	Chaparral | Coastal scrub | Desert wash | Great Basin grassland | Great Basin scrub | Mojavean desert scrub | Riparian woodland | Sonoran desert scrub | Upper montane coniferous forest | Valley & foothill grassland
Athene cunicularia	burrowing owl	None	None	G4	S3	Coastal prairie | Coastal scrub | Great Basin grassland | Great Basin scrub | Mojavean desert scrub | Sonoran desert scrub | Valley & foothill grassland
Corynorhinus townsendii	Townsend's big-eared bat	None	Candidate Threatened	G3G4	S2S3	Broadleafed upland forest | Chaparral | Chenopod scrub | Great Basin grassland | Great Basin scrub | Joshua tree woodland | Lower montane coniferous forest | Meadow & seep | Mojavean desert scrub | Riparian forest | Riparian woodland | Sonoran desert scrub | Sonoran thorn woodland | Upper montane coniferous forest | Valley & foothill grassland
Elanus leucurus	white-tailed kite	None	None	G5	S3	Cismontane woodland | Marsh & swamp | Riparian woodland | Valley & foothill grassland | Wetland
Emys marmorata	western pond turtle	None	None	G3G4	S3	Aquatic | Artificial flowing waters | Klamath/North coast flowing waters | Klamath/North coast standing waters | Marsh & swamp | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters | South coast flowing waters | South coast standing waters | Wetland
Lasiurus cinereus	hoary bat	None	None	G5	S4?	Broadleafed upland forest | Cismontane woodland | Lower montane coniferous forest | North coast coniferous forest

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Habitats
Myotis thysanodes	fringed myotis	None	None	G4	S4	Pinyon-juniper | Valley and foothill grasslands | Hardwood and hardwood-conifer | Caves, mines, buildings or crevices
Rana boylii	foothill yellow-legged frog	None	None	G3	S2S3	Aquatic | Chaparral | Cismontane woodland | Coastal scrub | Klamath/North coast flowing waters | Lower montane coniferous forest | Meadow & seep | Riparian forest | Riparian woodland | Sacramento/San Joaquin flowing waters
Rana draytonii	California red-legged frog	Threatened	None	G2G3	S2S3	Aquatic | Artificial flowing waters | Artificial standing waters | Freshwater marsh | Marsh & swamp | Riparian forest | Riparian scrub | Riparian woodland | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters | South coast flowing waters | South coast standing waters | Wetland
Riparia riparia	bank swallow	None	Threatened	G5	S2S3	Riparian scrub | Riparian woodland
Syncaris pacifica	California freshwater shrimp	Endangered	Endangered	G1	S1	Aquatic | Sacramento/San Joaquin flowing waters
Taxidea taxus	American badger	None	None	G5	S4	Many habitat types listed in CNDDB – only including region habitat types. Broadleaved upland forest | Chaparral | Cismontane woodland | Closed-cone coniferous forest | Freshwater marsh | Lower montane coniferous forest | Marsh & swamp | Meadow & seep | North coast coniferous forest | Riparian forest | Riparian scrub | Riparian woodland | Ultramafic | Upper montane coniferous forest | Valley & foothill grassland

6 STUDY METHODS

6.1 SPECIAL-STATUS PLANT SPECIES HABITAT ASSESSMENT AND SURVEYS

Darren Wiemeyer performed site visits on January 23 and April 12, 2017 to map habitat types, perform special-status plant species surveys and compile a plant and animal species list. Mr. Wiemeyer also performed a special-status plant species survey on July 1, 2012. In addition, past botanical surveys were performed by SCS Engineers in 2008, 2009 and 2010 (SCS Engineers, 2010a; SCS Engineers, 2010b; SCS Engineers, 2011).

Habitats were evaluated for their suitability to provide habitat for special-status plant species based on current conditions and past activities. A plant inventory list is included as Appendix C.

6.2 SPECIAL-STATUS ANIMAL SPECIES HABITAT ASSESSMENT AND WILDLIFE INVENTORY

Darren Wiemeyer performed site visits on January 23 and April 12, 2017 to map habitat types, perform special-status animal species habitat assessment, perform special-status plant species surveys and compile a plant and animal species list. The special-status animal species habitat assessment consisted of evaluating habitats for habitat suitability for special-status animal species that have the potential to utilize habitats at the site and in the vicinity of the site.

The determination of presence for special-status animal species possibly occurring at the site was based on habitat assessments, literature review and queries through CNDDB. Protocol level surveys for potentially occurring special-status animal species were not conducted for all species. All wildlife species observed in the field were noted.

6.2.1 Birds

The site was searched for the presence of burrows which could be used by burrowing owl (*Athena cunicularia*) and habitats were evaluated for the suitability for all special-status bird species identified in Table 2.

Trees were surveyed for the presence of rookeries, nests or cavities that could be used by special-status birds, including birds of prey. The nesting bird survey consisted of surveying the site for any bird nests or cavities with an emphasis on searching for raptor (birds of prey) nests, and to determine if birds are actively nesting or displaying nesting behavior. Many viewing vantage points were utilized to ensure complete survey coverage of the entire site. All trees and shrubs were inspected for the occurrence of nesting birds, including cavity nesting birds.

Binoculars were used to search in trees and other suitable nesting structures. If a bird was seen, its behavior was observed to determine if it was actively nesting in the area. Common nesting behavior by birds include collecting nesting materials, bringing food items to a nest and vocalizations to attract a mate and to establish or defend a nesting territory.

6.2.2 Mammals

There site was searched for the presence of large burrows which could be used by American badger (*Taxidea taxus*).

6.2.2.1 Bats

A bat habitat assessment was performed at the site. The habitats, primarily in the form of trees, were assessed to determine if suitable special-status bat nesting or roosting structures were exhibited in the trees. Suitable roosting and nesting structures are typically tree cavities, fissures and exfoliating bark.

6.2.3 Amphibians and Reptiles

The seasonal drainage and associated riparian scrub habitat was for habitat suitability for special-status amphibians, including California tiger salamander (*Ambystoma californiense*), foothill yellow-legged frog (*Rana boylii*), California red-legged frog (*Rana draytonii*) and western pond turtle (*Emys marmorata*).

6.2.4 Fish

The unnamed seasonal drainage does not support fish species so no further assessment was performed for special-status fish species such as steelhead (*Oncorhynchus mykiss irideus*) and coho salmon (*Oncorhynchus kisutch*).

6.2.5 Invertebrates

The unnamed seasonal drainage was assessed for its habitat suitability for California freshwater shrimp (*Syncaris pacifica*).

7 RESULTS AND DISCUSSION

7.1 PLANT COMMUNITIES & HABITATS

Habitat types at the site consist of non-native annual grassland, ruderal (disturbed) habitat and landscaped areas around the residences and structures and a small seasonal drainage with minimal riparian scrub habitat (Figure 4). There are several areas around the residences with planted coast redwood trees, walnut trees and a large blue gum tree (Figure 4).

7.1.1 Non-Native Annual Grassland

Non-native annual grassland is the dominant habitat within the study area (Figure 4). Dominant plant species consist of slender oats (*Avena barbarata*), perennial ryegrass (*Festuca perennis*), rip gut brome (*Bromus diandrus*), soft chess (*Bromus mollis*) field mustard (*Brassica rapa*), wild radish (*Raphanus sativa*), cutleaf geranium (*Geranium dissectum*) and spring vetch (*Vicia sativa*). The site is annually disked and mowed which has resulted in a dominance of non-native grasses and forbs.

7.1.2 Seasonal Drainage

An unnamed seasonal drainage occurs at the southeast corner of the site (Figure 4). The seasonal drainage originated from a culvert under Petaluma Hill Road and flows in a southerly direction.

The seasonal drainage channel ranges from 3 to 6 feet in width and 5 to 7 feet in depth. The bankfull channel ranges from 10-16 feet in width. The drainage does not exhibit undercut banks or exposed roots and the channel bottom consists of soil with vegetation with small areas of gravel.

This seasonal drainage was mapped by SCS Engineers (SCS Engineers; 2009). This seasonal drainage was confirmed by USACE staff and is considered Waters of the United States and Waters of the State. All areas below the ordinary High Water mark (OHW) on the bank fall within USACE jurisdiction and the full stream channel falls within SWRCB jurisdiction. A copy of the USACE jurisdictional confirmation letter and map is included as Appendix E.

7.1.3 Riparian Scrub

Riparian scrub habitat occurs only at the far eastern end of the seasonal drainage (Figure 4). Dominant species consist of black walnut (*Juglans nigra*), arroyo willow (*Salix lasiolepis*) and Himalaya blackberry (*Rubus armeniacus*). Riparian scrub habitat is a sensitive habitat type that falls within the jurisdiction of the CDFW.

7.2 SPECIAL-STATUS PLANTS

No special-status plant species were observed during the special-status plant species surveys. The past botanical surveys in 2008 2009 and 2010 conducted by SCS Engineers also did not observe any special-status plant species (SCS Engineers, 2010a; SCS Engineers, 2010b; SCS Engineers, 2011).

The non-native annual grassland habitat provides very limited habitat suitability for special-status plant species listed in Table 1 as it is dominated by non-native grasses that typical out compete native species. Furthermore, lack of serpentine soils and the lack of dominance of native grasses and forbs at the site further limits the habitat suitability and likelihood that special-status plant species occur at the site.

The seasonal drainage and associated riparian scrub habitat provides limited habitat suitability for special-status plant species. The dominance of Himalaya blackberry and other non-native species within the seasonal drainage limits the habitat suitability for special-status plant species. It is highly unlikely that special-status plant species occur in the seasonal drainage or in the riparian scrub habitat at the site.

Based on this evaluation of habitat suitability and the locations of proposed site developments within compacted gravel, landscaped or ruderal (disturbed) areas on the western portion of the site, it has been determined that there will be no impact to special-status plant species as a result of the proposed project.

7.3 WILDLIFE

The habitats at the site provides limited habitat for wildlife species. Although the site is connected to larger undeveloped areas that provide good habitat for wildlife, surrounding developments has limited the suitability of the site to support a diverse assemblage of wildlife species. The site would not be considered a significant wildlife corridor as the site is located at the far northwest corner of primarily undeveloped agricultural lands. However, it is likely that mule deer and other small to medium sized mammals utilize the site.

There were limited observations of pocket gophers and other small burrowing mammals and there were no large burrows that could be used by American badger or burrowing owl. Small to medium mammals such as striped skunk, raccoon, black-tailed jack rabbit, opossum, and to a lesser extent, gray fox and coyote, most likely utilize habitats at the site for foraging and cover.

A variety of native birds may nest and forage at the site. No nests were observed at the site, but the trees at the site provide suitable nesting habitat for birds, and to a lesser extent, raptors. The seasonal drainage and riparian scrub habitat does not provide suitable habitat for fish and only limited habitat value for amphibians such as Pacific chorus frog.

Wildlife species that were observed either through direct observation, heard, tracks observed, scat observed, or other indication during the site survey include mule deer, pocket gopher, fence lizard, turkey vulture, scrub jay, house finch, American goldfinch and black phoebe.

7.4 SPECIAL-STATUS ANIMAL SPECIES

7.4.1 Birds

7.4.1.1 Burrowing Owl

Conservation Status: CDFW - Species of Special Concern

Burrowing owl (*Athene cunicularia*) occurs in open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. Burrowing owl is a subterranean nester which is dependent upon burrowing mammals, most notably, the California ground squirrel. The site provides very limited, but suitable habitat for this species. No medium or large burrows were observed at the site, which significantly limits the suitability of the site for nesting. Surrounding developments also limits the suitability of the site for nesting and foraging habitat.

There is one CNDDB occurrence of this species 5 miles to the south of the site (Figure 5). The proposed project will avoid impacts to the non-native annual grassland at the site. Therefore, the proposed project will not impact potentially suitable habitat for this species. Based on this evaluation, it has been determined that there will be no significant impact to this species as a result of the proposed project.

7.4.1.2 White-tailed Kite

Conservation Status: CDFW - Fully Protected

White-tailed kite (*Elanus leucurus*) is generally found in rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodlands. They typically nest in oak trees with dense tops. The non-native annual grassland provides suitable foraging habitat for this species and the blue gum tree provides potentially suitable nesting habitat. No white-tailed kites or active nests were observed at the site.

There are no CNDDB occurrences of this species within 5-miles of the site (Figure 5). It is somewhat likely that species utilizes habitats at the site for foraging habitat but unlikely that it would nest at the site as they prefer oak trees for nesting. The proposed project will avoid impacts to the non-native annual grassland at the site but will require the removal of suitable nesting trees. Therefore, the project will not impact potentially suitable foraging habitat for this species but will impact potentially suitable nesting habitat.

7.4.1.3 Bank Swallow

Conservation Status: State - Threatened

Bank swallow (*Riparia riparia*) is a colonial nester that nests primarily in riparian and other lowland habitats. They require vertical banks and cliffs with fine textured/sandy soils near streams, rivers, lakes and ocean to dig nesting holes. The seasonal drainage and riparian scrub habitat at the site does not provide suitable habitat for this species as it lacks vertical banks and cliffs.

There are no CNDDB occurrences of this species within 5-miles of the site (Figure 5). It is highly unlikely that species utilizes habitats at the site. The proposed project will avoid impacts to potentially suitable habitat for this species. Therefore, it has been determined that there will be no significant impact to this species as a result of the proposed project.

7.4.2 Mammals

7.4.2.1 American Badger

Conservation Status: CDFW - Species of Special Concern

American badger (*Taxidea taxus*) generally occur in open pasture and grassland habitats and are most abundant in drier open stages of most shrub, forest and herbaceous habitats with friable soils on uncultivated ground. They dig their own burrows and prey primarily on burrowing rodents. The non-native annual grassland at the site provides very limited, but potentially suitable habitat for this species. However, there were no large burrows observed at the site which would greatly limit the likelihood that this species occurs at the site.

There are no CNDDB occurrences of this species within 5-miles of the site (Figure 5). The proposed project will avoid impacts to the non-native annual grassland at the site. Therefore, it has been determined that there will be no significant impact to this species as a result of the proposed project.

7.4.2.2 Special-Status Bat Species

All special-status bat species, including several bat species which do not have special status, but have potential to occur in habitats at the site, have been included in this evaluation of habitat suitability and discussion of potential impacts. All bat species have state protection during nesting and roosting seasons. The following bat species are included in this habitat assessment:

Pallid Bat (*Antrozous pallidus*) - Conservation Status: CDFW – Species of Special Concern

Townsend's Big-Eared Bat (*Corynorhinus townsendii*) - Conservation Status: State - Candidate Threatened; CDFW - Species of Special Concern

Hoary Bat (*Lasiurus cinereus*)

Fringed Myotis (*Myotis thysanodes*)

Bats are known to utilize a vast variety of habitat types for foraging and several types of structures for nesting and roosting including trees, cliffs, rock outcrops, buildings, bridges, caves and mines. The habitats at the site provides very limited foraging habitat for bats. The larger trees at the site provides suitable habitat for roosting as they exhibit cavities, fissures or exfoliating bark. The large blue gum tree provides the best roosting habitat for bat species. There was no indication that bats were utilizing any of the structures at the site.

There are no CNDDB occurrences of these bat species within 5-miles of the site (Figure 5). However, the loss of trees at the site, primarily the large blue gum tree, has the potential to impact roosting bats.

7.4.3 Amphibians and Reptiles

7.4.3.1 California Tiger Salamander

Conservation Status: Federal – Endangered; CDFW – Threatened

California tiger salamander (*Ambystoma californiense*) occurs in pasture land and vernal pool habitat in the Santa Rosa Plain. The site is within the potential range of the California tiger salamander (*Ambystoma californiense*) (CTS) as mapped by the United States Fish and Wildlife Service (USFWS) according to the Santa Rosa Plain Conservation Strategy (SRPCS) (SRPCST, 2005) and Enclosure 1 of the Programmatic Biological Opinion for U.S. Army Corps of Engineers Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California, dated November 9, 2007 (USFWS, 2007). The site is mapped as "May adversely affect listed plants and/or CTS". The site is also mapped within Critical Habitat for California tiger salamander.

A Site Assessment for California Tiger Salamander, prepared by Fawcett Environmental Consulting dated March 30, 2012 (Fawcett Environmental Consulting, 2012) is included as

Appendix D. This report contains a specific assessment and site evaluation for California tiger salamander.

There are numerous records of breeding or of individual CTS sightings west of Highway 101 within 3.1 miles of the project area (Figure 5). However, all the sites west of the 101 freeway and Santa Rosa Avenue are irrelevant to this site assessment, because the freeway and Santa Rosa Avenue are considered to be significant barriers to CTS migration (Fawcett, 2012).

The only known CTS locations within 3.1 miles of the project on the east side of the freeway are at the Horn Bank, which is located approximately 1.8 miles south of the project site (Figure 5). The project site is further isolated from the Horn Bank and all other lands potentially occupied by CTS south of the project site and neighboring property by the presence of the dense residential subdivision extending west from Old Petaluma Hill Road, south of the neighboring property (Fawcett, 2012).

The property is surrounded by urban development to the north, west, and south, i.e., south of the adjacent undeveloped parcel. To the east, beyond Petaluma Hill Road, lie pasture land and a dairy farm, all slated for future development, and outside the potential geographic range of CTS. In response to Comment 5 in the Final Rule designating critical habitat (USFWS 2011), the Service stated that certain “small isolated parcels within a matrix of urban development” were excluded from critical habitat because they were not considered “essential for the conservation of the Sonoma California tiger salamander because these areas would not likely contribute to the survival or recovery of the species”.

Since Petaluma Hill Road is considered to be the eastern boundary of the potential geographic range of Sonoma CTS in the project area, it seems that the project site as well as the neighboring property to the south should have been excluded from critical habitat by the same reasoning, since the properties are surrounded by urban development on three sides, and by the geographic range limit on the fourth side (Fawcett, 2012). Given the project site’s isolation and distance from the nearest known CTS location (1.8 miles), the property at 800 Yolanda Avenue is highly unlikely to be occupied by CTS at the present time and is unlikely to contribute to the survival or recovery of the species (Fawcett, 2012).

The non-native annual grassland habitat at the site provides potentially suitable aestivation habitat for this species. However, the proposed project will only impact compacted gravel (hardscape) and ruderal (disturbed) habitats and landscaped areas surrounding the residences. The proposed project will avoid impacts to potentially suitable aestivation habitat, which is the non-native annual grassland at the site (Figure 4).

Therefore, the proposed project will not impact potentially suitable habitat for this species. Based on this evaluation, it has been determined that there will be no impact to this species as a result of the proposed project.

7.4.3.2 Western Pond Turtle

Conservation Status: CDFW - Species of Special Concern

Western pond turtle *(Emys marmorata*) occurs in reservoirs, ponds, vernal pools, brackish estuaries, sloughs, drainage ditches, and perennial streams. They require basking sites and suitable upland habitat adjacent to aquatic habitats for egg-laying. Basking sites are typically logs, small islands and docks. The upland areas typically used by this species include sandy banks or grassy open fields.

The seasonal drainage at the site provides very limited habitat suitability for this species as it lacks perennial water and basking sites. There are several CNDDB occurrences of this species within 5-miles of the site (Figure 5). The proposed project will avoid impacts the non-native annual grassland, the seasonal drainage and its riparian scrub habitat. Therefore, it has been determined that there will be no impact to this species as a result of the proposed project.

7.4.3.3 Foothill Yellow-Legged Frog

Conservation Status: CDFW - Species of Special Concern

Foothill yellow-legged frog (*Rana boylii*) occurs in shallow streams with a rocky substrate. They need at least some cobble-sized substrate for egg-laying. The seasonal drainage and its riparian scrub habitat does not provide suitable habitat for this species as it does not contain riffles, cobble-sized substrate, undercut banks or exposed roots. There is one CNDDB occurrence of this species approximately 4.8 miles south of the site (Figure 5).

It is highly unlikely that this species occurs in the seasonal drainage at the site. The proposed project will avoid impacts to the non-native annual grassland, the seasonal drainage and its riparian scrub habitat. Therefore, it has been determined that there will be no significant impact to this species as a result of the proposed project.

7.4.3.4 California Red-Legged Frog

Conservation Status: Federal – Threatened; CDFW - Species of Special Concern

California red-legged frog occur in low-gradient stream reaches, ponds, reservoirs, vernal pools, and brackish lagoons. Breeding occurs from November through April, and eggs are laid in standing or slow-moving shallow water in floating masses attached to vegetation. The larvae require 3.5 to 7 months to reach metamorphosis, which usually occurs between July and September (Jennings and Hayes 1994). Adults prefer deep (>2ft. depth), standing or slow-moving water with dense, shrubby riparian vegetation, especially Arroyo willow (*Salix lasiolepis*) or dense emergent vegetation such as bulrush (*Scirpus* spp.) and cattail (*Typha sp*.). Both adults and juveniles routinely leave the water to forage in riparian areas, and some are known to move long distances (up to 2 miles) overland during the rainy season, and can be found within streams up to 2 miles from breeding sites (USFWS 2000).

The primary constituent elements for California red-legged frogs are aquatic and upland areas where suitable breeding and non-breeding habitat is interspersed throughout the landscape and is interconnected by un-fragmented dispersal habitat. Specifically, to be considered to have the primary constituent elements an area must include two (or more) suitable breeding locations, a permanent water source, associated uplands surrounding these water bodies up to 91 meters (300 feet) from the water's edge, all within 2 kilometers (1.25 miles) of one another and connected by barrier-free dispersal habitat that is at least 91 meters (300 feet) in width. When these elements are all present, all other essential aquatic habitat within 2 kilometers (1.25 miles), and free of dispersal barriers, will be afforded some protection under section 7(a)(2) of the Endangered Species Act.

The site is located within the potential range, but is not within any listed critical habitat areas for California red-legged frog. The nearest CNDDB occurrence is approximately 1.2 miles to the southeast of the site in Taylor Mountain Regional Park (Figure 5).

The seasonal drainage and its riparian scrub habitat does not provide suitable breeding habitat, but provides limited, yet suitable foraging and refuge habitat for this species. The non-native annual grassland habitat provides potentially suitable dispersal habitat for this species but its suitability is greatly diminished as the site does not connect riparian or aquatic habitats. The proposed project will only impact compacted gravel (hardscape) and ruderal (disturbed) habitats and landscaped areas surrounding the residences. The proposed project will not impact the non-native annual grassland, the seasonal drainage or its riparian scrub habitat or any potentially suitable upland dispersal habitat for this species.

Based on this evaluation, it has been determined that there will be no impact to California red-legged frog as a result of the proposed project.

7.4.4 Invertebrates

7.4.4.1 California Freshwater Shrimp

Conservation Status: Federal - Endangered; State - Endangered

California freshwater shrimp (*Syncaris pacifica*) occurs in low elevation, low gradient streams where riparian cover is moderate to heavy in Marin, Napa and Sonoma counties. California freshwater shrimp are found in flowing fresh waters, where they live under ledges or cut banks, among root wads with filamentous roots, among overhanging vegetation trailing in the water, emergent vegetation, or among leaves and debris lying on the bottom of slow-moving pools (USFWS 1998). In seasonal streams, freshwater shrimp survive the dry season within perennial pools.

There are no CNDDB occurrences of this species within 5-miles of the site (Figure 5). The nearest known occurrence of California freshwater shrimp is in Sonoma Creek. The seasonal drainage and its riparian scrub habitat does not provide suitable habitat for this species as it lacks moderate to heavy riparian cover, undercut banks, root wads and perennial pools.

The proposed project will not impact non-native annual grassland, the seasonal drainage or its riparian scrub habitat. Therefore, it has been determined that there will be no impact to this species as a result of the proposed project.

8 DISCUSSION OF POTENTIAL IMPACTS

8.1 SIGNIFICANCE CRITERIA

The determination of significance of impacts to biological resources involves an evaluation of the context in which the impact may occur and the intensity and extent of the impact's effect. The significance of potential impacts is assessed at a site-specific scale and in the larger regional context. The project's effect on biological resources would be considered significant if the project results in:

- Alteration of unique characteristics of the area, such as sensitive plant communities and habitats (i.e. serpentine habitats, wetlands, riparian habitats).
- Adverse impacts to special-status species
- Adverse impacts to important or vulnerable resources as determined by scientific opinion or resource agency concerns (i.e. special status habitats; e.g. wetlands).
- Interference with migratory routes.

8.2 POTENTIAL IMPACTS

The proposed project will only impact compacted gravel (hardscape) and ruderal (disturbed) habitats and landscaped areas surrounding the residences. The proposed project will avoid impacts the non-native annual grassland, the seasonal drainage and its riparian scrub habitat at the site (Figure 4). The proposed project will result in the loss of trees at the site. Tree removal and construction activities have the potential to impact native nesting birds if construction activities are initiated during bird nesting season (February 1 – August 31). Tree removal has the potential to impact roosting bat species if tree removal is proposed during active bat roosting time periods.

8.3 RECOMMENDED MITIGATION MEASURES

The following measures are proposed to avoid significant impacts to native nesting birds and roosting bats as a result of the development of the proposed project.

8.3.1.1 Nesting Birds

Tree removal and construction activities may disturb nesting birds if they initiate nesting in the trees proposed to be removed. Therefore, it is recommended that pre-construction surveys for nesting birds be performed if tree removal and construction activities are initiated during bird nesting season (February 1 – August 31).

A qualified biologist should perform a pre-construction survey for nesting birds within 14 days prior to ground breaking at the site if construction activities will take place between February 1 and August 31. If nesting birds are found, the qualified biologist should establish suitable buffers prior to ground breaking activities. To prevent encroachment, the established buffer(s) should be clearly marked by highly visibility material. The established buffer(s) should remain in effect until the young have fledged or the nest has been abandoned as confirmed by the qualified biologist. To more effectively identify active nests and to facilitate project scheduling, it is recommended that initial nesting surveys begin as early as February when the foliage on the trees are at a minimum and the nest building activity is high.

8.3.1.2 Roosting Bats

Tree removal has the potential to impact suitable bat roosting habitat. Therefore, it is recommended that the following measures be taken to avoid roosting bats.

A qualified biologist shall supervise any tree trimming or removal of suitable roosting trees. Tree removal should only be conducted during seasonal periods of bat activity (August 31 through October 15, when young would be self-sufficiently volant and prior to hibernation and March 1 to April 15 to avoid hibernating bats and prior to formation of maternity colonies).

Trees should be trimmed and/or removed in a two phased removal system conducted over two consecutive days. The first day (in the afternoon), limbs and branches would be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices or deep bark fissures would be avoided, and only branches or limbs without those features would be removed. On the second day, the entire tree would be removed.

9 REFERENCES

Best C., J. T. Howell, W. Knight, I. Knight, and M. Wells. 1996. A Flora of Sonoma County. California Native Plant Society, Sacramento. 347 pp.

California Department of Fish and Game (CDFG). 2000. Guidelines for assessing effects of proposed developments on rare and endangered plants and natural communities. CDFG, Sacramento.

California Natural Diversity Data Base (CNDDB). Quadrangle reports (February 2018) for *Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker* USGS 7.5-minute quadrangles.

California Native Plant Society (CNPS). January 2012. Inventory of Rare and Endangered Vascular Plants of California. California Native Plant Society Special Publication No. 1 (Sixth Edition, Electronic Version). Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society, Sacramento, CA.

CERES, 2009. Available from http://ceres.ca.gov/natural_resources/.

Ehrlich, P. R., Dobkin, D. S., Wheye D. 1988. The Birder’s Handbook – A Field Guide to the Natural History of North American Birds. Simon & Schuster, Inc. New York.

Fawcett Environmental Consulting. 2012. Site Assessment for California Tiger Salamander, dated March 30, 2012

Harrison, H. H. 1979. A Field Guide to Western Birds’ Nests. Houghton Mifflin Company, New York.

Hickman, J. C. (Ed.). 1993. The Jepson Manual of Higher Plants of California. University of California Press, Berkeley.

Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Non-game Heritage Program, California Department of Fish and Game, Sacramento.

Jennings, M.R. and M.P. Hayes 1994. Amphibian and reptile species of special concern in California. Final report. Prepared for the California Department of Fish and Game, Inland Fisheries Division. 255 p.

Natural Resources Conservation Service (NRCS). 1992. Hydric soils list: Santa Rosa CA Field Office. USDA-SCS, Davis, Calif.

Mayer, K. E., Laudenslayer, W. F. 1988. A Guide to Wildlife Habitats of California. State of California Resources Agency, Department of Fish and Game. Sacramento, CA. 166 pp.

Miller, V. C. 1972. Soil Survey of Sonoma County, California. U. S. Department of Agriculture, Soil Conservation Service, Santa Rosa. 188 pp.

Reed, P. B. 1988. National List of Plant Species That Occur in Wetlands: California (Region 0).

Santa Rosa Plain Conservation Strategy Team (SRPCST). 2005. Santa Rosa Plain Conservation Strategy (Final). December 1, 2005.

SCS Engineers, 2009. Jurisdictional Waters Delineation, dated July 17, 2009

SCS Engineers, 2010a. Biological Assessment, dated February 24, 2010

SCS Engineers, 2010b. Botanical Survey Report, dated February 24, 2010

SCS Engineers, 2011. Botanical Survey Letter, dated June 17, 2011

Tatarian, P. 2008. Movement Patterns of California Red-Legged Frog (*Rana Draytonii*) in an Inland California Environment. Herpetological Conservation and Biology 3(2):115-169

U.S. Fish and Wildlife Service (USFWS). 2002. Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*). U.S. Fish and Wildlife Service, Portland, Oregon. viii + 173 pp.

United States Fish and Wildlife Service, Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog, August 2005.

United States Fish and Wildlife Service (USFWS). 2007. Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California (Corps File Number 223420N).

USFWS 2011. Endangered and threatened wildlife and plants: Revised designation of critical habitat for the Sonoma county Distinct Population Segment of California tiger salamander. Final Rule. Federal Register 76(169): 54346-54372. U.S. Fish and Wildlife Service. 31 August 2011.

United States Fish and Wildlife Service (USFWS). 2017. Threatened and Endangered Species database System (TESS). Species Information – Threatened and Endangered Plants and Animals.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer and M. White. (Eds.) 1988. California's Wildlife Volume I Amphibians and Reptiles. State of California, The Resources Agency, Department of Fish and Game, Sacramento, CA. 272 pp.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer and M. White. (Eds.) 1990. California's Wildlife Volume II Birds. State of California, The Resources Agency, Department of Fish and Game, Sacramento, CA. 732 pp.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer and M. White. (Eds.) 1990. California's Wildlife Volume III Mammals. State of California, The Resources Agency, Department of Fish and Game, Sacramento, CA. 407 pp.

FIGURES

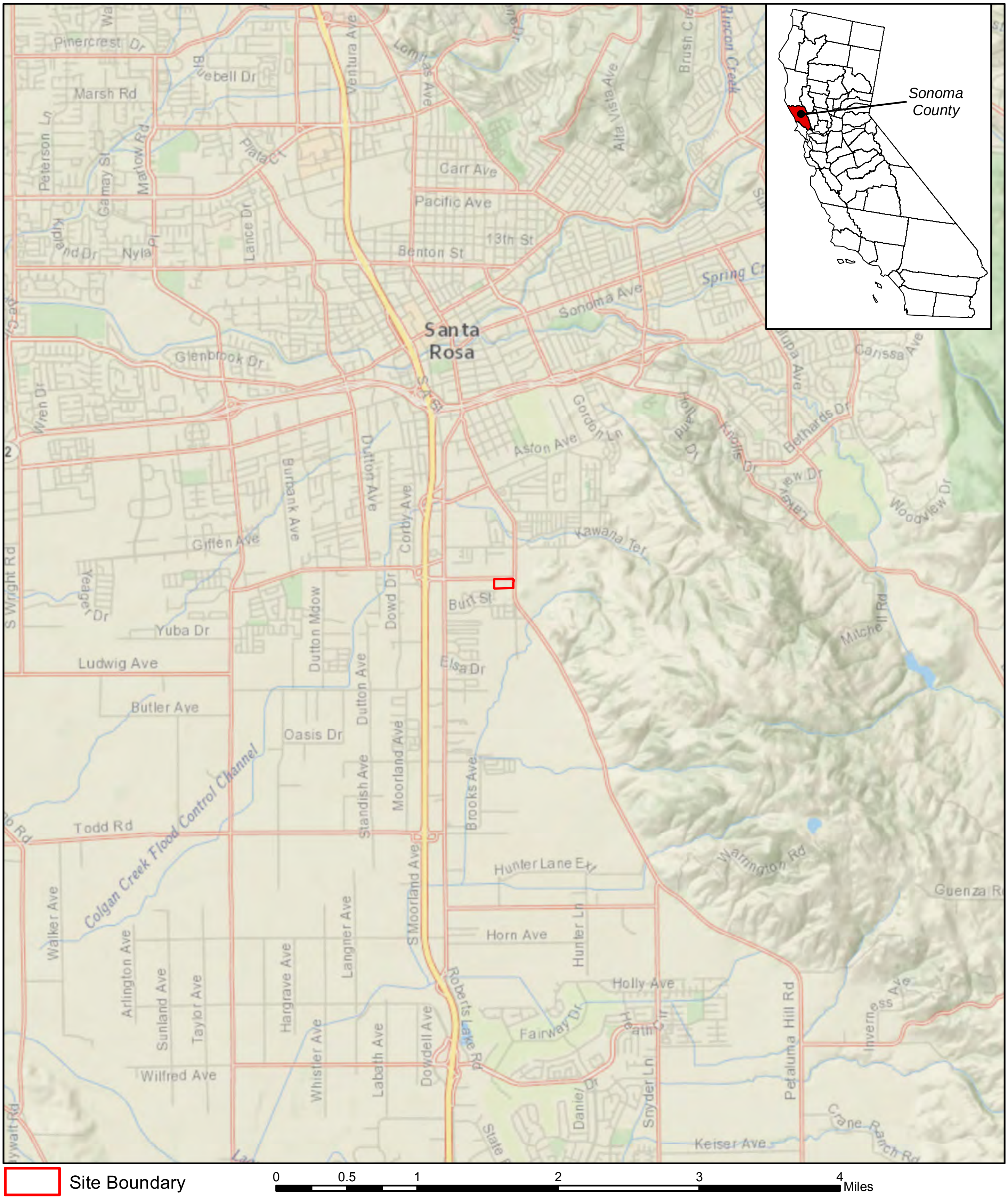


Figure 1 - Site Vicinity Map

Santa Rosa Farm Group
800 Yolanda Avenue - Santa Rosa, CA
APN: 044-091-063

Wiemeyer Ecological Sciences
4527 Montgomery Drive, Suite J
Santa Rosa, CA 95409

Parcel boundary provided by Sonoma County
Map date: 4/27/17

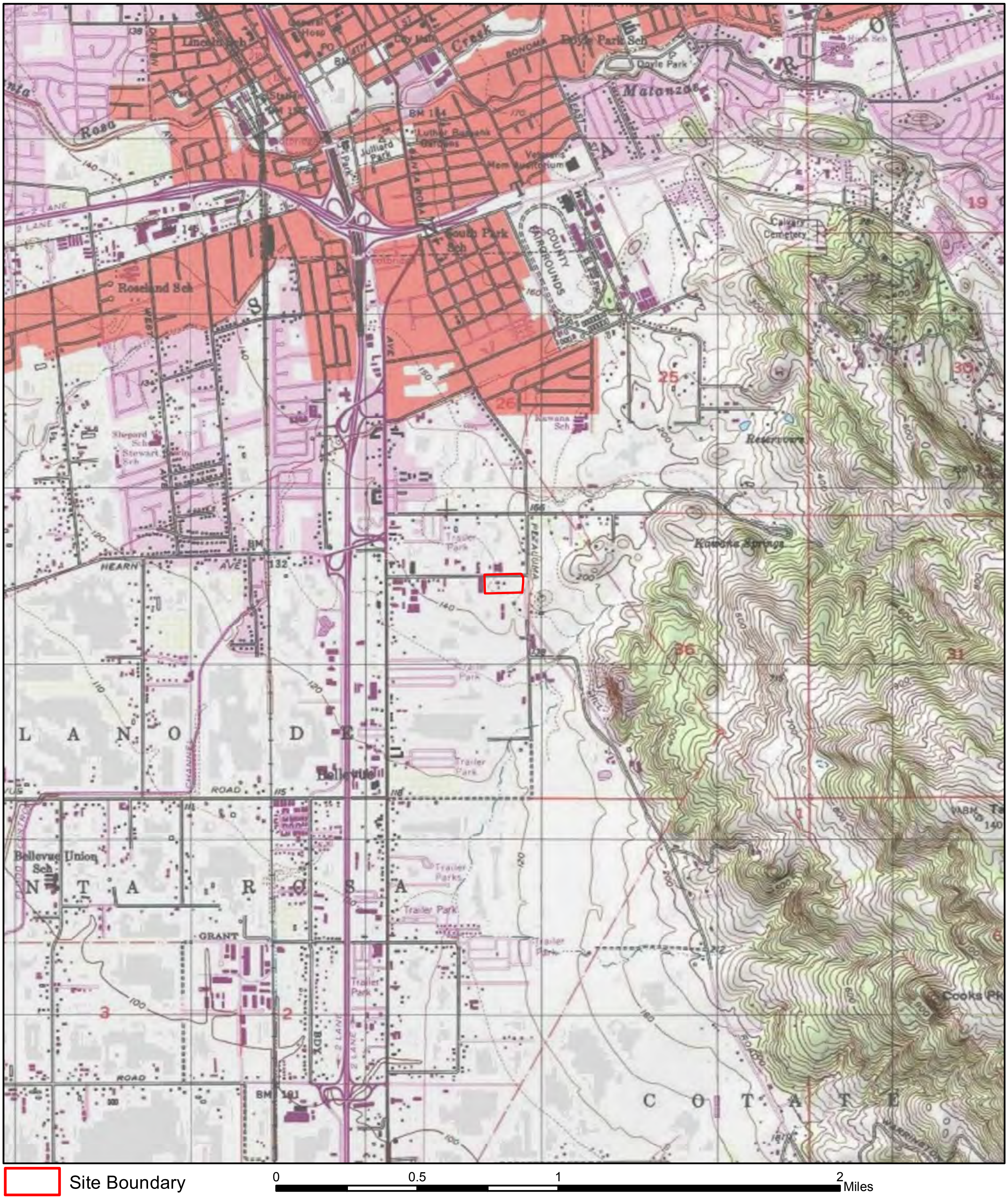


Figure 2 - USGS Map

Santa Rosa Farm Group
800 Yolanda Avenue - Santa Rosa, CA
APN: 044-091-063

N

Wiemeyer Ecological Sciences
4527 Montgomery Drive, Suite J
Santa Rosa, CA 95409

Parcel boundary provided by Sonoma County
Map date: 4/27/17

Site Boundary

CeA - Clear Lake clay, sandy substratum, drained, 0 to 2 percent slopes, MLRA 14

GoF - Goulding-Toomes complex, 9 to 50 percent slopes

0 50 100 200 300 400 Feet

Figure 3 - Soils Map	Wiemeyer Ecological Sciences 4527 Montgomery Drive, Suite J Santa Rosa, CA 95409	Parcel boundary provided by Sonoma County Soils provided by NRCS Map date: 4/2617
Santa Rosa Farm Group 800 Yolanda Avenue - Santa Rosa, CA APN: 044-091-063	N	

Figure 4 - Habitat Map
Santa Rosa Farm Group
800 Yolanda Avenue - Santa Rosa, CA
APN: 044-091-063

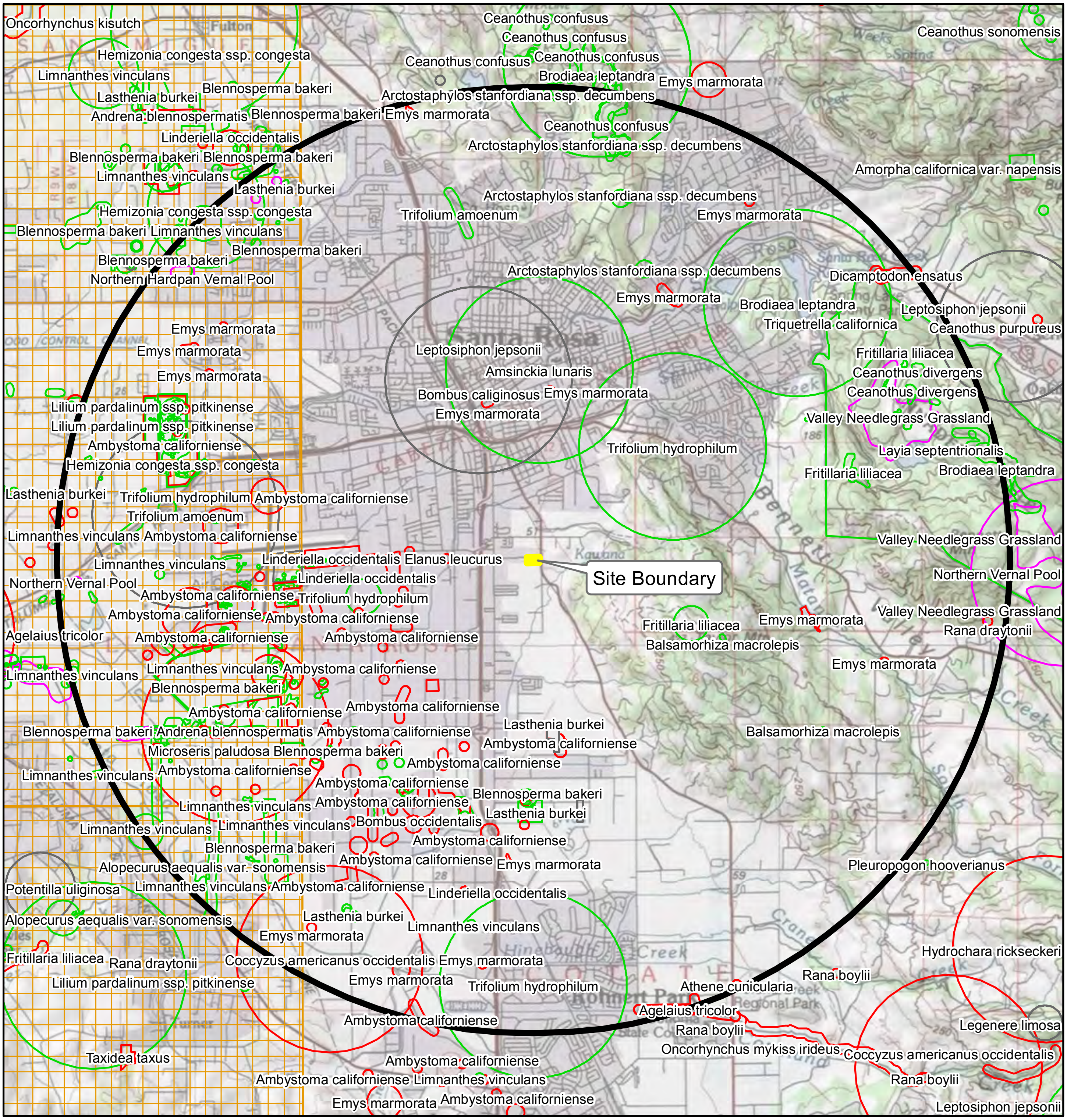
Wiemeyer Ecological Sciences
4527 Montgomery Drive, Suite J
Santa Rosa, CA 95409

Site Boundary
NAG - Native Annual Grassland
Seasonal drainage (centerline)

0 25 50 100 150 200 Feet

N

Parcel boundary provided by Sonoma County
Map date: 4/27/17
Aerial: Sonoma County Vegetation Mapping Program (2013)



Site Boundary | Plant | Terrestrial Comm. | Multiple
5 mile buffer | Animal | Aquatic Comm. | Sensitive EO's (Commercial only)

0 1 2 3 4 5 10 Miles

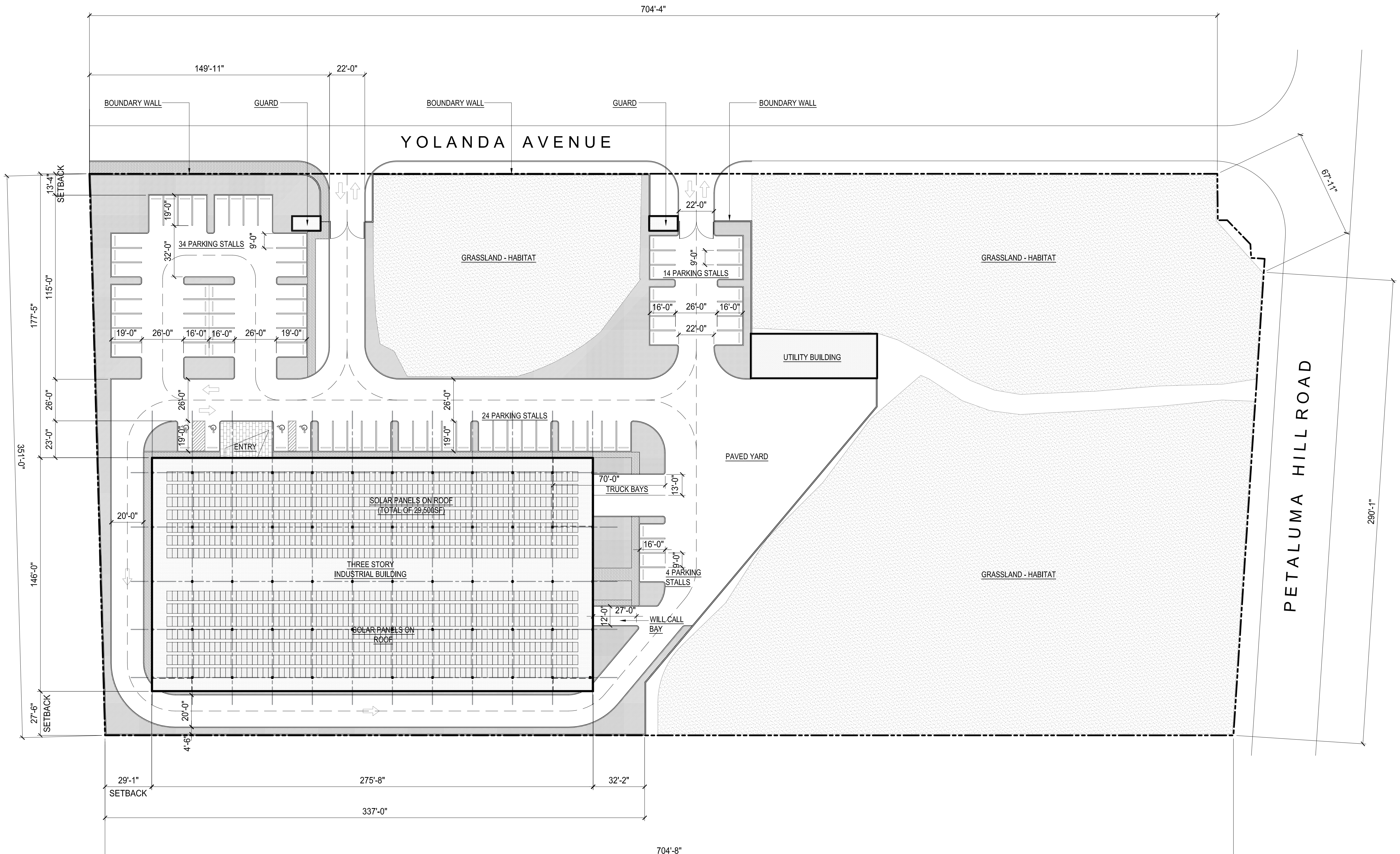
Figure 5 - CNDDB Occurrences

Santa Rosa Farm Group
800 Yolanda Avenue - Santa Rosa, CA
APN: 044-091-063

N

Wiemeyer Ecological Sciences
4527 Montgomery Drive, Suite J
Santa Rosa, CA 95409

Parcel boundary provided by Sonoma County
CNDDB provided by CDFW
Map date: 4/27/17



1 SITE PLAN
SCALE: 1/64" = 1'-0"

1 SITE PLAN
SCALE: 1/64" = 1'-0"

PARKING SUMMARY:

72	STANDARD PARKING STALL
4	ACCESSIBLE PARKING STALL
1	BICYCLE RACK

SANTA ROSA MM

800 YOLANDA AVENUE
SANTA ROSA, CA 95404

SAGA architecture
WWW.SAGARCHITECTURE.COM
233 CALIFORNIA ST.
EL SEGUNDO
CALIFORNIA 90245
310 322 0022

Consultant

Revisions

Seal/Signature

Project Number
1696

Date
APRIL 2017

Scale
1/64" = 1'-0"

Description
SITE PLAN

A-1: Northwest corner of site showing compacted gravel area.

A-2: Compacted gravel area and planted redwood trees.

A-3: Typical landscaping surrounding residences.

A-4: Non-native annual grassland habitat at site entrance.

A-5: Non-native annual grassland and large blue gum tree.

A-6: Seasonal drainage and riparian scrub habitat.

Santa Rosa Farm Group
800 Yolanda Avenue
Santa Rosa, CA
PHOTO PLATE A

WIEMEYER ECOLOGICAL SCIENCES
4527 MONTGOMERY DRIVE, SUITE J
SANTA ROSA, CA 95409
(707) 573-1770

APPENDIX A
SPECIAL STATUS PLANT SPECIES

APPENDIX A: CNDDB and CNPS 9-QUADRANGLE SEARCH LIST

Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker

CNDDB, CNPS - April, 2017

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Rare Plant Rank	Habitats
Allium peninsulare var. franciscanum	Franciscan onion	None	None	G5T1	S1	1B.2	Cismontane woodland | Valley & foothill grassland
Alopecurus aequalis var. sonomensis	Sonoma alopecurus	Endangered	None	G5T1Q	S1	1B.1	Freshwater marsh | Marsh & swamp | Riparian scrub | Wetland
Amorpha californica var. napensis	Napa false indigo	None	None	G4T2	S2	1B.2	Broadleaved upland forest | Chaparral | Cismontane woodland
Amsinckia lunaris	bent-flowered fiddleneck	None	None	G2?	S2?	1B.2	Cismontane woodland | Valley & foothill grassland
Anomobryum julaceum	slender silver moss	None	None	G4G5	S2	4.2	Broadleaved upland forest | Lower montane coniferous forest | North coast coniferous forest
Arctostaphylos canescens ssp. sonomensis	Sonoma canescent manzanita	None	None	G3G4T2	S2	1B.2	Chaparral | Lower montane coniferous forest | Ultramafic
Arctostaphylos densiflora	Vine Hill manzanita	None	Endangered	G1	S1	1B.1	Chaparral
Arctostaphylos stanfordiana ssp. decumbens	Rincon Ridge manzanita	None	None	G3T1	S1	1B.1	Chaparral
Astragalus breweri	Brewer's milk-vetch	None	None	G3	S3	4.2	Chaparral | Cismontane woodland | Meadows and seeps | Valley & foothill grassland
Astragalus claranus	Clara Hunt's milk-vetch	Endangered	Threatened	G1	S1	1B.1	Chaparral | Cismontane woodland | Valley & foothill grassland
Balsamorhiza macrolepis	big-scale balsamroot	None	None	G2	S2	1B.2	Chaparral | Cismontane woodland | Ultramafic | Valley & foothill grassland
Blennosperma bakeri	Sonoma sunshine	Endangered	Endangered	G1	S1	1B.1	Valley & foothill grassland | Vernal pool | Wetland

APPENDIX A: CNDDB and CNPS 9-QUADRANGLE SEARCH LIST

Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker

CNDDB, CNPS - April, 2017

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Rare Plant Rank	Habitats
Brodiaea leptandra	narrow-anthered brodiaea	None	None	G3?	S3?	1B.2	Broadleaved upland forest | Chaparral | Cismontane woodland | Lower montane coniferous forest | Valley & foothill grassland
Calamagrostis bolanderi	Bolander's reed grass	None	None	G4	S4	4.2	Bogs and fens | Broadleafed upland forest | Closed-cone coniferous forest | Coastal scrub | Meadows and seeps | Marshes and swamps | North Coast coniferous forest
Calamagrostis crassiglumis	Thurber's reed grass	None	None	G3Q	S2?	2B.1	Coastal scrub | Freshwater marsh | Marsh & swamp | Wetland
Calamagrostis ophitidis	serpentine reed grass	None	None	G3	S3.3	4.3	Chaparral | Lower montane coniferous forest | Meadows and seeps | Valley and Foothill grassland
Calandrinia breweri	Brewer's calandrinia	None	None	G4T3	S3.2?	4.2	Chaparral | Coastal Scrub
Calochortus uniflorus	pink star-tulip	None	None	G4	S3	4.2	Coastal prairie | Coastal scrub | Meadows and seeps | North Coast coniferous forest
Calystegia collina ssp. oxyphylla	Mt. Saint Helena morning-glory	None	None	G4T3	S3.2	4.2	Chaparral | Ultramafic
Campanula californica	swamp harebell	None	None	G3	S3	1B.2	Bog & fen | Closed-cone coniferous forest | Coastal prairie | Marsh & swamp | Meadow & seep | North coast coniferous forest | Wetland
Castilleja ambigua var. ambigua	johnny-nip	None	None	G4T3T4	S3	4.2	Coastal bluff scrub | Coastal prairie | Coastal scrub | Marshes and swamps | Valley and foothill grassland | Vernal pools margins
Castilleja uliginosa	Pitkin Marsh paintbrush	None	Endangered	GXQ	SX	1A	Freshwater marsh | Marsh & swamp | Wetland

APPENDIX A: CNDDB and CNPS 9-QUADRANGLE SEARCH LIST

Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker

CNDDB, CNPS - April, 2017

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Rare Plant Rank	Habitats
Ceanothus confusus	Rincon Ridge ceanothus	None	None	G1	S1	1B.1	Chaparral | Cismontane woodland | Closed-cone coniferous forest | Ultramafic
Ceanothus divergens	Calistoga ceanothus	None	None	G2	S2	1B.2	Chaparral | Cismontane woodland | Ultramafic
Ceanothus foliosus var. vineatus	Vine Hill ceanothus	None	None	G3T1	S1?	1B.1	Chaparral
Ceanothus gloriosus var. exaltatus	glory brush	None	None	G3G4T3	S3.3	4.3	Chaparral
Ceanothus purpureus	holly-leaved ceanothus	None	None	G2	S2	1B.2	Chaparral
Ceanothus sonomensis	Sonoma ceanothus	None	None	G2	S2	1B.2	Chaparral | Ultramafic
Centromadia parryi ssp. parryi	pappose tarplant	None	None	G3T1	S1	1B.2	Coastal prairie | Marsh & swamp | Meadow & seep | Valley & foothill grassland
Chorizanthe valida	Sonoma spineflower	Endangered	Endangered	G1	S1	1B.1	Coastal prairie
Clarkia breweri	Brewer's clarkia	None	None	G3	S3.2	4.2	Chaparral | Cismontane woodland | Coastal scrub
Clarkia imbricata	Vine Hill clarkia	Endangered	Endangered	G1	S1	1B.1	Chaparral | Valley & foothill grassland
Cordylanthus tenuis ssp. brunneus	serpentine bird's-beak	None	None	G4G5T3	S3.3	4.3	Closed-cone coniferous forest | Chaparral | Cismontane woodland
Cordylanthus tenuis ssp. capillaris	Pennell's bird's-beak	Endangered	Rare	G4G5T1	S1	1B.2	Chaparral | Closed-cone coniferous forest | Ultramafic
Cuscuta obtusiflora var. glandulosa	Peruvian dodder	None	None	G5T4T5	SH	2B.2	Marsh & swamp | Wetland
Cypripedium montanum	mountain lady's-slipper	None	None	G4	S4	4.2	Boadleafed upland forest | Cismontane woodland | Lower montane coniferous forest | North Coast coniferous forest

APPENDIX A: CNDDB and CNPS 9-QUADRANGLE SEARCH LIST

Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker

CNDDB, CNPS - April, 2017

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Rare Plant Rank	Habitats
Delphinium luteum	golden larkspur	Endangered	Rare	G1	S1	1B.1	Chaparral | Coastal prairie | Coastal scrub
Downingia pusilla	dwarf downingia	None	None	G1	S2	2B.2	Valley & foothill grassland | Vernal pool | Wetland
Erigeron biolettii	streamside daisy	None	None	G3?	S3?	3	Broadleafed upland forest | Cismontane woodland | North Coast coniferous forest
Erigeron serpentinus	serpentine daisy	None	None	G2	S2	1B.3	Chaparral | Ultramafic
Eriophorum gracile	slender cottongrass	None	None	G5	S4	4.3	Bogs and fens | Meadows and seeps | Upper montane coniferous forest
Eryngium constancei	Loch Lomond button-celery	Endangered	Endangered	G1	S1	1B.1	Vernal pools
Fritillaria liliacea	fragrant fritillary	None	None	G2	S2	1B.2	Coastal prairie | Coastal scrub | Ultramafic | Valley & foothill grassland
Gilia capitata spp. tomentosa	wolly-headed gilia	None	None	G5T2T3	S2	1B.1	Serpentinite, rocky outcrops | Coastal bluff scrub | Valley and foothill grassland
Gratiola heterosepala	Boggs Lake hedge-hyssop	None	Endangered	G2	S2	1B.2	Freshwater marsh | Marsh & swamp | Vernal pool | Wetland
Hemizonia congesta ssp. congesta	congested-headed hayfield tarplant	None	None	G5T2T3	S2S3	1B.2	Coastal scrub | Valley & foothill grassland
Hesperevax caulescens	hogwallow starfish	None	None	G3	S3	4.2	Valley and foohill grassland | Vernal pools
Horkelia tenuiloba	thin-lobed horkelia	None	None	G2	S2.2	1B.2	Chaparral | Coastal scrub
Hosackia gracilis	harlequin lotus	None	None	G4	S3	4.2	Broadleafed upland forest | Coastal bluff scrub | Closed-cone coniferous forest | Cismontane woodland | Coastal prairie | Coastal scrub | Meadows and seeps | Marshes and swamps | North Coast coniferous forest | Valley and foothill grassland

APPENDIX A: CNDDB and CNPS 9-QUADRANGLE SEARCH LIST

Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker

CNDDB, CNPS - April, 2017

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Rare Plant Rank	Habitats
Iris longipetala	coast iris	None	None	G3	S3.2	4.2	Coastal prairie | Lower montane coniferous forest | Meadows and seeps
Lasthenia burkei	Burke's goldfields	Endangered	Endangered	G1	S1	1B.1	Meadow & seep | Vernal pool | Wetland
Lasthenia californica ssp. bakeri	Baker's goldfields	None	None	G3TH	SH	1B.2	Closed-cone coniferous forest | Coastal scrub
Lasthenia conjugens	Contra Costa goldfields	Endangered	None	G1	S1	1B.1	Cismontane woodland | Playas | Valley and foothill grassland | Vernal pools
Layia serpentrionalis	Colusa layia	None	None	G2	S2	1B.2	Chaparral | Cismontane woodland | Valley and foothill grassland
Legenere limosa	legenere	None	None	G2	S2.2	1B.1	Vernal pool | Wetland
Leptosiphon acicularis	bristly leptosiphon	None	None	G3	S3.2?	4.2	Chaparral | Cismontane woodland | Coastal prairie | Valley and foothill grassland
Leptosiphon jepsonii	Jepson's leptosiphon	None	None	G2	S2	1B.2	Chaparral | Cismontane woodland | Ultramafic
Lessingia arachnoidea	Crystal Springs lessingia	None	None	G1	S1	1B.2	Cismontane woodland | Coastal scrub | Ultramafic | Valley & foothill grassland
Lessingia holoeuca	wolly-headed lessingia	None	None	G3	S3.2?	3	Broadleafed upland forest | Coastal scrub | Lower montane coniferous forest | Valley and foothill grassland
Lilium pardalinum ssp. pitkinense	Pitkin Marsh lily	Endangered	Endangered	G5T1	S1	1B.1	Cismontane woodland | Freshwater marsh | Marsh & swamp | Meadow & seep | Wetland
Lilium rubescens	redwood lily	None	None	G3	S3.2?	4.2	Broadleafed upland forest | Chaparral | Lower montane coniferous forest | North Coast coniferous forest | Upper montane coniferous forest

APPENDIX A: CNDDB and CNPS 9-QUADRANGLE SEARCH LIST

Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker

CNDDB, CNPS - April, 2017

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Rare Plant Rank	Habitats
Limnanthes vinculans	Sebastopol meadowfoam	Endangered	Endangered	G1	S1	1B.1	Meadow & seep | Valley & foothill grassland | Vernal pool | Wetland
Lomatium repostum	Napa lomatium	None	None	G3	S3.3	4.3	Chaparral | Cismontane woodland
Lupinus sericatus	Cobb Mountain lupine	None	None	G2	S2.2	1B.2	Chaparral | Cismontane woodland | Lower montane coniferous forest | Ultramafic
Micropus amphibolus	Mt. Diablo cottonweed	None	None	G3	S3.2?	3.2	rocky | Broadleafed upload forest | Chaparral | Cismontane woodland | Valley and foothill grassland
Microseris paludosa	marsh microseris	None	None	G2	S2.2	1B.2	Cismontane woodland | Closed-cone coniferous forest | Coastal scrub | Valley & foothill grassland
Mondarella viridis	green monardella	None	None	G3T3	S3.3	4.3	Broadleafed upland forest | Chaparral | Cismontane woodland
Navarretia cotulofilia	cotula navarretia	None	None	G3	S3.2	4.2	Chaparral | Cismontane woodland | Valley and foothill grassland
Navarretia heterandra	Tehama navarretia	None	None	G3	S3.3	4.3	Valley and foothill grassland | Vernal pools
Navarretia leucocephala ssp. bakeri	Baker's navarretia	None	None	G4T2	S2	1B.1	Cismontane woodland | Lower montane coniferous forest | Meadow & seep | Valley & foothill grassland | Vernal pool | Wetland
Navarretia leucocephala ssp. plieantha	many-flowered navarretia	Endangered	Endangered	G4T1	S1	1B.2	Vernal pool | Wetland
Penstemon newberryi var. sonomensis	Sonoma beardtongue	None	None	G4T1	S2	1B.3	Chaparral

APPENDIX A: CNDDB and CNPS 9-QUADRANGLE SEARCH LIST

Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker

CNDDB, CNPS - April, 2017

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Rare Plant Rank	Habitats
Perideridia gairdneri spp. gairdneri	Gairdner's yampah	None	None	G5T4	S4	4.2	Broadleafed upalnd forest | Chaparral | Coastal prairie | Valley and foothill grassland | Vernal pools
Plagiobothrys strictus	Calistoga popcorn flower	Endangered	Threatened	G1	S1	1B.1	Meadows and seeps | Valley and foothill grassland | Vernal pools
Pleuropogon hooverianus	North Coast semaphore grass	None	Threatened	G2	S2	1B.1	Broadleaved upland forest | Meadow & seep | North coast coniferous forest | Wetland
Pleuropogon refractus	nodding semaphore grass	None	None	G4	S3.2?	4.2	Lower montane coniferous forest | Meadows and seeps | North Coast coniferous forest | Riparian forest
Poa napensis	Napa blue grass	Endangered	Endangered	G1	S1	1B.1	Meadows and seeps | Valley and foothill grassland
Potentilla uliginosa	Cunningham Marsh cinquefoil	None	None	GH	SH	1A	Marshes and swamps
Ranunculus lobbii	Lobb's aquatic buttercup	None	None	G4	S3.2	4.2	Cismontane woodland | North Coast coniferous forest | Valley and foothill grassland | Vernal pools
Rhynchospora alba	white beaked-rush	None	None	G5	S2	2B.2	Bog & fen | Marsh & swamp | Meadow & seep | Wetland
Rhynchospora californica	California beaked-rush	None	None	G1	S1	1B.1	Freshwater marsh | Lower montane coniferous forest | Marsh & swamp | Meadow & seep | Wetland
Rhynchospora capitellata	brownish beaked-rush	None	None	G5	S1	2B.2	Lower montane coniferous forest | Marsh & swamp | Meadow & seep | Upper montane coniferous forest | Wetland

APPENDIX A: CNDDB and CNPS 9-QUADRANGLE SEARCH LIST

Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker

CNDDB, CNPS - April, 2017

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Rare Plant Rank	Habitats
Rhynchospora globularis	round-headed beaked-rush	None	None	G5	S1	2B.1	Freshwater marsh | Marsh & swamp | Wetland
Sidalcea hickmanii ssp. napensis	Napa checkerbloom	None	None	G3T1	S1	1B.1	Chaparral
Sidalcea oregana ssp. valida	Kenwood Marsh checkerbloom	Endangered	Endangered	G5T1	S1	1B.1	Freshwater marsh | Marsh & swamp | Wetland
Trifolium amoenum	showy rancheria (two-fork) clover	Endangered	None	G1	S1	1B.1	Coastal bluff scrub | Ultramafic | Valley & foothill grassland
Trifolium buckwestiorum	Santa Cruz clover	None	None	G2	S2	1B.1	Broadleafed upland forest | Cismontane woodland | Coastal Prairie
Trifolium hydrophilum	saline clover	None	None	G2	S2	1B.2	Marsh & swamp | Valley & foothill grassland | Vernal pool | Wetland
Triquetrella californica	coastal triquetrella	None	None	G1	S1	1B.2	Coastal bluff scrub | Coastal scrub | Valley & foothill grassland
Viburnum ellipticum	oval-leaved viburnum	None	None	G5	S2.3	2B.3	Chaparral | Cismontane woodland | Lower montane coniferous forest

APPENDIX B
SPECIAL STATUS ANIMAL SPECIES

APPENDIX B: CNDDB 9-QUADRANGLE ANIMAL LIST

Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker

CNDDB - April, 2017

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Habitats
Accipiter striatus	sharp-shinned hawk	None	None	G5	S3	Cismontane woodland | Lower montane coniferous forest | Riparian forest | Riparian woodland
Agelaius tricolor	tricolored blackbird	None	None	G2G3	S2	Freshwater marsh | Marsh & swamp | Swamp | Wetland
Ambystoma californiense	California tiger salamander	Endangered	Threatened	G2G3	S2S3	Cismontane woodland | Meadow & seep | Riparian woodland | Valley & foothill grassland | Vernal pool | Wetland
Andrena blennospermatis	Blennosperma vernal pool andrenid bee	None	None	G2	S2	Vernal pool
Antrozous pallidus	pallid bat	None	None	G5	S3	Chaparral | Coastal scrub | Desert wash | Great Basin grassland | Great Basin scrub | Mojavean desert scrub | Riparian woodland | Sonoran desert scrub | Upper montane coniferous forest | Valley & foothill grassland
Athene cunicularia	burrowing owl	None	None	G4	S3	Coastal prairie | Coastal scrub | Great Basin grassland | Great Basin scrub | Mojavean desert scrub | Sonoran desert scrub | Valley & foothill grassland
Caecidotea tomalensis	Tomales isopod	None	None	G2	S2	Aquatic | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Proposed Threatened	Endangered	G5T3Q	S1	Riparian forest
Corynorhinus townsendii	Townsend's big-eared bat	None	Candidate Threatened	G3G4	S2S3	Broadleafed upland forest | Chaparral | Chenopod scrub | Great Basin grassland | Great Basin scrub | Joshua tree woodland | Lower montane coniferous forest | Meadow & seep | Mojavean desert scrub | Riparian forest | Riparian woodland | Sonoran desert scrub | Sonoran thorn woodland | Upper montane coniferous forest | Valley & foothill grassland

APPENDIX B: CNDDB 9-QUADRANGLE ANIMAL LIST

Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker

CNDDB - April, 2017

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Habitats
Dicamptodon ensatus	giant salamander	None	None	G3	S2S3	Aquatic | Meadow & seep | North coast coniferous forest | Riparian forest
Elanus leucurus	white-tailed kite	None	None	G5	S3	Cismontane woodland | Marsh & swamp | Riparian woodland | Valley & foothill grassland | Wetland
Emys marmorata	western pond turtle	None	None	G3G4	S3	Aquatic | Artificial flowing waters | Klamath/North coast flowing waters | Klamath/North coast standing waters | Marsh & swamp | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters | South coast flowing waters | South coast standing waters | Wetland
Flaco peregrinus anatum	American peregrine falcon	Delisted	Deisted	G4T4	S3S4	Near wetlands, lakes, rivers | Cliffs, banks, dunes, mounds | man-made structures
Hydrochara rickseckeri	Ricksecker's water scavenger beetle	None	None	G1G2	S1S2	Aquatic | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters
Hydroporus leechi	Leech's skyline diving beetle	None	None	G1?	S1?	Aquatic
Hysterocarpus traski pomo	Russian River tule perch	None	None	G5T2	S2	Aquatic | Klamath/North coast flowing waters
Lasiurus cinereus	hoary bat	None	None	G5	S4?	Broadleafed upland forest | Cismontane woodland | Lower montane coniferous forest | North coast coniferous forest
Lavinia symmetricus navarroensis	Navarro roach	None	None	G4T1T2	S1S2	Aquatic | Sacramento/San Joaquin flowing waters
Linderiella occidentalis	California linderiella	None	None	G3	S2S3	Vernal pool

APPENDIX B: CNDDB 9-QUADRANGLE ANIMAL LIST

Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker

CNDDB - April, 2017

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Habitats
Myotis thysanodes	fringed myotis	None	None	G4	S4	Pinyon-juniper | Valley and foothill grasslands | Hardwood and hardwood-conifer | Caves, mines, buildings or crevices
Oncorhynchus kisutch	coho salmon - central California coast ESU	Endangered	Endangered	G4	S2?	Aquatic
Oncorhynchus mykiss irideus	steelhead - central California coast DPS	Threatened	None	G5T2Q	S2	Aquatic | Sacramento/San Joaquin flowing waters
Pandion haliaetus	osprey	None	None	G5	S3	Ocean shores | Bays | Freshwater Lakes | Large streams
Rana boylii	foothill yellow-legged frog	None	None	G3	S2S3	Aquatic | Chaparral | Cismontane woodland | Coastal scrub | Klamath/North coast flowing waters | Lower montane coniferous forest | Meadow & seep | Riparian forest | Riparian woodland | Sacramento/San Joaquin flowing waters
Rana draytonii	California red-legged frog	Threatened	None	G2G3	S2S3	Aquatic | Artificial flowing waters | Artificial standing waters | Freshwater marsh | Marsh & swamp | Riparian forest | Riparian scrub | Riparian woodland | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters | South coast flowing waters | South coast standing waters | Wetland
Riparia riparia	bank swallow	None	Threatened	G5	S2S3	Riparian scrub | Riparian woodland
Strix occidentalis caurina	northern spotted owl	Threatened	Candidate	?	?	North coast coniferous forest | Oldgrowth | Redwood | Lower montane coniferous forest

APPENDIX B: CNDDB 9-QUADRANGLE ANIMAL LIST

Santa Rosa, Healdsburg, Calistoga, Cotati, Sonoma, Mark West Springs, Glen Ellen, Kenwood, Sebastopol, Camp Meeker

CNDDB - April, 2017

Scientific Name	Common Name	Federal List	California List	Global Rank	State Rank	Habitats
Syncaris pacifica	California freshwater shrimp	Endangered	Endangered	G1	S1	Aquatic | Sacramento/San Joaquin flowing waters
Taxidea taxus	American badger	None	None	G5	S4	Many habitat types listed in CNDDB – only including region habitat types. Broadleaved upland forest | Chaparral | Cismontane woodland | Closed-cone coniferous forest | Freshwater marsh | Lower montane coniferous forest | Marsh & swamp | Meadow & seep | North coast coniferous forest | Riparian forest | Riparian scrub | Riparian woodland | Ultramafic | Upper montane coniferous forest | Valley & foothill grassland

APPENDIX C
PLANT INVENTORY LIST

Appendix C: Plant Inventory List
800 Yolanda Avenue, Santa Rosa, CA

FAMILY	SPECIES NAME	COMMON NAME	NATIVE=N INTRODUCED=I
Apiaceae			
	Daucus carota	wild carrot	I
	Foeniculum vulgare	fennel	I
Asteraceae			
	Centaurea calcitrapa	purple star thistle	I
	Chicorum intybus	chicory	I
	Cirsium vulgare	bull thistle	I
	Hypocharis glabra	smooth cat's ear	I
	Hypocharis radicata	cats ear	I
	Lactuca serriola	prickly lettuce	I
	Picris echioides	bristly ox tongue	I
	Sonchus oleraceus	sow thistle	I
Convolvulaceae			
	Convolvulus arvensis	bindweed	I
Cruciferae			
	Brassica geniculata	shortpod mustard	I
	Brassica rapa	field mustard	I
	Lepidium nitidum	pepper grass	N
	Raphanus sativus	wild radish	I
Cupressaceae			
	Juniperus spp.	juniper	I
Cyperaceae			
	Cyperus eragrostis	nut-sedge	I
Euphorbiaceae			
	Euphorbia serpyllifolia	spurge	N

FAMILY	SPECIES NAME	COMMON NAME	NATIVE=N INTRODUCED=I
Fabaceae			
	Medicago polymorpha	bur-clover	I
	Trifolium variegatum	white-tip clover	N
	Vicia sativa	spring vetch	I
Fagaceae			
	Quercus lobata	valley oak	N
Geraniaceae			
	Erodium botrys	long-beaked filaree	I
	Erodium cicutarium	redstem filaree	I
	Geranium dissectum	wild geranium	I
	Geranium molle	dove's foot geranium	I
Juglandaceae			
	Juglans hindsi	Cal. black walnut	N
	Juglans regia	English walnut	I
Juncaceae			
	Juncus bufonius	toadrush	N
	Juncus tenuis	slender rush	N
Lamiaceae			
	Mentha pelugium	pennyroyal	I
Malvaceae			
	Malva rotundifolia	mallow	I
Myrtaceae			
	Eucalyptus globulus	blue gum	I
Oleaceae			
	Fraxinus latifolia	Oregon ash	N
Onagaraceae			
	Camissonia ovatum (Oenothera o.)	Sun Cup	N
	Epilobium ciliatum	willow herb	N
Papaveraceae			
	Eschscholzia californica	California poppy	N
Pinaceae			
	Pinus radiata	Monterey pine	I
	Sequoia sempervirens	coast redwood	I

FAMILY	SPECIES NAME	COMMON NAME	NATIVE=N INTRODUCED=I
Plantaginaceae			
	Plantago lanceolata	English plantain	I
Poaceae			
	Avena barbata	slender wild oat	I
	Avena fatua	wild oat	I
	Briza minor	small quaking grass	I
	Bromus diandrus	rip-gut brome	I
	Bromus mollis	soft chess	I
	Festuca perennis	perennial rye grass	I
	Hordeum marinum spp. gussoneanum	Mediterranean barley	I
	Phalaris aquatica	Harding grass	I
	Poa annua	annual bluegrass	I
	Polypogon monspeliensis	rabbitsfoot grass	I
	Vulpia myuros	rat-tail fescue	I
Polygonaceae			
	Polygonum aviculare	common knotweed	I
	Rumex crispus	curly dock	I
Portulaceae			
	Claytonia perfoliata	miners lettuce	N
Primulaceae			
	Anagallis arvensis	scarlet pimpernel	I
Ranunculaceae			
	Ranunculus muricatus	spiny buttercup	I
Rosaceae			
	Rubus armeniacus	Himalayan berry	I
Rubiaceae			
	Galium aparine	cleavers	I
Salicaceae			
	Salix lasiolepis	arroyo willow	N
Scrophulariaceae			
	Parentucellia viscosa	parentucella	I

APPENDIX D
CALIFORNIA TIGER SALAMANDER SITE ASSESSMENT

SITE ASSESSMENT FOR CALIFORNIA TIGER SALAMANDER

800 YOLANDA AVENUE, SANTA ROSA, SONOMA COUNTY

APN 044-091-063

Prepared for:

Mr. Bill Davidson
P.O. Box 8988
Truckee, CA 96162

By:

Michael H. Fawcett, Ph.D.
Fawcett Environmental Consulting
P.O. Box 385
Bodega, CA 94922
Telephone: 707/876-3450

30 March 2012

BACKGROUND

A 5.53-acre parcel (APN-044-091-063) located at 800 Yolanda Avenue in Santa Rosa, Sonoma County (Figure 1), is proposed for development for commercial use as a warehouse facility. The owner, Mr. Bill Davidson, first contacted me in 2007 regarding how his plans could be affected by the property's location within the potential geographic range of the Sonoma Distinct Population Segment (DPS) of the endangered California tiger salamander, *Ambystoma californiense* (CTS). I visited the property on 20 September 2007, and examined habitat features, took photographs, and measured various portions of the property in order to estimate the acreage that could be considered potentially suitable upland habitat for CTS. Mr. Davidson decided not to proceed at that time with preparing a site assessment for CTS as per *Interim guidance on site assessment and field surveys for determining presence or a negative finding of the California tiger salamander* (hereafter, "*Interim Guidance*"), a U.S. Fish and Wildlife Service (USFWS or Service) document (USFWS 2003).

Later, SCS Engineers prepared a Wetland Delineation (SCS Engineers 2009) and a Biological Assessment for special-status plants or plant communities (SCS Engineers 2010). The U.S. Army Corps of Engineers (USACE) issued a letter dated 24 September 2009 confirming the findings of the Wetland Delineation (i.e., there are no wetlands on the property), but taking jurisdiction of a seasonal ditch crossing the southeast portion of the property. Those documents are attached at the end of this report and are incorporated by reference. In 2011 I was asked to prepare a CTS site assessment, so I revisited the property on 17 September 2011 to examine changes that had occurred since my 2007 visit, to wit: further removal of materials left from a previous commercial operation on the western half of the property, and a small amount of added landscaping (~0.03 acres).

PROJECT DESCRIPTION

The proposed project consists of constructing commercial warehouse buildings on a 5.53-acre parcel (APN-044-091-063) located at 800 Yolanda Avenue, Santa Rosa, California 95404. The area is within Santa Rosa's Urban Growth Boundary and is zoned for light industrial and rural residential uses. The property includes approximately 3.03 acres of hardscape (parking and driveways), residential buildings, associated outbuildings and landscaping, and approximately 2.4 acres of non-native annual grassland (Figure 2). A seasonal ditch crossing the southeast corner of the property, along with its associated riparian area, will be left undisturbed; this area constitutes approximately 0.1 acres and is the area for which the USACE claimed jurisdiction.

SITE ASSESSMENT

The *Interim Guidance* (USFWS 2003) requests information to answer three questions (Elements):

Element 1. Is the project site within the range of the CTS?

The project site is within the potential geographic range of the Sonoma DPS of CTS, as defined by the Service (USFWS 2003). If a 404 permit from the USACE is required for the project, the Programmatic Biological Opinion (Programmatic) is applicable to this project (USFWS 2007). Enclosure 1 in the Programmatic identifies the parcel at 800 Yolanda and the adjacent parcel to the south as within an area where projects "may adversely affect listed plants and/or CTS". However, the owner has decided to leave the small jurisdictional ditch in the southeast corner of the property undisturbed, so a 404 permit may not be needed. In the Santa Rosa Plain Conservation Strategy (USFWS and ten others 2005), which is the biological framework for the Programmatic, the same parcels are identified as having the "Potential for presence of CTS and listed plants" (Figure 3 in the Conservation Strategy), although only a thin strip of land west of Petaluma Hill Road connects the parcels to other "potential for presence" lands to the south.

> Element 2. What are the known localities of CTS within the project site and within 3.1 miles (5.0 kilometers) of the project boundaries?

There are numerous records of breeding or of individual CTS sightings west of Highway 101 within 3.1 miles of the project area (Figure 3). However, all the sites west of the 101 freeway and Santa Rosa Avenue are irrelevant to this site assessment, because the freeway and Santa Rosa Avenue are considered to be significant barriers to CTS migration. The only known CTS locations within 3.1 miles of the project on the east side of the freeway are at the Horn Bank, which is located approximately 1.8 miles south of the project site (Figure 4). The Horn Bank was found to be a breeding site for CTS during the winter of 2009-2010 (V. Griego, USFWS, *personal communication*; G. Monk, Monk Associates, *personal communication*). The project site is further isolated from the Horn Bank and all other lands potentially occupied by CTS south of the project site and neighboring property by the presence of the dense residential subdivision extending west from Old Petaluma Hill Road, south of the neighboring property (Figure 8).

> Element 3. What are the habitats within the project site and within 1.24 miles of the project boundaries?

Terrestrial habitat

More than half of the property at the project site consists of an existing residence and outbuildings, landscaped areas adjacent to the residence and outbuildings, driveways, and a large area of compacted gravel related to a former business on the western half of the property (Figure 2). Approximately 2.4 acres consists of regularly disked, non-native annual grassland (Figures 5-6). Soil types and plant species are described in detail in the Biological Assessment for plants (SCS Engineers 2010). A few burrows and mounds made by Botta's pocket gopher (*Thomomys bottae*) were observed in the grassland areas during each of my site visits (Figure 7). Since gopher burrows are the primary subterranean habitat used by CTS on the Santa Rosa Plain, the grassland habitat at the project site could represent potentially suitable upland habitat for juvenile and adult CTS, and the property appears to be designated critical habitat (USFWS 2011, map on p.

54371). Annual shallow disking performed at the project site would be likely to kill some CTS, if any were present, through crushing, cutting, exposing individuals to predators, or by reducing the number of burrows available (USFWS 2011, *Special Management Considerations*, p. 54355). However, pocket gopher burrows may extend as deep as six feet below ground (U.C. 2002), well below the depth of typical shallow disking (6-12 inches), and CTS have been found to occupy some lands on the Santa Rosa Plain subject to annual disking (LSA Associates, Inc. 2004), so the disking does not necessarily exclude the possibility that CTS occupy the site.

Aquatic and riparian habitat

The ditch crossing the southeast corner of the 800 Yolanda Avenue property is described in the Wetland Delineation (SCS Engineers 2009). The Wetland Delineation found that the ditch did not include any of the three wetland characteristics (hydrophytic vegetation, hydric soils, or wetland hydrology), all three of which must be met in order for an area to be considered a jurisdictional wetland under Section 404 of the Clean Water Act. The Corps of Engineers claimed jurisdiction of the ditch as "other waters of the U.S." because the ditch is "a drainage channel that is part of a tributary system to the Colgan Creek Flood Control Channel" (USACE 2009, p. 1). Colgan Creek is the stream crossing Petaluma Hill Road north of Kawana Springs Road, approximately 3000 feet north of Yolanda Avenue (Figure 1). After crossing Petaluma Hill Road, Colgan Creek becomes a trapezoidal channel that turns northwest and passes beneath the 101 freeway at the Baker Avenue Interchange, then heads southwest as the Colgan Creek Flood Channel. The Ditch at 800 Yolanda Avenue flows from Petaluma Hill Road southwest and disappears into the annual grassland of the property adjacent to 800 Yolanda Avenue (Figure 8); thus, it appears to be completely separated from the Colgan Creek system, although it is perhaps a remnant of a tributary that existed before the area was developed, and/or may drain into an underground culvert of which I am unaware. In any event, the ditch is an ephemeral channel that has no possibility of being a breeding site for CTS. Riparian vegetation associated with the ditch is minimal, consisting mostly of non-native weeds and a single walnut tree (Figure 6, this report; and SCS Engineers 2009).

Southeast of Mr. Davidson's property, on the east side of Petaluma Hill Road, there is a dairy farm with manure ponds and other wetlands, and adjacent to the dairy is a former rock quarry (now a landscape materials operation) with two settlement ponds (Figure 4). Any of those ponds could be potentially suitable for CTS breeding, but they are outside the potential geographic range of CTS, as defined by the Service. A small, square pond associated with an abandoned dairy farm can also be seen in Figure 4 and Figure 8, south of the housing development next to the undeveloped grassland immediately south of 800 Yolanda Avenue. I am not aware of any larvae surveys having been conducted at any of the aquatic sites mentioned above. However, if any of those sites are active breeding sites, it seems likely that there would have been reports of adult or juvenile CTS on Petaluma Hill Road, Old Petaluma Hill Road, or other roads in the area sometime in the past ten years or so that Dave Cook and others have been conducting road surveys at night during fall rains, but there have been no such reports. The nearest known breeding site or reported individual CTS east of the freeway remains the Horn Bank, approximately 1.8 miles south of Mr. Davidson's property.

Conclusions

The property is surrounded by urban development to the north, west, and south, i.e., south of the adjacent undeveloped parcel (Figure 8). To the east, beyond Petaluma Hill Road, lie pasture land and a dairy farm, all slated for future development, and outside the potential geographic range of CTS (Conservation Strategy, Figure 3). In response to Comment 5 in the Final Rule designating critical habitat (USFWS 2011), the Service stated that certain "small isolated parcels within a matrix of urban development" were excluded from critical habitat because they were not considered "essential for the conservation of the Sonoma California tiger salamander because these areas would not likely contribute to the survival or recovery of the species". Since Petaluma Hill Road is considered to be the eastern boundary of the potential geographic range of Sonoma CTS in the project area, it seems that the project site as well as the neighboring property to the south should have been excluded from critical habitat by the same reasoning, since the properties are surrounded by urban development on three sides, and by the geographic range limit on the fourth side.

Given the project site's isolation and distance from the nearest known CTS location (1.8 miles), the property at 800 Yolanda Avenue is highly unlikely to be occupied by CTS at the present time and is unlikely to contribute to the survival or recovery of the species, regardless of whether or not the proposed project is developed.

REFERENCES

M.H. Fawcett 2005. Site assessment for California tiger salamander: Farmer's Lane Extension. Prepared for Green Valley Consulting Engineers and the City of Santa Rosa. May 2005.

LSA Associates, Inc. 2004. Santa Rosa City Farms, Sonoma County, California: California tiger salamander survey, Field data report. Prepared for City of Santa Rosa. August 2004.

SCS Engineers 2009. Jurisdictional Waters Delineation: Assessor's Parcel No. 044-091-063, 800 Yolanda Avenue, Santa Rosa, Sonoma County, CA. Prepared for Bill Davidson, 800 Yolanda Avenue, Santa Rosa, CA 95404.

SCS Engineers 2010. Biological Assessment: Assessor's Parcel No. 044-091-063, 800 Yolanda Avenue, Santa Rosa, Sonoma County, CA. Prepared for Bill Davidson, 800 Yolanda Avenue, Santa Rosa, CA 95404.

USACE 2009. Letter to Bill Davidson (File Number 2009-00319N). U.S. Army Corps of Engineers, San Francisco District. 24 September 2009.

USFWS 2003. Interim guidance on site assessment and field surveys for determining presence or a negative finding of the California tiger salamander. U.S. Fish and Wildlife Service. October 2003.

USFWS and ten others 2005. Santa Rosa Plain Conservation Strategy. Final Report. 1 December 2005.

USFWS 2007. Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers (Corps) permitted projects that may affect California tiger salamander and three endangered plant species on the Santa Rosa Plain, California (Corps File Number 223420N). U.S. Fish and Wildlife Service. 9 November 2007.

USFWS 2011. Endangered and threatened wildlife and plants: Revised designation of critical habitat for the Sonoma county Distinct Population Segment of California tiger salamander. Final Rule. Federal Register 76(169): 54346-54372. U.S. Fish and Wildlife Service. 31 August 2011.

FIGURES

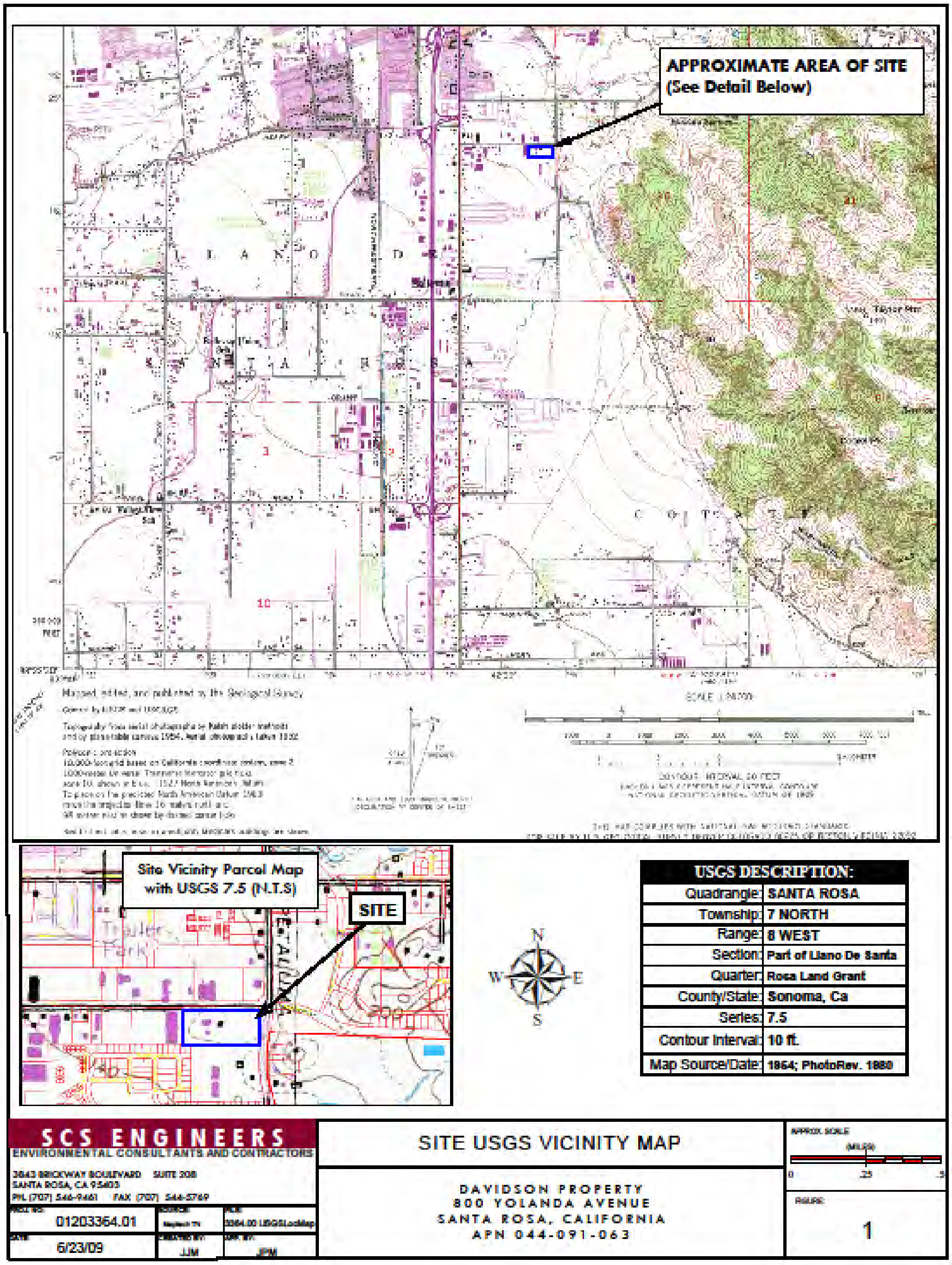


Figure 1. Regional vicinity map---Figure 1 in Wetland Delineation Report (SCS Engineers 2009)

Figure 2. Project Site and existing features

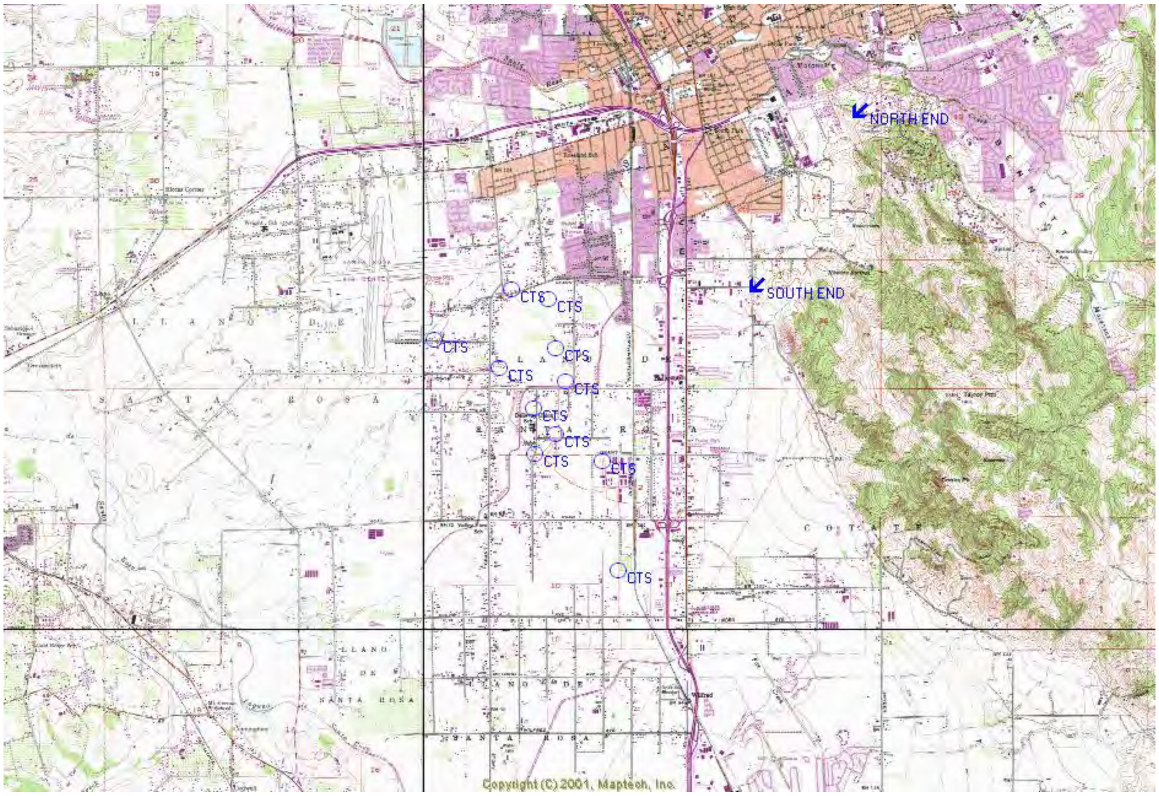


Figure 3. Known CTS localities within 3.1 miles of project site in 2005---figure made for a Site Assessment for the proposed Farmer's Lane Extension (Fawcett 2005); the arrow South End points directly at 800 Yolanda Avenue. CTS locations are from CNDDB records.
Map: USGS 7.5 min. quad Santa Rosa
Scale: 1 inch equals 4000 feet

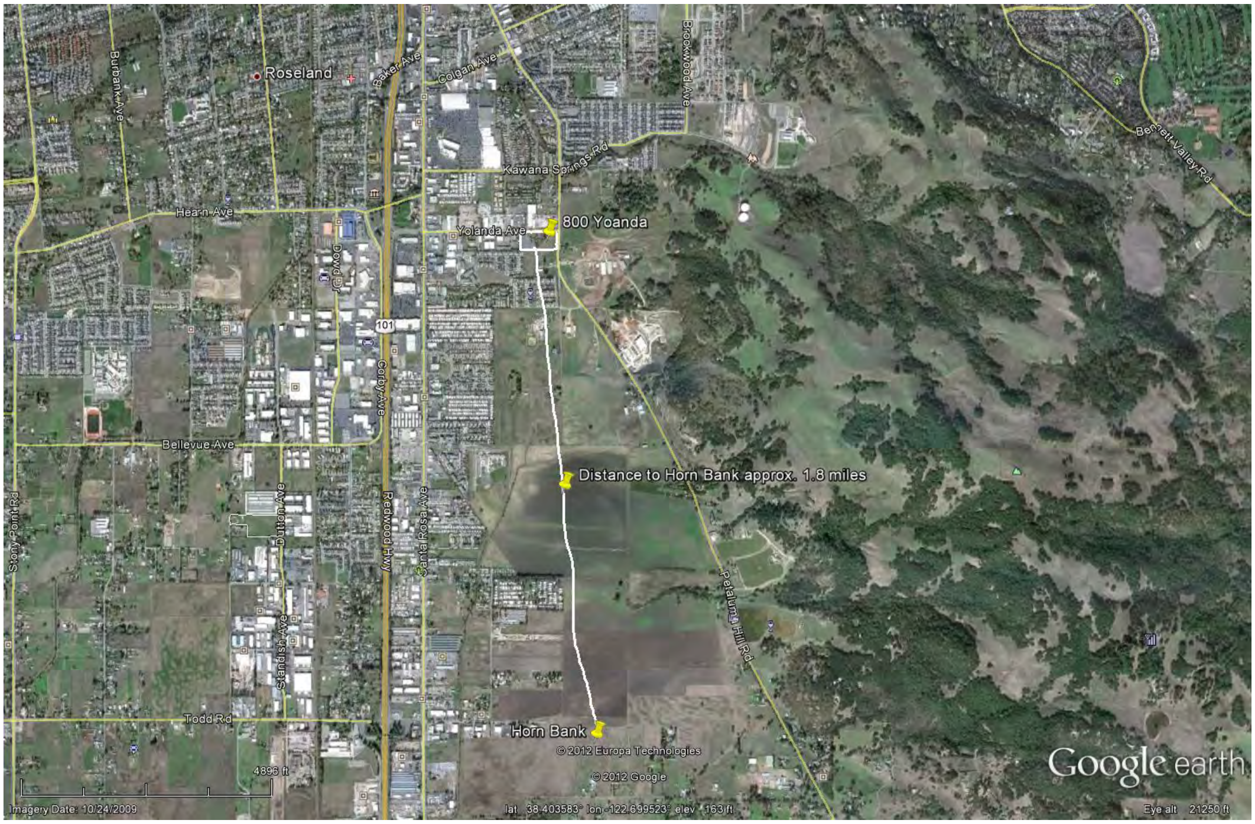


Figure 4. Project Site in relation to Horn Bank

Figure 5. Disked annual grassland, view west, September 2007---residence in center, Yolanda Avenue on right

Figure 6. Disked annual grassland, view east, September 2007 --- drainage ditch and riparian fragment in center background, car on Petaluma Hill Road

Figure 7. Gopher mound in grassland area, September 2007

Figure 8. Project Site (center) and surrounding lands

APPENDIX E

USACE JURISDICTIONAL CONFIRMATION LETTER DATED SEPTEMBER 24, 2009

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1398

REPLY TO
ATTENTION OF

SEP 24 2009

Regulatory Division

SUBJECT: File Number 2009-00319N

Mr. Bill Davidson
800 Yolanda Avenue
Santa Rosa, California 95404

Dear Mr. Davidson:

Thank you for your submittal of July 27, 2009 requesting confirmation of the extent of Corps of Engineers jurisdiction at your property located at 800 Yolanda Avenue, a 5.53-acre parcel within the City of Santa Rosa, Sonoma County, California (APN 044-091-063).

The enclosed map entitled "Wetland Delineation Map, Davidson Property, APN 044-091-063, Sonoma, California," in one (1) sheet date certified September 23, 2009, accurately depicts the extent and location of Corps jurisdiction within the study area boundary. The jurisdictional delineation is based on the current conditions of the site, as verified during a field investigation of September 17, 2009, and other data included with your submittal. This jurisdictional delineation will expire in three (3) years from the date of this letter, unless new information or a change in field conditions warrants a revision to the delineation map prior to the expiration date.

Unless exempt by regulation, all proposed discharges of dredged or fill material occurring below the plane of ordinary high water in non-tidal waters of the United States and within the lateral extent of wetlands adjacent to these waters require Department of the Army authorization and the issuance of a permit under Section 404 of the Clean Water Act (33 U.S.C. Section 1344). Waters of the United States generally include the territorial seas, all navigable waters, including waters subject to the ebb and flow of the tide, non-tidal interstate and intrastate waters and their tributary waters, including lakes, ponds, rivers, streams, intermittent streams, and adjacent wetlands, the use, degradation, or destruction of which could affect interstate or foreign commerce. Section 404 waters within the study area boundary area include a drainage channel that is part of a tributary system to the Colgan Creek Flood Control Channel.

You are advised that the Corps has established an Administrative Appeal Process, as described in 33 CFR Part 331 (65 FR 16,486; Mar. 28, 2000), and outlined in the enclosed flowchart and "Notification of Administrative Appeal Options, Process, and Request for Appeal" form (NAO-RFA). If you do not intend to accept the approved jurisdictional determination, you may elect to provide new information to the District Engineer for reconsideration or submit a completed NAO-RFA form to the Division Engineer to initiate the appeal process. You will relinquish all rights to appeal, unless the Corps receives new information or a completed NAO-

RFA form within sixty (60) days of the date of the NAO-RFA.

You may refer any questions on this matter to Mr. Bryan Matsumoto of my staff by telephone at 415-503-6786 or by e-mail at bryan.t.matsumoto@usace.army.mil. All correspondence should be addressed to the Regulatory Division, North Branch, referencing the file number at the head of this letter.

Sincerely,

Jane M. Hicks
Chief, Regulatory Division

Enclosures

Copy Furnished (w/ delineation map only):

RWQCB, Santa Rosa, CA (Attn: Stephen Bargsten)
SCS Engineers, Santa Rosa, CA (Attn: JaNelle Merry)

Wetland Delineation Map

DAVIDSON PROPERTY
APN 044-091-063
SONOMA, CALIFORNIA

N

0 35 70 140 210 280 Feet

US Army Corps of Engineers

Jurisdictional Delineation Pursuant to Section 10 of the Rivers and Harbors Act (RHA) and Section 404 of the Clean Water Act (CWA): 800 Yolanda Avenue, a 5.53-acre parcel within the City of Santa Rosa, Sonoma County, California (APN 044-091-063).

Study Area Boundary

Drainage Channel subject to Section 404 CWA

Section 10 of the RHA and Section 404 of the CWA Jurisdiction Verified only within the designated Study Area Boundary.

File No: 2009-00319N Date: September 23, 2009 Page 1 of 1

Source of Base Map; Sonoma County GIS Department Aerial Layer, 2000.
County of Sonoma Parcel Layer, 2008.
NAD_1983_StatePlane_California_II_FIPS_0402_Feet
Projection: Lambert_Conformal_Conic

SCS ENGINEERS

3843 BRICKWAY BLVD. SUITE 208 SANTA ROSA, CALIFORNIA 95403 PH: (707) 546-9461 FX: (707) 546-5759	PROJECT NUMBER: 01203364.00 CREATED BY: JJM	DATE: 7/13/09 APPROVED BY: JPM	FIGURE: 4

APPENDIX F

HORTICULTURAL ASSOCIATES, TREE PRESERVATION AND MITIGATION REPORT, 800 YOLANDA AVENUE, SANTA ROSA, DATED DECEMBER 1, 2017

HORTICULTURAL
Associates

Consultants in Horticulture and Arboriculture

TREE PRESERVATION AND MITIGATION REPORT

800 Yolanda Avenue
Santa Rosa, CA

Prepared by:

John C. Meserve
Consulting Arborist and Horticulturist
ISA Certified Arborist, WE #0478A
ISA Tree Risk Assessment Qualified

December 1, 2017

HORTICULTURAL Associates

Consultants in Horticulture and Arboriculture
P.O Box 1261, Glen Ellen, CA 95442

December 1, 2017

Mr. Danny Abdelmalak
The Santa Rosa Farm Group
9030 National Blvd.
Los Angeles. CA 90034

Re: Completed *Tree Preservation and Mitigation Report*, 800 Yolanda Avenue, Santa Rosa, CA

Danny,

Attached you will find our completed *Tree Preservation and Mitigation Report* for the above noted site in Santa Rosa. A total of 78 trees were evaluated on the property, and this includes all trees that are present and larger than 4 inches in trunk diameter, per the Santa Rosa Tree Ordinance.

Each tree in this report was evaluated and documented for species, size, health, and structural condition. The *Tree Inventory Chart* also includes information about expected impacts of the proposed commercial development plan and recommendations for action based on the plan reviewed. The *Tree Location Plan* shows the location and numbering sequence of all evaluated trees. A *Tree Protection Fence* detail is included, as well as *Tree Protection Guidelines.*

This report is intended to be a basic inventory of trees present at this site, which includes a general review of tree health and structural condition. No in-depth evaluation has occurred, and assessment has included only external visual examination without probing, drilling, coring, root collar examination, root excavation, or dissecting any tree part. Failures, deficiencies, and problems may occur in these trees in the future, and this inventory in no way guarantees or provides a warranty for their condition.

EXISTING SITE CONDITION SUMMARY

The project site consists of a variety of structures including residential, outbuilding, and barns.

EXISTING TREE SUMMARY

Native tree species found on the site include Coast Live Oak and Valley Oak in very small quantities.

Most trees present are ornamentals, or native species planted as ornamentals. A majority are Coast Redwoods, but also present are Honey Locust, Black Walnut, English Walnut, Blue Gum, Almond, Evergreen Ash, and Crabapple.

CONSTRUCTION IMPACT SUMMARY

Of the 78 trees in this inventory the following impacts can be expected:

(20) Preservation appears to be possible

(58) Removal recommended due to expected development impacts

No grading, drainage, or utility plans were reviewed as part of this assignment, and these activities may have impacts on trees that are considered preservable in this study. Further review may be necessary after this information becomes available.

Please feel free to contact me if you have questions regarding this report, or if further discussion would be helpful.

Regards,

John C. Meserve
Consulting Arborist and Horticulturist
American Society of Consulting Arborists
ISA Certified Arborist, WE #0478A
ISA Tree Risk Assessment Qualified

INTERNATIONAL SOCIETY OF ARBORICULTURE
JOHN C. MESERVE
WC-0478A
Signature
CERTIFIED ARBORIST

TREE INVENTORY CHART

TREE INVENTORY
800 Yolanda Avenue
Santa Rosa, CA

December 1, 2017

Tree #	ase print	Common Name	Trunk (dbh ± inches)	Height (± feet)	Radius (± feet)	Health 1 - 5	Structure 1 - 4	Expected Impact	Recommendations
1	*Prunus dulcis*	Almond	10+8+8+11+11	15	12	2	2	3	2
2	*Sequoia sempervirens*	Coast Redwood	6	14	6	4	3	3	2
3	*Juglans regia*	English Walnut	19+20	16	18	3	3	2	1, 6, 7, 8, 9
4	*Juglans nigra*	Black Walnut	23	30	18	4	3	1	1, 6, 7, 8, 9
5	*Sequoia sempervirens*	Coast Redwood	7	18	10	2	4	3	2
6	*Sequoia sempervirens*	Coast Redwood	7	18	10	3	4	2	1, 6, 7, 8, 9
7	*Sequoia sempervirens*	Coast Redwood	6	18	10	3	4	2	1, 6, 7, 8, 9
8	*Sequoia sempervirens*	Coast Redwood	4	12	10	1	4	2	1, 6, 7, 8, 9
9	*Sequoia sempervirens*	Coast Redwood	7	20	10	3	4	2	1, 6, 7, 8, 9
10	*Sequoia sempervirens*	Coast Redwood	6	18	10	2	4	2	1, 6, 7, 8, 9
11	*Sequoia sempervirens*	Coast Redwood	6	18	10	2	4	3	2
12	*Sequoia sempervirens*	Coast Redwood	7	20	10	3	4	3	2
13	*Sequoia sempervirens*	Coast Redwood	6	20	10	1	4	3	2
14	*Sequoia sempervirens*	Coast Redwood	12	22	12	1	4	3	2
15	*Sequoia sempervirens*	Coast Redwood	8	21	12	4	3	3	2
16	*Sequoia sempervirens*	Coast Redwood	13	25	12	4	3	3	2

TREE INVENTORY
800 Yolanda Avenue
Santa Rosa, CA

Tree #	ase print	Common Name	Trunk (dbh ± inches)	Height (± feet)	Radius (± feet)	Health 1 - 5	Structure 1 - 4	Expected Impact	Recommendations
17	*Sequoia sempervirens*	Coast Redwood	4	18	10	3	4	3	2
18	*Sequoia sempervirens*	Coast Redwood	7	20	10	4	4	3	2
19	*Sequoia sempervirens*	Coast Redwood	12	25	12	4	4	3	2
20	*Sequoia sempervirens*	Coast Redwood	4	14	8	3	4	3	2
21	*Sequoia sempervirens*	Coast Redwood	4	16	8	3	4	3	2
22	*Sequoia sempervirens*	Coast Redwood	5	18	10	3	4	3	2
23	*Sequoia sempervirens*	Coast Redwood	5	20	10	3	4	3	2
24	*Sequoia sempervirens*	Coast Redwood	6	22	10	3	4	3	2
25	*Sequoia sempervirens*	Coast Redwood	5	20	10	3	4	3	2
26	*Sequoia sempervirens*	Coast Redwood	7	18	10	3	4	3	2
27	*Sequoia sempervirens*	Coast Redwood	4	15	10	3	4	3	2
28	*Sequoia sempervirens*	Coast Redwood	3	12	6	2	4	3	2
29	*Sequoia sempervirens*	Coast Redwood	6	16	10	2	4	3	2
30	*Sequoia sempervirens*	Coast Redwood	12	25	12	1	4	3	2
31	*Juglans nigra*	Black Walnut	23	35	18	3	3	3	2
32	*Juglans nigra*	Black Walnut	9+10+11+12+13	35	18	2	3	3	2

HORTICULTURAL ASSOCIATES
P.O. Box 1261, Glen Ellen, CA 95442
707.935.3911

TREE INVENTORY
800 Yolanda Avenue
Santa Rosa, CA

Tree #	ase print	Common Name	Trunk (dbh ± inches)	Height (± feet)	Radius (± feet)	Health 1 - 5	Structure 1 - 4	Expected Impact	Recommendations
33	*Juglans nigra*	Black Walnut	14+14	35	20	3	3	3	2
34	*Juglans nigra*	Black Walnut	12+19	35	20	3	3	3	2
35	*Juglans nigra*	Black Walnut	15	15	12	2	1	2	1, 6, 7, 8, 9
36	*Fraxinus uhdei*	Evergreen Ash	24	15	12	2	1	3	2
37	*Sequoia sempervirens*	Coast Redwood	23	50	15	4	3	3	2
38	*Gleditsia triacanthos*	Honey Locust	9	25	12	3	3	3	2
39	*Sequoia sempervirens*	Coast Redwood	30	50	15	4	3	3	2
40	*Sequoia sempervirens*	Coast Redwood	24	50	15	4	3	3	2
41	*Sequoia sempervirens*	Coast Redwood	26	50	15	4	3	3	2
42	*Sequoia sempervirens*	Coast Redwood	20	50	15	4	3	3	2
43	*Sequoia sempervirens*	Coast Redwood	20	50	15	4	3	3	2
44	*Sequoia sempervirens*	Coast Redwood	20	50	15	4	3	3	2
45	*Sequoia sempervirens*	Coast Redwood	4	12	5	3	3	3	2
46	*Sequoia sempervirens*	Coast Redwood	5	12	5	3	3	3	2
47	*Sequoia sempervirens*	Coast Redwood	4	16	8	3	3	3	2

TREE INVENTORY
800 Yolanda Avenue
Santa Rosa, CA

Tree #	ase print	Common Name	Trunk (dbh ± inches)	Height (± feet)	Radius (± feet)	Health 1 - 5	Structure 1 - 4	Expected Impact	Recommendations
48	*Sequoia sempervirens*	Coast Redwood	4	15	6	3	3	3	2
49	*Sequoia sempervirens*	Coast Redwood	5	15	6	3	3	3	2
50	*Sequoia sempervirens*	Coast Redwood	4	12	6	3	3	3	2
51	*Sequoia sempervirens*	Coast Redwood	5	20	8	3	3	3	2
52	*Sequoia sempervirens*	Coast Redwood	5	20	8	3	3	3	2
53	*Sequoia sempervirens*	Coast Redwood	5	20	8	3	3	3	2
54	*Sequoia sempervirens*	Coast Redwood	7	20	8	3	3	3	2
55	*Sequoia sempervirens*	Coast Redwood	5	20	8	3	3	3	2
56	*Sequoia sempervirens*	Coast Redwood	5	20	8	3	3	3	2
57	*Malus floribunda*	Crabapple	4+3+2+2	10	8	2	2	3	2
58	*Sequoia sempervirens*	Coast Redwood	6	18	10	3	4	2	1, 6, 7, 8, 9
59	*Sequoia sempervirens*	Coast Redwood	6	18	10	3	4	1	1, 6, 7, 8, 9
60	*Sequoia sempervirens*	Coast Redwood	5	18	10	3	4	1	1, 6, 7, 8, 9
61	*Sequoia sempervirens*	Coast Redwood	6	18	10	3	4	1	1, 6, 7, 8, 9
62	*Sequoia sempervirens*	Coast Redwood	5	18	10	3	4	1	1, 6, 7, 8, 9

TREE INVENTORY
800 Yolanda Avenue
Santa Rosa, CA

Tree #	ase print	Common Name	Trunk (dbh ± inches)	Height (± feet)	Radius (± feet)	Health 1 - 5	Structure 1 - 4	Expected Impact	Recommendations
63	*Sequoia sempervirens*	Coast Redwood	5	15	8	3	4	1	1, 6, 7, 8, 9
64	*Sequoia sempervirens*	Coast Redwood	5	15	8	3	4	1	1, 6, 7, 8, 9
65	*Sequoia sempervirens*	Coast Redwood	5	12	8	3	4	1	1, 6, 7, 8, 9
66	*Sequoia sempervirens*	Coast Redwood	4	12	8	3	4	1	1, 6, 7, 8, 9
67	*Sequoia sempervirens*	Coast Redwood	4	12	8	3	4	1	1, 6, 7, 8, 9
68	*Sequoia sempervirens*	Coast Redwood	5	15	8	3	4	1	1, 6, 7, 8, 9
69	*Eucalyptus globulus*	Blue Gum	80	50	30	2.5	2	3	2
70	*Quercus lobata*	Valley Oak	17	40	60	4	3	2	1, 6, 7, 8, 9
71	*Sequoia sempervirens*	Coast Redwood	6	15	8	3	4	3	2
72	*Sequoia sempervirens*	Coast Redwood	6	15	8	3	4	3	2
73	*Sequoia sempervirens*	Coast Redwood	6	15	8	3	4	3	2
74	*Sequoia sempervirens*	Coast Redwood	6	15	8	3	4	3	2
75	*Sequoia sempervirens*	Coast Redwood	6	15	8	3	4	3	2
76	*Sequoia sempervirens*	Coast Redwood	6	15	8	3	4	3	2
77	*Sequoia sempervirens*	Coast Redwood	6	15	8	3	4	3	2

TREE INVENTORY
800 Yolanda Avenue
Santa Rosa, CA

Tree #	ase print	Common Name	Trunk (dbh ± inches)	Height (± feet)	Radius (± feet)	Health 1 - 5	Structure 1 - 4	Expected Impact	Recommendations
78	*Sequoia sempervirens*	Coast Redwood	6	15	8	3	4	3	2

KEY TO TREE INVENTORY CHART

KEY TO TREE INVENTORY CHART

800 Yolanda Avenue
Santa Rosa, California

Tree Number

Each tree has been identified in the field with an aluminum tag and reference number. Tags are attached to the trunk at approximately eye level and the *Tree Location Plan* illustrates the location of each numbered tree that is outside the creek setback area. Trees in the creek setback area have been tagged and numbered, but only their approximate locations have been illustrated.

Species

Each tree has been identified by genus, species and common name. Many species have more than one common name.

Trunk

Each trunk has been measured, to the nearest one half inch, to document its diameter at 4 feet above adjacent grade. Trunk diameter is a good indicator of age, and is commonly used to determine mitigation replacement requirements.

Height

Height is estimated in feet, using visual assessment.

Radius

Radius is estimated in feet, using visual assessment. Since many canopies are asymmetrical, it is not uncommon for a radius estimate to be an average of the canopy size.

Health

The following descriptions are used to rate the health of a tree. Trees with a rating of 4 or 5 are very good candidates for preservation and will tolerate more construction impacts than trees in poorer condition. Trees with a rating of 3 may or may not be good candidates for preservation, depending on the species and expected construction impacts. Trees with a rating of 1 or 2 are generally poor candidates for preservation.

(5) Excellent - health and vigor are exceptional, no pest, disease, or distress symptoms.

(4) Good - health and vigor are average, no significant or specific distress symptoms, no significant pest or disease.

(3) Fair - health and vigor are somewhat compromised, distress is visible, pest or disease may be present and affecting health, problems are generally correctable.

(2) Marginal - health and vigor are significantly compromised, distress is highly visible and present to the degree that survivability is in question.

(1) Poor - decline has progressed beyond the point of being able to return to a healthy condition again. Long-term survival is not expected. This designation includes dead trees.

Structure

The following descriptions are used to rate the structural integrity of a tree. Trees with a rating of 3 or 4 are generally stable, sound trees which do not require significant pruning, although cleaning, thinning, or raising the canopy might be desirable. Trees with a rating of 2 are generally poor candidates for preservation unless they are preserved well away from improvements or active use areas. Significant time and effort would be required to reconstruct the canopy and improve structural integrity. Trees with a rating of 1 are hazardous and should be removed.

(4) Good structure - minor structural problems may be present which do not require corrective action.

(3) Moderate structure - normal, typical structural issues which can be corrected with pruning.

(2) Marginal structure - serious structural problems are present which may or may not be correctable with pruning, cabling, bracing, etc.

(1) Poor structure - hazardous structural condition which cannot be effectively corrected with pruning or other measures, may require removal depending on location and the presence of targets.

Development Impacts

Considering the proximity of construction activities, type of activities, tree species, and tree condition - the following ratings are used to estimate the amount of impact on tree health and stability. Most trees will tolerate a (1) rating, many trees could tolerate a (2) rating with careful consideration and mitigation, but trees with a (3) rating are poor candidates for preservation due to their very close proximity to construction or because they are located within the footprint of construction and cannot be preserved.

(3) A significant impact on long term tree integrity can be expected as a result of proposed development.

(2) A moderate impact on long term tree integrity can be expected as a result of proposed development.

(1) A very minor or no impact on long term tree integrity can be expected as a result of proposed development.

(0) No impact is expected

Recommendations

Recommendations are provided for removal or preservation. For those being preserved, protection measures and mitigation procedures to offset impacts and improve tree health are provided.

(1) Preservation appears to be possible.

(2) Removal is required due to significant development impacts.

(3) Removal is recommended due to poor health or hazardous structure.

(4) Removal is required due to significant development impacts and poor existing condition.

(5) Removal is recommended due to poor species characteristics.

(6) Install temporary protective fencing at the edge of the dripline, or edge of approved construction, prior to beginning grading or construction. Maintain fencing in place for duration of all construction activity in the area.

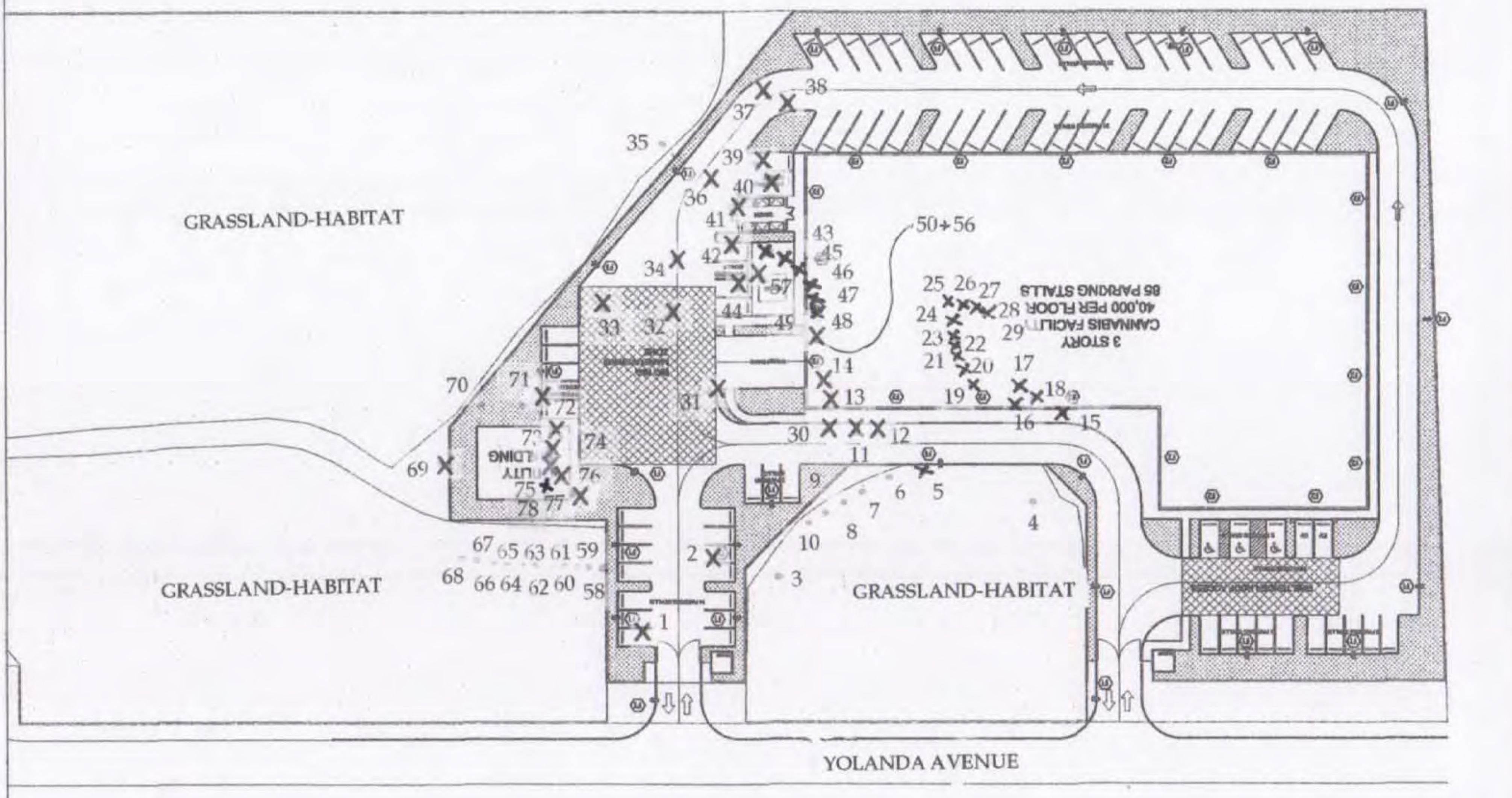
(7) Maintain existing grade within the fenced portion of the dripline. Route drainage swales and all underground work outside the dripline.

(8) Place a 4" layer of chipped bark mulch over the soil surface within the fenced dripline prior to installing temporary fencing. Maintain this layer of mulch throughout construction.

(9) Prune to clean, raise, or provide necessary clearance, per International Society of Arboriculture Pruning Standards. Pruning to occur by, or under the supervision of, an Arborist certified by the International Society of Arboriculture. Pruning Standards are attached to this report.

TREE LOCATION PLAN

TREE LOCATION AND NUMBERING PLAN
800 Yolanda Avenue
Santa Rosa, CA



TREE PROTECTION GUIDELINES

TREE PROTECTION GUIDELINES
FOR CONSTRUCTION AROUND PRESERVED TREES

800 Yolanda Avenue
Santa Rosa, CA

TREE PROTECTION ZONE

The Tree Protection Zone is illustrated on the Improvement Plans and represents the area around each tree, or group of trees, which must be protected at all times with tree protection fencing. No encroachment into the Tree Protection Zone is allowed at any time without approval from the project arborist, and unauthorized entry may be subject to civil action and penalties.

The protected area beneath the canopy of each tree will be designated by the project arborist as the Tree Protection Zone at a location determined to be adequate to ensure long term tree viability and health. The Tree Protection Zone may not be consistent with the canopy dripline in many locations.

TREE PROTECTION FENCING

Prior to initiating any construction activity on a construction project, including demolition, vegetation or approved tree removal, grubbing, or grading, temporary protective fencing shall be installed at each site tree or group of trees. Fencing shall be located at the edge of the Tree Protection Zone as specifically designated by the project arborist.

Fencing shall be minimum 4' height at all locations, and shall form a continuous barrier without entry points around all individual trees, or groups of trees. Barrier type fencing such as *Tensar* plastic fencing is recommended, but any fencing system that adequately prevents entry will be considered for approval by the project arborist. The use of post and cable fencing is not acceptable.

Fencing shall be installed in a professional manner using standard quality farm 'T' posts that are placed no more than 8 feet on center. Fencing shall be attached to each post at 5 locations with plastic electrical ties. Fencing shall be stretched tightly between posts in all locations. See fencing detail.

Fencing shall serve as a barrier to prevent encroachment of any type by construction activities including equipment, building materials, storage, outhouses, or personnel.

All encroachment into the fenced Tree Protection Zone must be approved in writing and supervised by the project arborist. Fencing relocation from original placement must also be approved in writing and be approved by the project arborist. Approved Tree Protection Zone encroachment may require additional mitigation or protection measures that will be determined by the project arborist at the time of the request.

Contractors and subcontractors shall direct all equipment and personnel to remain outside the fenced area at all times until project is complete, and shall instruct personnel and sub-contractors as to the purpose and importance of fencing and preservation. All contractors and subcontractors are notified by this specification that there will be no exceptions without prior written approval.

Fencing shall be upright and functional at all times prior to demolition and grading and through completion of construction in the specific area of protected trees. If the project is to occur in phases fencing may be removed as each phase is completed.

GRADING AND TRENCHING

Any construction activity that necessitates soil excavation in the vicinity of preserved trees shall be avoided where possible, or be appropriately mitigated under the guidance of the project arborist. All contractors must be aware at all times that specific protection measures are defined, and non-conformance may generate stop-work orders.

The designated Tree Protection Zone is defined around all site trees to be preserved. Fences protect the designated areas. No grading or trenching is to occur within this defined area unless so designated by the Improvement Plan, and where designated shall occur under the direct supervision of the project arborist.

Trenching should be routed around the Tree Protection Zone whenever possible. Where trenching has been designated within the Tree protection Zone, utilization of underground technology to bore, tunnel or excavate with high-pressure air or water will be specified. Hand digging will be generally discouraged unless site conditions restrict the use of alternate technology.

All roots greater than one inch in diameter shall be cleanly hand-cut as they are encountered in any trench or in any grading activity. The tearing of roots by equipment of any type shall not be allowed. Mitigation treatment of pruned roots shall be specified by the project arborist as determined by the degree of root pruning, location of root pruning, and potential exposure to desiccation. No pruning paints or sealants shall be used on cut roots.

Where significant roots are encountered mitigation measures such as supplemental irrigation and/or organic mulches may be specified by the project arborist to offset the reduction of root system capacity.

Retaining walls are effective at holding grade changes outside the area of the Tree Protection Zone and are recommended where necessary. Retaining walls shall be constructed in post and beam or drilled pier construction styles where they are necessary near or within the Tree Protection Zone.

Placement of fill soils is generally discouraged within the Tree Protection Zone, but in some approved locations may be approved to cover up to 30% of this area. The species and condition of the tree shall be considered, as well as site and soil conditions, and depth of fill. Retaining walls should be utilized to minimize the area of fill within the Tree Protection Zone Type of fill soil and placement methods shall be specified by the project arborist.

Grade changes near or within the Tree Protection Zone shall be designed so that surface drainage will not diverted toward or around the root crown in any manner. Grade shall drain away from root crown at a minimum of 2%. If grading toward the root collar is unavoidable, appropriate surface and/or subsurface drain facilities shall be installed so that water is effectively diverted away from root collar area.

Approved fill soils within the Tree Protection Zone may also be mitigated using aerated gravel layers as specified by the project arborist.

Tree roots will be expected to grow into areas of soil fill, and quality of imported soil shall be considered. Fill soil shall be site topsoil that closely matches that present within the root zone area. When import soil is utilized it must be the same or slightly coarser texture than existing site soil, should have a pH range comparable to site soils, and generally should have acceptable chemical properties for appropriate plant growth. A soil analysis is required prior to soil importation to evaluate import soil for these criteria.

Grade reduction within the designated Tree Protection Zones shall be generally discouraged, and where approved, shall be conducted only after careful consideration and coordination with the project arborist.

Foundations or footings of any type within the Tree Protection Zone shall be constructed using design techniques that eliminate the need for trenching into natural grade. These techniques might include drilled piers, grade beams, bridges, or cantilevered structures.

TREE DAMAGE

Any form of tree damage which occurs during the demolition, grading, or construction process shall be evaluated by the project arborist. Specific mitigation measures will be developed to compensate for or correct the damage. Fines and penalties may also be levied.

Horticultural Associates
P.O. Box 1261
Glen Ellen, CA 95442
707-935-3911

Measures may include, but are not limited to, the following:

- pruning to remove damaged limbs or wood
- bark scoring to remove damaged bark and promote callous formation
- alleviation of compaction by lightly scarifying the soil surface
- installation of a specific mulching material
- supplemental irrigation during the growing season for up to 5 years
- treatment with specific amendments intended to promote health, vigor, or root growth
- vertical mulching or soil fracturing to promote root growth
- periodic post-construction monitoring at the developer's expense
- tree replacement, or payment of the established appraised value, if the damage is so severe that long term survival is not expected

MULCHING

Trees will generally benefit from the application of a 4 inch layer of chipped bark mulch over the soil surface within the greater root zone area. Ideal mulch material is a chipped bark containing a wide range of particle sizes. Bark mulches composed of shredded redwood, bark screened for uniformity of size, or chipped lumber are not acceptable.

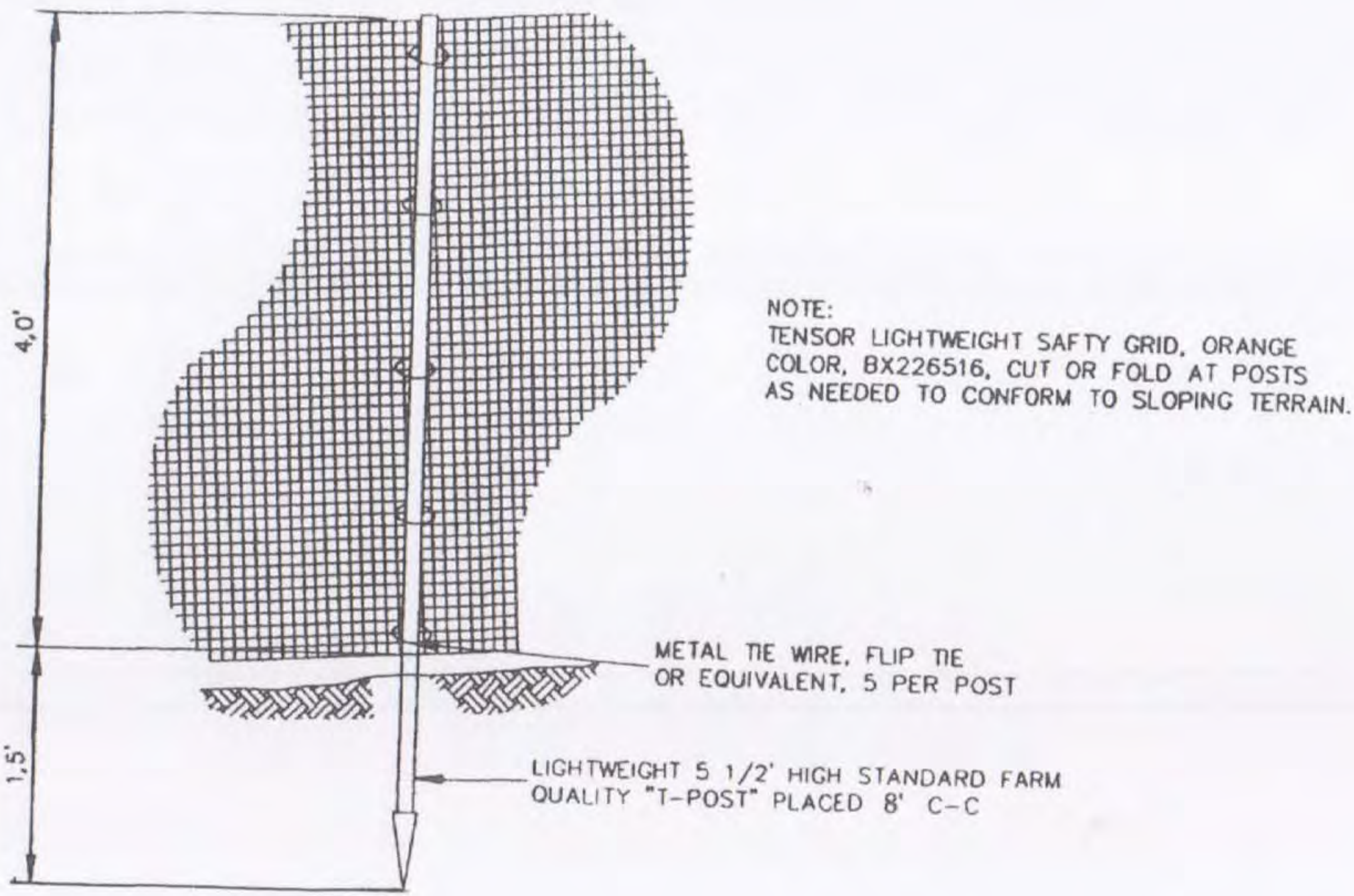
Chipped bark mulch may not originate from any tree infected with, or exhibiting symptoms of, Sudden Oak Death (SOD) due to the potential of infecting existing site trees.

TREE PRUNING AND TREATMENTS

All recommendations for pruning or other treatments must be completed prior to acceptance of the project. It is strongly recommended that pruning be completed prior to the start of grading to facilitate optimum logistics and access.

All pruning shall be conducted in conformance with International Society of Arboriculture pruning standards, and all pruning must occur under the direct supervision of, an arborist certified by the International Society of Arboriculture.

TREE FENCING DETAIL



TREE PROTECTION

California Tiger Salamander Impact Analysis
800 Yolanda Avenue, Santa Rosa, California
APN: 044-091-063 (~5.53 Acres)

April 1, 2020

Report Prepared For:

800 Yolanda, LLC
9030 National Blvd.
Los Angeles, California 90034

Attention: Mr. Danny Abdelmalak

Report Prepared By:

Monk & Associates, Inc.
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867, ext. 201

Contact: Mr. Geoff Monk

TABLE OF CONTENTS

Figures
Attached at Back of Report

Exhibits
Attached at Back of Report

1. INTRODUCTION

Monk & Associates (M&A) Principal Biologist Mr. Geoff Monk analyzed whether the construction of a three story, 116,800 square foot cannabis facility with 85 parking stalls (the proposed project) located at 800 Yolanda Avenue in Santa Rosa, California (Figures 1, 2, and 3) (the project site) could impact the California Tiger Salamander (*Ambystoma californiense*) or trigger any requirements for California tiger salamander mitigation measures. The Sonoma County Distinct Population Segment (DPS) of the California tiger salamander is listed as endangered under the Federal Endangered Species Act (FESA) and as threatened under the California Endangered Species Act (CESA). As discussed below, the conclusion of this report is that the proposed project would not impact the California tiger salamander and would not require California tiger salamander mitigation. This finding is primarily based on the fact that: (1) no California tiger salamander have been identified on the project site and the project site is not within the known dispersal distance of the California tiger salamander; (2) the project site provides no suitable breeding or oversummering habitat for the California tiger salamander; (3) the project site is in an urbanized area with surrounding residential and commercial development and heavily trafficked roads; (4) proposed development on the project site is limited primarily to hardpack surface areas; (5) the proposed project does not require permits from any natural resource agency; and (6) the proposed project will not result in take of the California tiger salamander, as defined in the FESA.

To complete the analysis in this report, Mr. Monk visited the project site on December 17, 2019 to examine existing conditions. Mr. Monk also examined a site development plan to determine whether construction of the proposed project would affect potential California tiger salamander breeding habitat, oversummering habitat, or dispersal habitat. Mr. Monk also reviewed other biological reports prepared for the proposed project listed in Section 2 below, and other regulatory documents as discussed herein and as presented in the Literature Cited Section of this report.

2. BACKGROUND DOCUMENT REVIEW

Prior to conducting the site investigation, M&A reviewed available relevant biological assessments prepared for the proposed project including:

1) *California Tiger Salamander Habitat Evaluation of Subject Area – 800 Yolanda Avenue, Santa Rosa, California*, prepared on June 26, 2017 by Wiemeyer Ecological Sciences (Wiemeyer 2017);

2) *Biological Assessment. Santa Rosa Farm Group, 800 Yolanda Avenue, Santa Rosa, CA.* Prepared by Mr. Darren Wiemeyer, Wiemeyer Ecological Sciences, 4000 Montgomery Drive, Suite L-5, Santa Rosa, CA 95405 March 7, 2018;

3) A *Site Assessment for California Tiger Salamander* prepared by Fawcett Environmental Consulting dated March 30, 2012 (Fawcett Environmental Consulting, 2012); and

4) The current version of the California Natural Diversity Data Base (CNDDB 2019) for records of California tiger salamander occurrences within 3 miles of the project site (Figure 4).

3. MONK & ASSOCIATES EXPERTISE WITH THE CALIFORNIA TIGER SALAMANDER

M&A holds a federal 10(a)(1)(A) Recovery Permit and a California Department of Fish and Wildlife (CDFW) Memorandum of Understanding (MOU) allowing M&A to conduct formal California tiger salamander assessments and surveys. Mr. Geoff Monk, principal biologist at M&A has extensive experience in the Santa Rosa Plain having conducted 79 California tiger salamander surveys and assessments since 1989 (Exhibits A-A to A-C). Currently, in Santa Rosa, M&A is conducting a U.S. Fish and Wildlife Service (USFWS) and CDFW approved protocol California tiger salamander survey (USFWS 2003) off Fulton Road. Also, M&A has been conducting a formal USFWS approved California tiger salamander larval survey off Wood Road in Santa Rosa that will continue next winter as a formally approved full protocol survey.

It is likely that the only other biologists that have a similar extent of California tiger salamander survey work in the Santa Rosa Plain is Dr. Michael Fawcett (private consultant) and Mr. David Cook (Sonoma County Water Agency). Dr. Fawcett previously analyzed the effects of the proposed project on the California tiger salamander and concluded the project would not impact the California tiger salamander. Thus, two of the most experienced biologists conducting California tiger salamander work on the Santa Rosa Plain over the last 30 years (Dr. M. Fawcett and G. Monk) have now evaluated whether the proposed project could impact the California tiger salamander.

4. FINDINGS OF PRIOR EVALUATIONS ON THE EFFECTS OF THE PROPOSED PROJECT ON THE CALIFORNIA TIGER SALAMANDER

Dr. M. Fawcett (Fawcett 2012), and D. Wiemeyer (Wiemeyer 2017 and 2018) concluded that development of the project would not impact the California tiger salamander based on the distances between the project site and known California tiger salamander occurrences (Figure 4 and Exhibit B), as well as noting that urban development and infrastructure located between the project site and known California tiger salamander occurrences would constitute geographic barriers to migration to the project site. Wiemeyer (2017 and 2018) and Fawcett (2012) determined that Highway 101 and Santa Rosa Avenue are major barriers to California tiger salamander migration. Accordingly, they concluded that records for California tiger salamander on the other side of (west) of Highway 101 from the project site (as shown in Figure 4) were irrelevant to their assessment of the effects of the proposed project on the California tiger salamander (Fawcett 2012; Wiemeyer 2017 and 2018).

In addition, Dr. Fawcett (Fawcett 2012), and D. Wiemeyer (Wiemeyer 2017 and 2018) concluded that the closest known California tiger salamander record east of Highway 101, is located at the Horn Mitigation Bank (recorded by Mr. Monk), which is approximately 1.8 miles south of the project site (Figure 4). A few other more distant California tiger salamander breeding records also occur at other Horn Conservation Banks also recorded by Mr. Monk. The USFWS/CDFW recognized dispersal distance of the California tiger salamander is 1.3 miles from their breeding sites (USFWS 2003). Thus, the California tiger salamander would not be expected to be able to disperse to the project site from the closest California tiger salamander breeding record east of Highway 101 that is 1.8 miles southeast of the project site (Exhibit B). Moreover, Fawcett and Wiemeyer (op. citations) also concluded that, regardless of the distance between the project site and the Horn Banks, there is dense residential subdivision extending west from Old Petaluma Hill Road that would constitute physical and geographical barriers to dispersal of the California tiger salamander from the Horn Banks to the project site. Dr. Fawcett specifically concluded: *Given the project site's isolation and distance from the nearest known California tiger salamander location (1.8 miles), the property at 800 Yolanda Avenue is highly unlikely to be occupied by California tiger salamander at the present time and is unlikely to contribute to the survival or recovery of the species*. Also, Mr. Wiemeyer specifically concluded: *Based on this evaluation, it has been determined that there will be no impact to this species* [the California tiger salamander] *as a result of the proposed project.* These conclusions are further supported by M&A's analysis that follow in this report.

5. CALIFORNIA TIGER SALAMANDER

5.1 Legal status

5.1.1 FEDERAL AND CALIFORNIA ENDANGERED SPECIES ACTS

The California tiger salamander Sonoma County DPS is a federally listed endangered species (USFWS 2003). The proposed project site is located within its known range. The USFWS determined that the Sonoma County DPS is significantly and immediately imperiled by a variety of threats including habitat destruction, degradation, and fragmentation due to urban development, road construction, pesticide drift, collection, and inadequate regulatory mechanisms. In addition, it determined that this population could face extinction as a result of naturally occurring events (e.g., fires, droughts) due to the small and isolated nature of the remaining breeding sites combined with the small number of individuals in the population. On August 31, 2011, the Final Rule on the Revised Designation of Critical Habitat for the Sonoma County Distinct Population of the California tiger salamander was published (76 FR 54346 54372) (USFWS 2011). Approximately 47,383 acres were designated as Critical Habitat. *The proposed project site is barely located within designated critical habitat in the Santa Rosa Plain (Figure 5).*

On March 4, 2010, the California tiger salamander was also State listed as a threatened species under the California Endangered Species Act (CESA).

Because of these listings, proposed projects may not adversely impact California tiger salamanders without incidental take authority from both USFWS and CDFW. Prior to implementing a project that would result in "take" (i.e., to harm, harass, or kill) of California tiger salamanders, applicants must obtain "Incidental Take" authorization from the USFWS pursuant to either Section 7 or Section 10 of the FESA. Similarly, projects that would result in take of California tiger salamanders must also obtain an Incidental Take Permit (ITP) from CDFW pursuant to the CESA.

5.1.2 Santa Rosa Plain Conservation Strategy and Programmatic Biological Opinion

In 2005, USFWS published the Final Santa Rosa Plain Conservation Strategy (USFWS et al. 2005). The Conservation Strategy was intended to (1) create a long-term conservation program for California tiger salamander and several listed plant species on the Santa Rosa Plain; and (2) support the issuance of incidental take authorization for future development projects that would adversely affect the listed (covered) species. Among other things, the Conservation Strategy identified eight conservation areas for the covered species; provided for the establishment and management of preserve areas; authorized translocation of covered species; set forth policies for improving and managing habitat; recommended mitigation requirements for the covered species; and identified potential funding mechanisms for conservation and recovery projects.

The Conservation Strategy, however, depended on participating local jurisdictions including the City of Santa Rosa, developing and adopting an Implementation Plan. To date, adoption of an Implementation Plan has not occurred. While certain municipal agencies still reference the Conservation Strategy for potential impact analysis, it is not currently a legally binding document. Nonetheless, below, this report analyzes certain sections of the Conservation Strategy in relation to the project site.

In May 2006, the USFWS and CDFW issued a letter (Interim Mitigation 2006 Letter 2006) to the Santa Rosa Plan Conservation Strategy Committee regarding interim mitigation guidelines for California tiger salamander. The letter amends the agencies' prior June 29, 2005 letter (Letter 2005), which is referenced in Section 5.4: Interim CTS Mitigation of the Conservation Strategy. This report analyzes the applicability of the Interim Mitigation Letter (Letter 2006) to the project site.

The entire project site is approximately 5.53 acres (Figure 3). Revised Figure 3 of the Conservation Strategy shows (not attached hereto) the project site as being mapped within a broad area labeled as "Potential for Presence of California tiger salamander and Listed Plants." However, as described herein, M&A has confirmed through site-level surveys and analysis that the entire 5.33 acres would be most unlikely to support the California tiger salamander. In addition, prior biological studies that analyzed the proposed project noted that the project site is effectively surrounded by urban development including industrial uses to the north, residential uses to the south, Petaluma Hill Road to the east, and more industrial uses to the west. Because of the project site's location, from a recovery perspective, it would be most unlikely to be regarded by the resource agencies as essential for the conservation of the California tiger salamander.

M&A recognizes that the project site is within a mapped area shown on Exhibit C (Revised Figure 3 of the Conservation Strategy), which indicates that there is "potential presence" of the California tiger salamander. Section 5.3.3.2 of the Conservation Strategy states: Projects will be proposed in areas beyond 1.3 miles from a known CTS breeding site, but within the "Potential for Presence of CTS" or "Potential for Presence of CTS and Listed Plants" areas shown on Figure 3, where CTS information is lacking. The potential presence of the California tiger salamander on the project site has been investigated by leading experts with this salamander on the Santa Rosa Plain. Dr. Fawcett (Fawcett 2012), and D. Wiemeyer (Wiemeyer 2017 and 2018), after analyzing the setting of the project site, concluded that the California tiger salamander would not occur on this site. Similarly, based on evidence accumulated for this report, and additional site visits, Mr. Monk, it was also similarly determined that California tiger salamander would be most unlikely to occur on any portion of the project site. Further analyses are unwarranted owing to the distance of the project site to known records of the California tiger salamander (as further discussed below) and the project site's setting in an urbanized/industrialized area.

Section 4.2 of the Conservation Strategy states that *designation of an individual property as being within a conservation area does not change that property's land use designation or zoning, or otherwise restrict the use of that property. However, compliance with the ESA and other State and Federal law is still required*. Here, it is important to note the proposed project is not in a designated Conservation Area (Conservation Strategy Figure 3) and it does not have a federal nexus nor are permits required for the proposed project from State or Federal resource agencies. More specifically, in 2007, USFWS issued a Programmatic Biological Opinion for U.S. Army Corps of Engineers Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain (Programmatic BO) (USFWS 2007). The Programmatic BO is intended to simplify the consultation process under Section 7 of^ FESA for development projects on the Santa Rosa Plain that require permits from the Army Corps of Engineers (Corps). Because the proposed project avoids jurisdictional wetlands and does not require a permit from the Corps, the Programmatic BO is inapplicable to the proposed project.

Section 5 of the Conservation Strategy provides mitigation measure guidance. Section 5.3.3: Mitigation for the California tiger salamander states that "the mitigation outline in Section 5.3 will not be applied until this [implementation plan] planning process is complete. Recall, as noted above, that the implementation plan is not complete at this time. As a result, there is no binding California tiger salamander mitigation that could apply to the project. However, for informational purposes only, this report explains the mitigation guidance set forth in the Conservation Strategy and the Interim Mitigation Letter.

The mitigation guidance in the Conservation Strategy is grouped by four types of projects, including: (1) projects likely to impact the California tiger salamander; (2) projects beyond 1.3 miles from California tiger salamander breeding sites; (3) projects where presence of the California tiger salamander is not likely, and (4) linear projects. The entire project site falls into the third category (projects where presence of California tiger salamander is not likely) for several reasons, as explained in detail below.

Section 5.3.3.3 of the Conservation Strategy states that *impacts to California tiger salamander is not likely on some lands beyond 1.3 miles from breeding sites, or on land within 1.3 miles from breeding sites that are surrounded by significant barriers or are otherwise unsuitable California tiger salamander habitat*. Regarding the proposed project site, the closest breeding record is 1.35 miles, beyond the recognized dispersal distance of this salamander (Exhibit B). A most important consideration is that while there are adult records west of the project site slightly closer than 1.3 miles (Figure 4), mitigation in the Conservation Strategy (USFWS 2005) is based upon the closest breeding record unless there is an adult record within 500 feet of a project site, which isn't the case for the project site. Regardless, the closest breeding record and other adult occurrences occur on the other side of Highway 101, a significant geographic barrier (Figure 4) to California tiger salamander migration that is well recognized by CDFW and USFWS.

The closest record on the same side of Highway 101 as the project site is located approximately 1.8 miles to the southeast at the Horn Banks and is much further than the 1.3 mile known dispersal distance from breeding sites. Finally, the entire project site is on land that is surrounded by significant development barriers that would prevent California tiger salamander migration and dispersal to the project site. Open land to the east of Petaluma Hill Road immediately east of the project site is outside the Santa Rosa Plain, and regardless in the Conservation Exhibit C, Revised Figure 3 is categorized as *CTS is Not Likely*. Thus, this salamander would be most unlikely to migrate to the project site from areas where it does not occur.

Finally, M&A's principal biologist Mr. G. Monk, Dr. M. Fawcett (Fawcett 2012), and D. Wiemeyer (Wiemeyer 2017 and 2018) have assessed the entire project site and all concluded this it is unsuitable California tiger salamander habitat. Based on these findings, and the guidance in Section 5.3.3: Mitigation for the California tiger salamander in the Conservation Strategy, no mitigation is warranted for development on the project site, even if the Conservation Strategy was applied to the entire project site.

The Interim Mitigation Letter (Letter 2006) would also not require mitigation for a project on the project site. This letter states specifically that "[t]he Interim mitigation guidelines shall apply to all projects that may result in "take" of the CTS as defined in the federal ESA." The Interim Mitigation Letter (Letter 2006) also states that "[u]nless otherwise shown in the map attached to the Conservation Strategy as Figure 3 mitigation for CTS will be required for all projects within 1.3 miles of a known breeding site *so long as the project site supports potential CTS habitat*." See Encloser 1 of the Interim Mitigation Letter. As explained in this report, and prior biological assessments: (a) the project site does not support the California tiger salamander and it would be most unlikely to be used in anyway by the California tiger salamander. Impacts associated with development of the proposed project would not result in take of California tiger salamander due to existing conditions. As corroborated by independent California tiger salamander biologists that studied the project site, it does not provide California tiger salamander habitat. Therefore, the interim mitigation guidelines do not apply to the project site based on the express terms of the Interim Mitigation Letter.

In an abundance of caution this report also reviewed the proposed mitigation ratios in the Interim Mitigation Letter (Letter 2006). These ratios do not apply to the project. Nonetheless, for informational purposes only, the mitigation ratio of 0.2:1 which applies to projects that are greater than 1.3 miles form a known California tiger salamander breeding record, is the only ratio that could potentially apply to the project site because the project site is designated as "Potential for Presence of CTS and Listed Plants" in Exhibit C Revised Figure 3 of the Conservation Strategy. However, mitigation requirements in the Interim Mitigation Letter (Letter 2006) do not apply to this project site specifically because the project will not result in take of California tiger salamander and several biological evaluations of the project site have determined that the project site does not support California tiger salamander. Therefore, per the terms of the Interim Mitigation Letter no mitigation is required for development on the project site.

5.1.3 SANTA ROSA PLAIN RECOVERY PLAN (USFWS 2016)

M&A also reviewed the USFWS' Santa Rosa Plain Recovery Plan (USFWS 2016). The Recovery Plan governs FESA compliance for "discretionary projects" that are being reviewed by federal "nexus" agencies (nexus refers to other federal agencies that are not the USFWS). In the Recovery Plan (op. cit.) the project site is not mapped within a "Core California tiger salamander Area." Rather, it is mapped within the Horn Hunter Management Area (Figure 6). The site is located on a narrow tip of this management area that is surrounded by urban development.

Generally, the Recovery Plan applies to projects undergoing federal nexus agency review for issuance of discretionary federal permits. In those cases, impacts to the California tiger salamander within a mapped Core or Management Area may require mitigation. Here, the proposed project does not require a federal permit and there is no federal nexus that would trigger permit or mitigation requirements. In addition, as discussed within this report, the project site does not support California tiger salamander, and the proposed project will not impact suitable California tiger salamander habitat. As the project will not trigger a federal discretionary permit, the Recovery Plan is not legally applicable, nor could mitigation measures apply.

5.2 Life History

California tiger salamanders occur in grasslands and open oak woodlands that provide suitable aestivation and/or breeding habitats. M&A has worked with populations that are almost at sea level (Catellus Site in the City of Fremont) to almost 2,900 feet above sea level (Kammerer Ranch, East Santa Clara County). California tiger salamanders spend most of their lives underground. They typically only emerge from their subterranean refugia for a few nights each year during rainfall events typically in late October through December to migrate to breeding ponds where they lay eggs. After spending a up to a few weeks and sometimes longer in breeding ponds the adult salamanders then return to their subterranean over-summering refugia not to resurface until the following breeding season. Young hatch typically in February and March and metamorphose leaving natal ponds in search of subterranean refugia typically in late April and May.

Deep, seasonal and sometimes perennial wetlands typically provide most of the breeding habitat used by California tiger salamanders. California tiger salamanders attach their eggs to rooted, emergent vegetation, and other stable filamentous objects in the water column. Eggs are gelatinous and are laid singly or occasionally in small clusters. Eggs range in size from about three-quarters (¾) the diameter of a dime to the full diameter of a dime. Typically, seasonal breeding pools must hold water into the month of May to allow enough time for larvae to fully metamorphose. Pools that are 16 inches or deeper in the peak winter months usually will remain inundated long enough to provide good breeding conditions for California tiger salamanders. Optimal pools are typically deeper than 16 inches consistently in most winters.

In dry years, seasonal wetlands, especially shallower pools, may dry too early to allow enough time for California tiger salamander larvae to successfully metamorphose. As pools dry down to very small areas of inundation, California tiger salamander larvae become concentrated and are particularly susceptible to predation. In Cotati, Mr. Monk observed drying pool predation of larvae by red-sided garter snakes (*Thamnophis sirtalis infernalis*). Similarly, ducks (various spp.)

are often observed predating larvae breeding pools. In duck-ravaged pools, California tiger salamander larvae concentrate in deeper water or are found in areas along the pool margins were pools remain relatively deep and/or there is dense emergent vegetation. When pools dry too soon, desiccated California tiger salamander larvae can be found in pool bottoms but owing to scavengers usually the desiccated larvae disappear within a day or two.

5.3 Migration

Adult California tiger salamanders have been observed up to 2,092 meters (1.3 miles) from breeding ponds (USFWS 2004). As such, unobstructed migration corridors are an important component of California tiger salamander habitat. In Sonoma County, Mr. G. Monk has been conducting California tiger salamander surveys since 1989 (Exhibits A-A to A-C). It is M&A's direct experience that California tiger salamanders move to their breeding pools at night during the first heavy, typically warmer, rainfall events of the year, usually in late-October into early December. In most instances, early movements from over-summering refugia to breeding sites do not occur until it has been raining continuously for several days, but occasionally errant salamanders may move to breeding pools during light rainfall events too. Typically, per M&A's experiences movements of California tiger salamander primarily occur when temperatures are above 48° F.

A primary factor encouraging larger movements of California tiger salamanders is continuous or nearly continuous rainfall over many days. Resultant widespread ground saturation that otherwise floods over-summering refugia can result in relatively large numbers of California tiger salamanders leaving their refugia in search of breeding sites over a one- or two-night period (as observed by G. Monk and S. Lynch during numerous studies). In addition to pitfall trapping results that demonstrate such movements, often these focused movement periods are evident in breeding pools where up to several size classes of larvae can be identified later in the spring, each size class likely being representative of a focused movement period for adult breeding salamanders.

5.4 Project Site Breeding Analysis

There are no aquatic habitats on or near the project site that could be used by the California tiger salamander for breeding. An intermittent drainage that creases the southeast corner of the project site does not support pools or remain hydrated long enough in the winter/spring to provide potential California tiger salamander breeding habitat. It was dry on December 17, 2019 after over 7 inches of rainfall in the Santa Rosa Plain had fallen in the prior two months.

Mr. Monk has also studied the Kawana Meadows project site east of Petaluma Hill Road immediately east of the project site. Also, the Kennedy-Wilson project sites both that are east of Petaluma Hill Road and immediately to the northeast of the project site. M&A has been studying these project sites for several years and they do not to provide potential California tiger salamander breeding habitat. Finally, a dairy that occurs east of Petaluma Hill Road just to the southeast of the project site, immediately south of the Kawana Meadows project site, supports a dairy waste pond that was constructed to comply with Regional Water Quality Control Board storm water management requirements. While working at the Kawana Meadows project immediately to the north, which for a time was accessed through this dairy, Mr. Monk examined this waste pond. It was uninhabitable by amphibians owing to the extent of cattle waste in the pond. This pond apparently is routinely cleaned every year scraping out contaminated soils and removing it to an appropriate landfill. This pond would not be used by California tiger salamanders for breeding.

5.5 Closest Known California Tiger Salamander Breeding Population

The closest known California tiger salamander breeding pool to the project site is located approximately 1.35 miles west of the project site on the west side (other side) of Highway 101 (Exhibit B). Highway 101 is a well-recognized geographic barrier that would prevent California tiger salamander dispersal over or across this freeway. The closest known CNDDB breeding record (CNDDB Occurrence No. 1088) for the California tiger salamander to the project site that is not separated from the project site by dense urban development and Highway 101 (see next section) is located approximately 1.80-miles to the southeast at the Horn Bank mitigation complex (Exhibit B). Multiple record locations at the Horn Bank mitigation complex are from Mr. Monk's California tiger salamander studies that encompassed all the Horn Banks and many other adjacent properties to these banks.

5.6 Potential Migration to the Project Site from Known Breeding Locations

The closest known California tiger salamander breeding pool to the project site is located approximately 1.35 miles west of the project site on the other side of Highway 101 from the project site. Highway 101 is a CDFW and USFWS recognized geographic barrier to California tiger salamander migration and would prevent any California tiger salamanders from migrating from one side of this Freeway to the other.

The Santa Rosa Plain Recovery Plan (USFWS 2016) states: *Habitat fragmentation also plays a role in reducing Sonoma County California tiger salamander abundances. California tiger salamanders require a large amount of barrier-free landscape for successful migration (Shaffer et al. 1993; Loredo et al. 1996). Urbanization and conversion to intensive agriculture can create permanent barriers that can isolate California tiger salamanders and prevent them from moving to new breeding habitat or prevent them from returning to their breeding ponds or underground burrow sites. Roads and highways also create permanent physical obstacles and increase habitat fragmentation. Road construction can reduce or eliminate the viability of a breeding site, and in some cases, larger portions of a metapopulation (Service 2003).*

It is well known that amphibians and reptiles are highly susceptible to injury or death while crossing roads (van Gelder 1973, Fahrig et al. 1995, Carr and Fahrig 2001). Hels and Buchwald (2001) studied the relationship between traffic volume and amphibian mortality for several species of frogs and salamanders. They concluded that:

- *Where amphibians have fixed route to and from spawning sites, they maybe undeterred by low to medium traffic intensity (i.e., below 12,000 vehicles per 24 hours),*

- *Mortality of this type of road therefore may be higher than predicted from traffic intensity alone, and*

- *With increased traffic intensity; mortality may eventually reduce the population to a level where its reproductive output is too small to reach the carrying capacities of the breeding ponds*.

Highway 101 far exceeds traffic volumes expected to constitute a complete and total physical geographic barrier for California tiger salamander migration. Accordingly, records of California tiger salamanders located west of (on the other side of) Highway 101 are not regarded as relevant to the project site located at 800 Yolanda Avenue.

The closest known breeding site east of Highway 101 (on the same side of Highway 101 as the project site) is located approximately 1.8 miles southeast of the project site at the Horn Banks. This record location exceeds the scientifically established dispersal distance for the California tiger salamander of 1.3 miles (USFWS 2004). Regardless, in the intervening area between the record location and the project site there is extensive development that also constitutes a significant geographic barrier to California tiger salamander movements from record locations to the project site.

5.7 Potential Migration from Open Spaces East, North and Northeast of the Project Site

The USFWS' Conservation Strategy (USFWS et al. 2005) indicates areas where FESA listed plants and the California tiger salamander are a concern. Revised Map 3 of the Conservation Strategy indicates that the areas north of Yolanda Avenue and the project site, and west and southwest of the project site, are "Already Developed (no potential for impact)" (Exhibits B and C). The Conservation Strategy (op. cit.) maps areas that are south, southeast, east, and northeast of the project site as "Presence of California tiger salamander is not likely but Mitigation for Listed Plants may be required." Accordingly, the Conservation Strategy isolates the proposed project site (and the parcel immediately to the south of similar size) within areas where impacts to the California tiger salamander are regarded as not expected or are not likely. In the same vein, the USFWS/Corps 2007 Programmatic Biological Opinion (that includes Enclosure 1 and 2 maps) (USFWS 2007) designates these same areas as "No Effect" on the California tiger salamander. This corroborates Mr. Monk's conclusion, and the conclusions of other well-known California tiger salamander biologists, that development on the project site would have no effects on the California tiger salamander.

5.7 California Tiger Salamander Project Site Hard Pack Assessment

M&A routinely assesses hard pack developed areas in our Biological Assessments prepared for the USFWS and the CDFW to exclude these areas from consideration for mitigation compensation for a project's impacts to California tiger salamander habitat. As a matter of policy, both the USFWS and CDFW exclude developed areas including buildings, paved parking areas, sidewalks, and other gravel impregnated areas (collectively termed hard pack developed areas) from consideration as potential California tiger salamander habitat. The USFWS' Conservation Strategy (USFWS 2005) states on page 40 *the mitigation requirement for projects on parcels with existing hardscape (see Glossary) can be reduced by the amount of hardscape present*. The Glossary (Section 11) of the Conservation Strategy provides the following definition: **"Hardscape** – Roads, parking lots, compacted gravel surfaces, buildings, or other structures." Neither CDFW nor USFWS requires California tiger salamander mitigation compensation for impacts to "hard-pack" areas.

M&A visited the project site on December 17, 2019 to examine hard-pack areas and using GPS equipment surveyed these areas (Figure 7). Later the GIS files were overlaid over the site development plan to determine if the project would be constructed on existing hard-pack surfaces (Figure 8). Approximately 3.06 acres of the 5.53-acre project site are regarded as hardpack surfaces. M&A confirmed that all proposed development would be on existing hard-packed surfaces that under all circumstances would not be regarded as California tiger salamander habitat. Accordingly, as designed there is no possible impact to the California tiger salamander from implementation of the proposed project.

Furthermore, even if development extended beyond the hard pack areas of the project site, as discussed above, the proposed project or any development on the project site does not trigger the any requirement for mitigation pursuant to the Conservation Strategy (USFWS et al. 2005) or the USFWS's 2016 Recovery Plan (USFWS 2016).

Here, it is also important to recognize that the proposed project was designed to avoid natural areas to the extent feasible by locating structures, parking areas, and ingress and egress points on existing hardscape areas. In doing so, the proposed project ensures it is not possible to impact the California tiger salamander and as such, there are no requirements for mitigation compensation. If the project development activities were to extend beyond existing developed hardpacked surfaces to implement roadway or frontage improvements, there would still be no mitigation requirements because several biological studies by recognized California tiger salamander experts determined that the project site would be most unlikely to support California tiger salamanders.

6. ANALYSIS SUMMARY AND CONCLUSIONS

There is no known breeding habitat on or within 1.3 miles of the project site. The known dispersal distance of the California tiger salamander from their breeding sites is 1.3 miles (USFWS 2004). *While there is an adult California tiger salamander CNDDB record 1.25 miles west of the project site, regardless mitigation requirements are based upon the distance from a project site to the closest breeding site unless there is an adult record within 500 feet of a proposed project site (Conservation Strategy 2005). The closest adult record west of the project site id approximately 6,336 feet from the project site and is on the opposite side of Highway 101 (Figure 4) an impenetrable California tiger salamander migration barrier.* While there is a California tiger salamander CNDDB breeding site record approximately 1.35 miles west of the project site (Exhibit B), it is also on the opposite side of Highway 101 from the project site. Highway 101, which is routed between the closest breeding record 1.35 miles west of the project site, is an impenetrable geographic barrier to California tiger salamander migration. Accordingly, California tiger salamanders west of Highway 101 would be unable to access the project site.

The closest known California tiger salamander breeding site east of Highway 101 (the same side of Highway 101 as the project site) is located approximately 1.8 miles southeast of the project site at the Horn Banks (Exhibit B). *This record location exceeds the scientifically established dispersal distance for the California tiger salamander of 1.3 miles from its breeding sites (USFWS 2004).* Regardless, in much of the intervening areas between the extant record locations and the project site there is extensive development that also constitutes significant geographic barriers to California tiger salamander movements from known record locations to the project site. USFWS' Recovery Plan (USFWS 2016) states: *Urbanization and conversion to intensive agriculture can create permanent barriers that can isolate California tiger salamanders and prevent them from moving to new breeding habitat or prevent them from returning to their breeding ponds or underground burrow sites.*

The project site is barely within USFWS mapped Critical Habitat (Figure 6). That said, the areas immediately north, west, east of the project site are not in mapped in Critical Habitat, are not regarded as potential habitat of the California tiger salamander in the Conservation Strategy (USFWS 2005), and there is high density residential housing south of the project site (Figure 2). This high density residential housing also constitutes a significant geographic barrier that would prevent migration to the project site by California tiger salamanders from areas south of the project site.

The Final Santa Rosa Plain Conservation Strategy (USFWS et. al. 2005) maps the proposed project as being within a broad area labeled as "Potential for Presence of California tiger salamander and Listed Plants" (Exhibit C. Conservation Strategy Revised Fig. 3). However, blowing up Revised Figure 3 of the Conservation Strategy so that it can be examined closely, the project site parcel and the parcel immediately south of the project site (a similarly sized relatively small parcel) are surrounded by mapped areas designated as "Already Developed (no potential for impact)" or "Presence of California tiger salamander is not likely and there are no listed plants in this area" (Exhibit D).

The proposed project site is sandwiched inbetween Conservation Strategy designated areas of "no potential impact" and "presence of California tiger salamander not likely." This mapping would suggest that the proposed project site is isolated within and surrounded by other mapped areas where the California tiger salamander is not expected to occur. Thus, unless this salamander was known to be present on the project site or the neighbor's similarly sized parcel, from these mapping designations alone it can be concluded that the project site is most unlikely to support this salamander. M&A has confirmed through site-level surveys and analysis that the project site would be most unlikely to support California tiger salamander. As there is no apparent breeding habitat on the project site (confirmed by multiple studies discussed herein) or on the neighbor's (small) parcel, as confirmed by Mr. Monk via looking at neighbor's parcel from project site and via aerial photograph examination, this salamander would also be unlikely to be on the neighbor's parcel.

Therefore, the Conservation Strategy, including the Interim Mitigation Letter (Letter 2006), does not impose mitigation requirements or other obligations on the proposed project. Similarly, because the proposed project does not require any discretionary federal permit from a nexus federal agency (e.g., from the Corps), the Programmatic Biological Opinion (USFWS, 2007) is inapplicable to the proposed project.

The USFWS/Corps 2007 Programmatic Biological Opinion (that includes Enclosure 1 and 2 maps) (USFWS 2007) *indicates the project site and areas immediately to the north, west, and south are designated: "No Effect" on California tiger salamander.*

The USFWS' Santa Rosa Plain Recovery Plan (USFWS 2016) *indicates that project site is not within a Core California tiger salamander Area* but is barely within the Horn Hunter Management Area (Figure 6). The Recovery Plan governs FESA compliance for "discretionary projects" that are being reviewed by federal "nexus" agencies (nexus refers to other federal agencies that are not the USFWS). *As the proposed project will not trigger a requirement for a federal discretionary permit, the Recovery Plan has no legally binding or required mitigation measures that would be applied to the proposed project.*

M&A confirmed that all proposed development would be on existing hard-packed surfaces that under all circumstances would not be regarded as California tiger salamander habitat (Figure 8). In addition, even if non-native ruderal grassland areas on the project site were disturbed by frontage improvements or roadway widenings undertaken by the applicant or the City of Santa Rosa, these activities do not trigger the California tiger salamander mitigation requirements set forth in the Conservation Strategy.

The proposed project would not result in "take" (harm or mortality), or direct or indirect adverse impacts to the California tiger salamander. This conclusion corroborates similar conclusions made by M. Fawcett (Fawcett 2012), and D. Wiemeyer (Wiemeyer 2017 and 2018). Accordingly, the proposed project would not trigger any regulatory requirement for incidental take coverage under the CESA or FESA, or any regulatory agency mandated mitigation requirements for the California tiger salamander or its habitat. ***Simply put, Incidental Take Permits and California tiger salamander mitigation are not required for the proposed project pursuant to the CESA or FESA. Pursuant to the California Environmental Quality Act (CEQA) the proposed project would not result in any potentially significant or significant adverse impacts to the California tiger salamander***.

7. LITERATURE CITED

Carr, L. W., and L. Fahrig. 2001. Effect of road traffic on two amphibian species of differing vagility. Conservation Biology 15:1071-1078.

CNDDB (California Natural Diversity Data Base). 2019. RareFind 5. Computer printout for special-status species within a three-mile radius of the proposed project site. California Natural Heritage Division, California Department of Fish and Game, Sacramento, CA.

Fahrig, L., J. H. Pedlar, S. E. Pope, P. D. Taylor, and J. F. Wegner. 1995. Effect of road traffic on amphibian density. Biological Conservation 74:177-182.

Fawcett M. 2012. Site Assessment for California Tiger Salamander, dated March 30, 2012. Fawcett Environmental Consulting, P.O. Box 385, Bodega, CA 94922

Hels T and Buchwald E. 2001. The effect of road kills on amphibian populations. IN: Proceedings of the 2001 International Conference on Ecology and Transportation, Eds. Irwin C.L., Garrett P., McDermott K.P. Center for Transportation and the Environment. North Carolina State University, Raleigh, NC: pp. 25-42.

USFWS (U.S. Fish & Wildlife Service). 2003. Sonoma County population of California tiger salamander listed as an endangered species. Federal Register: March 19, 2003 (Volume 68, Number 53), Rules and Regulations, Page 13497-13520. From the Federal Register online via GPO Access [wais.access.gpo.gov]

USFWS (U.S. Fish & Wildlife Service). 2003. Interim guidance on site assessment and field surveys for determining presence or a negative finding of the California tiger salamander. October 2003. Joint survey protocol released by the California Department of Fish and Game and the U.S. Fish and Wildlife Service. October 2003. 12 pp.

USFWS (U.S. Fish & Wildlife Service). 2004. Endangered and threatened wildlife and plants; determination of threatened status for the California tiger salamander; and special rule exemption for existing routine ranching activities; Final Rule. Federal Register Vol 69, No 149 pps. 47212-47248. August 4, 2004.

USFWS (U.S. Fish & Wildlife Service) et. al. 2005. Final Santa Rosa Plain Conservation Strategy. Sacramento Office of the U.S. Fish and Wildlife Service, California Department of Fish and Game, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, North Coast Regional Water Quality Control Board, County of Sonoma, Cities of Cotati, Rohnert Park, and Santa Rosa, Laguna de Santa Rosa Foundation. December 1, 2005.

USFWS (U.S. Fish & Wildlife Service). 2007. Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers (Corps) Permitted Projects that Affect the California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California (Corps File No. 223420N). November 9, 2007. 41 pp. w/ Enclosures.

USFWS (U.S. Fish & Wildlife Service). 2011. Endangered and Threatened Wildlife and Plants: Revised Designation of Critical Habitat for the Sonoma County Distinct Population Segment of California Tiger Salamander; Final Rule. Federal Register 50 CFR Part 17 August 31, 2011 (Volume 76, Number 169) Page 54346.

USFWS (U.S. Fish and Wildlife Service). 2016. Recovery Plan for the Santa Rosa Plain: *Blennosperma bakeri* (Sonoma sunshine)*; Lasthenia burkei* (Burke's goldfields)*; Limnanthes vinculans* (Sebastopol meadowfoam); California Tiger Salamander Sonoma County Distinct Population Segment (*Ambystoma californiense*). U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. vi + 128 pp. June 20, 2016. Federal Register. Pages: 39945-39946.

van Gelder, J. J. 1973. A quantitative approach to the mortality resulting from traffic in a population of *Bufo bufo* L. Oecologia 13:93-95.

Wiemeyer D. 2017. California Tiger Salamander Habitat Evaluation of Subject Area - 800 Yolanda Avenue, Santa Rosa, CA. Prepared by Mr. Darren Wiemeyer, Wiemeyer Ecological Sciences, 4000 Montgomery Drive, Suite L-5, Santa Rosa, CA 95405 June 26, 2017.

Wiemeyer D. 2018. Biological Assessment. Santa Rosa Farm Group, 800 Yolanda Avenue, Santa Rosa, CA. Prepared by Mr. Darren Wiemeyer, Wiemeyer Ecological Sciences, 4000 Montgomery Drive, Suite L-5, Santa Rosa, CA 95405 March 7, 2018

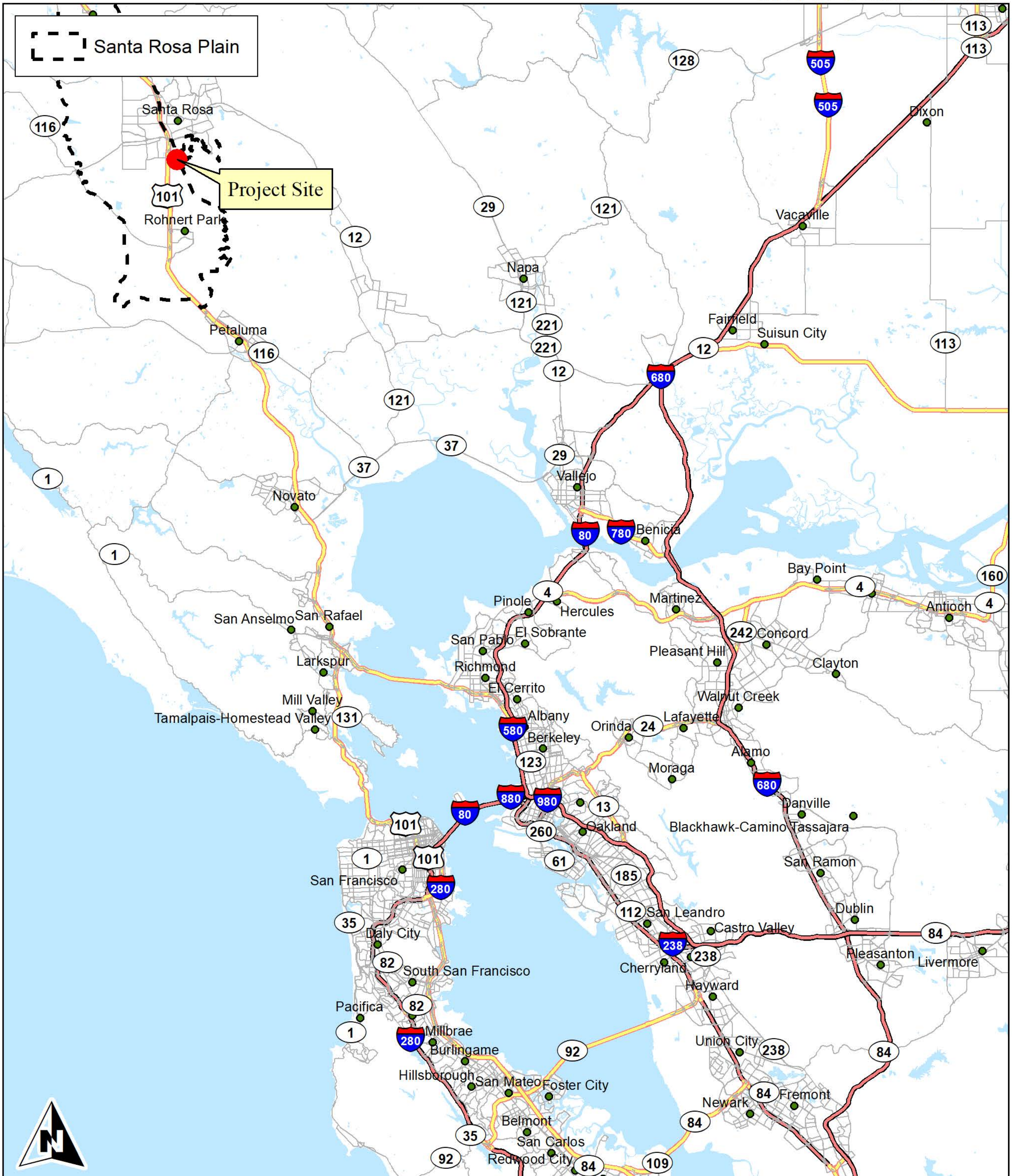
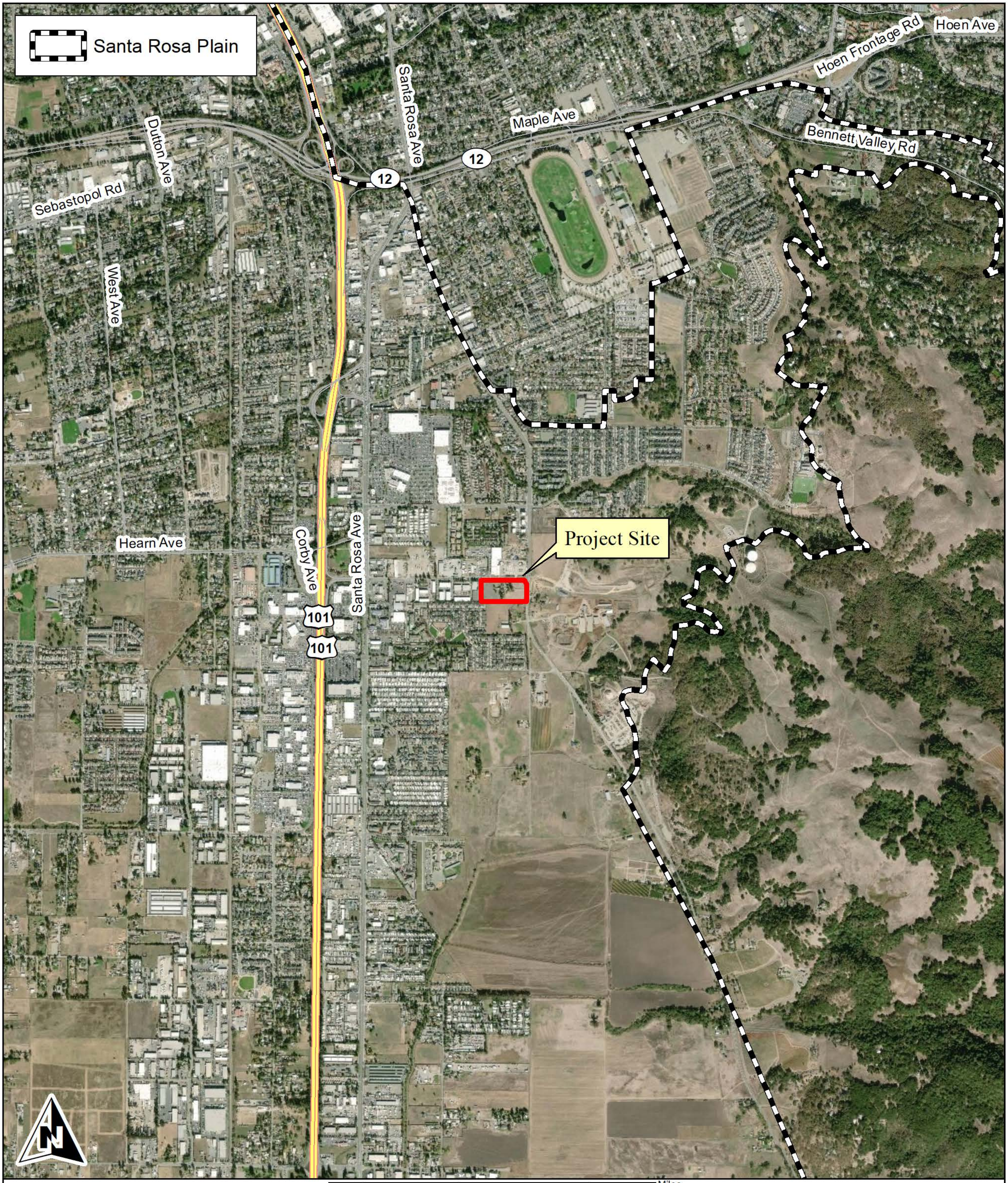


Figure 1. 800 Yolanda Avenue Project Site
Regional Map
Santa Rosa, California

Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

County: Sonoma
Map Preparation Date: December 18, 2019



Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

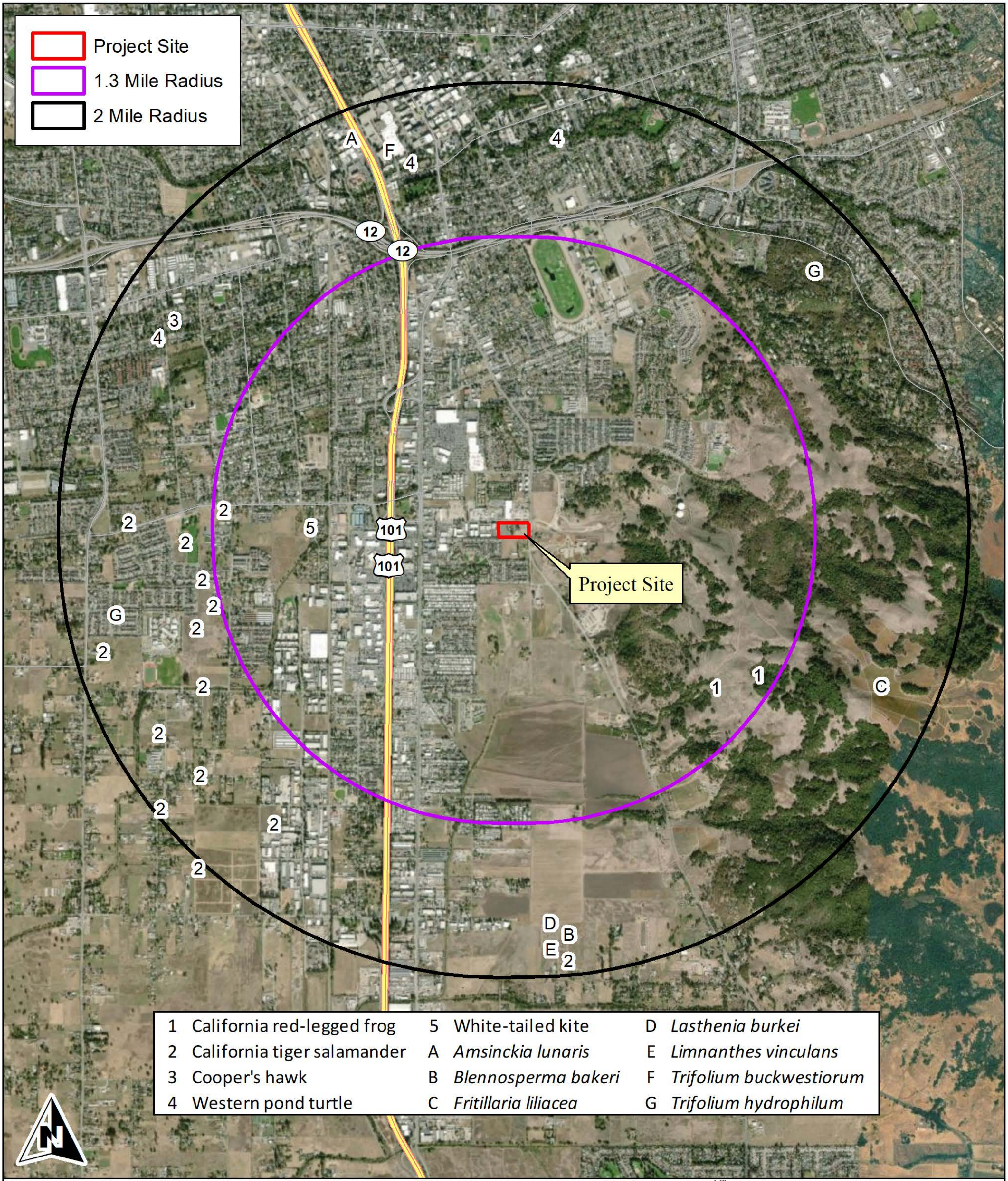
Figure 2. 800 Yolanda Avenue Project Site
Location Map
Santa Rosa, California

38.412784 -122.705737
Land Grant
7.5-Minute Santa Rosa quadrangle
Aerial Photograph Source: ESRI
Map Preparation Date: December 18, 2019

Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

Figure 3. Aerial Photograph of the
800 Yolanda Avenue Project Site
Santa Rosa, California

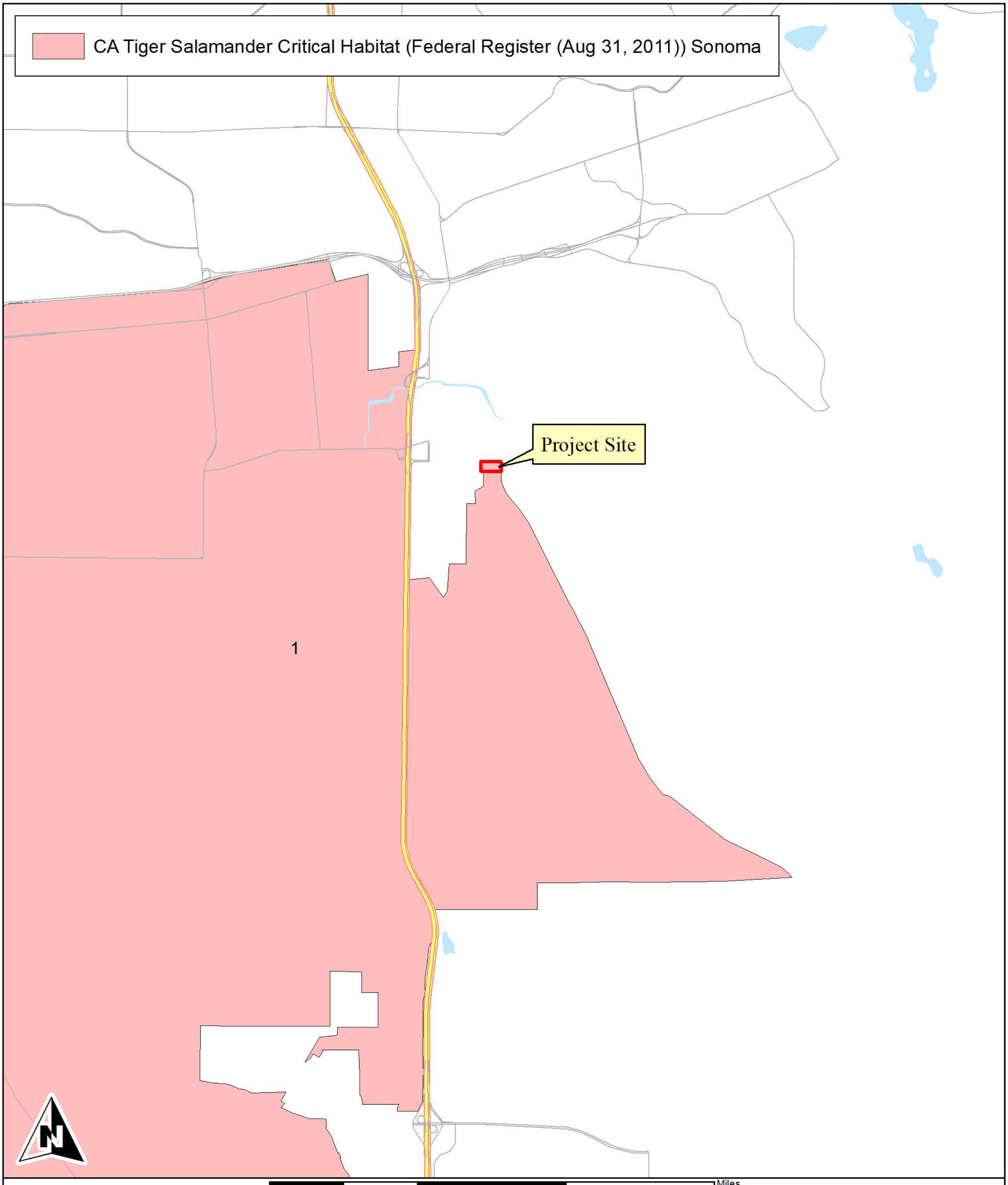
Aerial Photograph Source: ESRI
Map Preparation Date: December 18, 2019



Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

Figure 4. Known CNDDB Records for Special-Status Species Within 1.3 Miles & 3 Miles of the 800 Yolanda Avenue Project Site

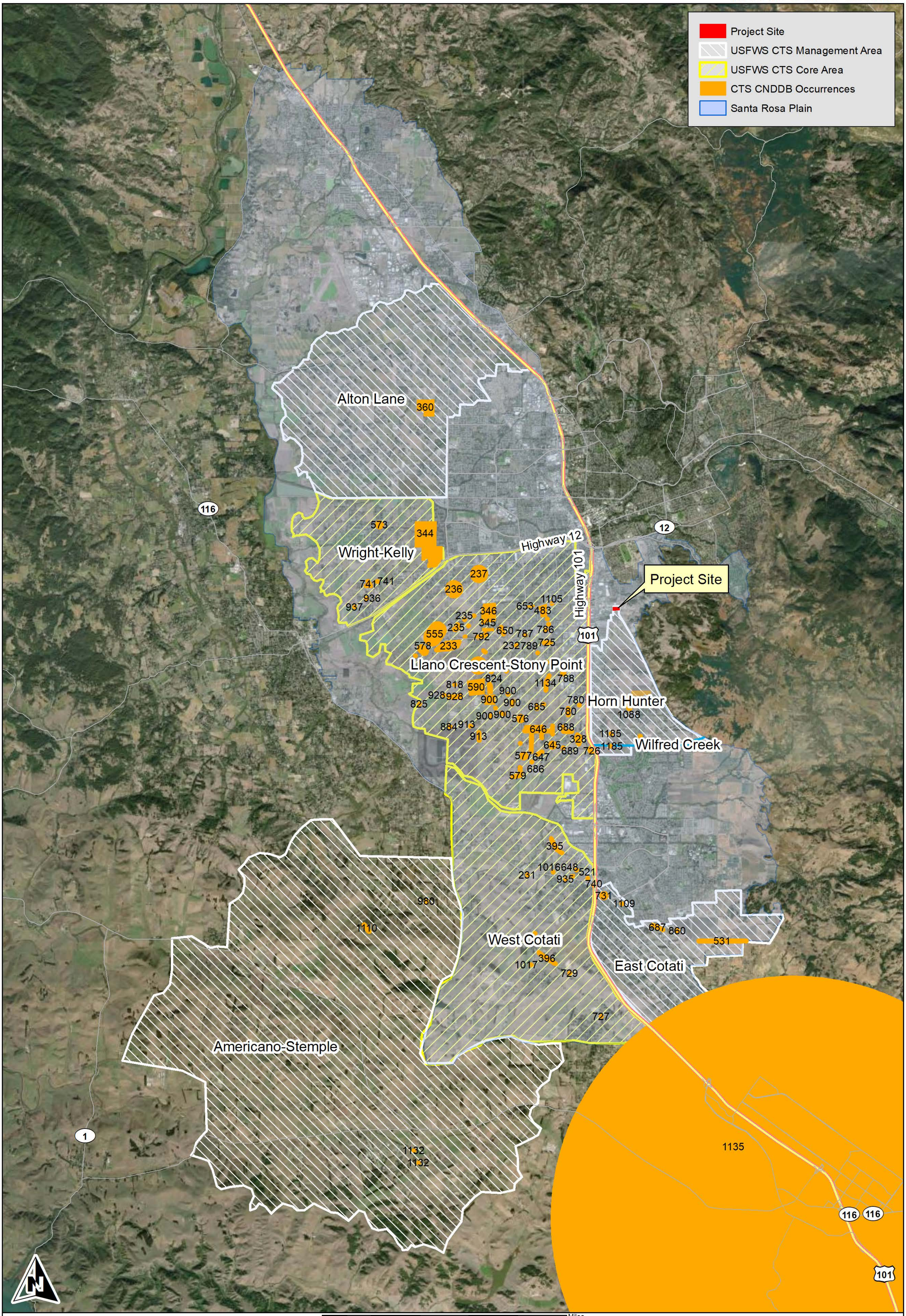
Map Preparation Date:
March 26, 2020
Source: CDFW, California
Natural Diversity Data Base, 2020



Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

Figure 5. USFWS Critical Habitat in the Vicinity of the 800 Yolanda Avenue Project Site

Source: USFWS
Map Preparation Date: December 30, 2019



Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

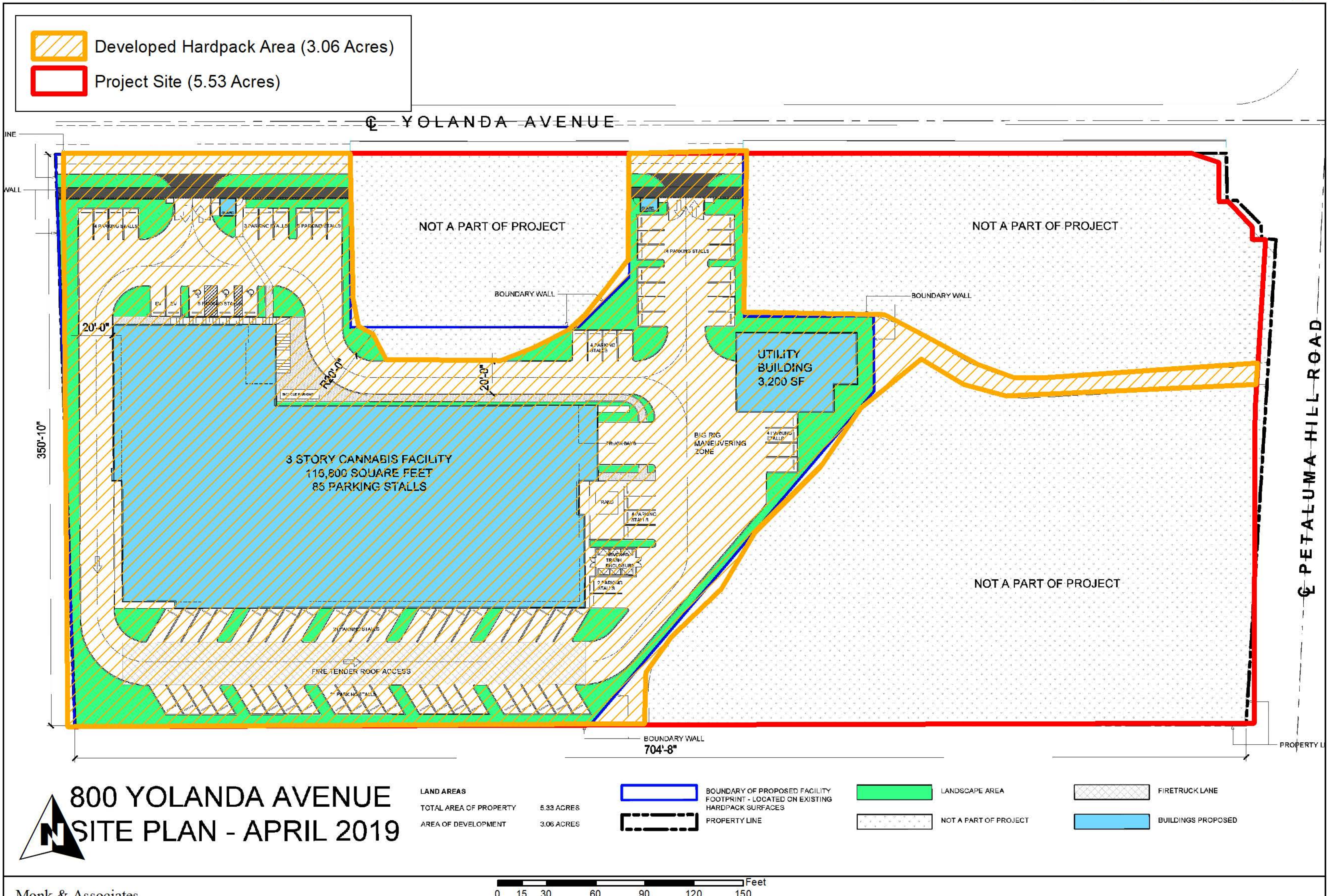
Figure 6. Santa Rosa Plain California Tiger Salamander Core and Management Areas (USFWS 2016) in the Vicinity of the 800 Yolanda Avenue Project Site

County: Sonoma
Aerial Photograph Source: ESRI
Map Preparation Date: December 30, 2019

Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

Figure 7. Developed Hardpack Area of the
800 Yolanda Avenue Project Site
Santa Rosa, California

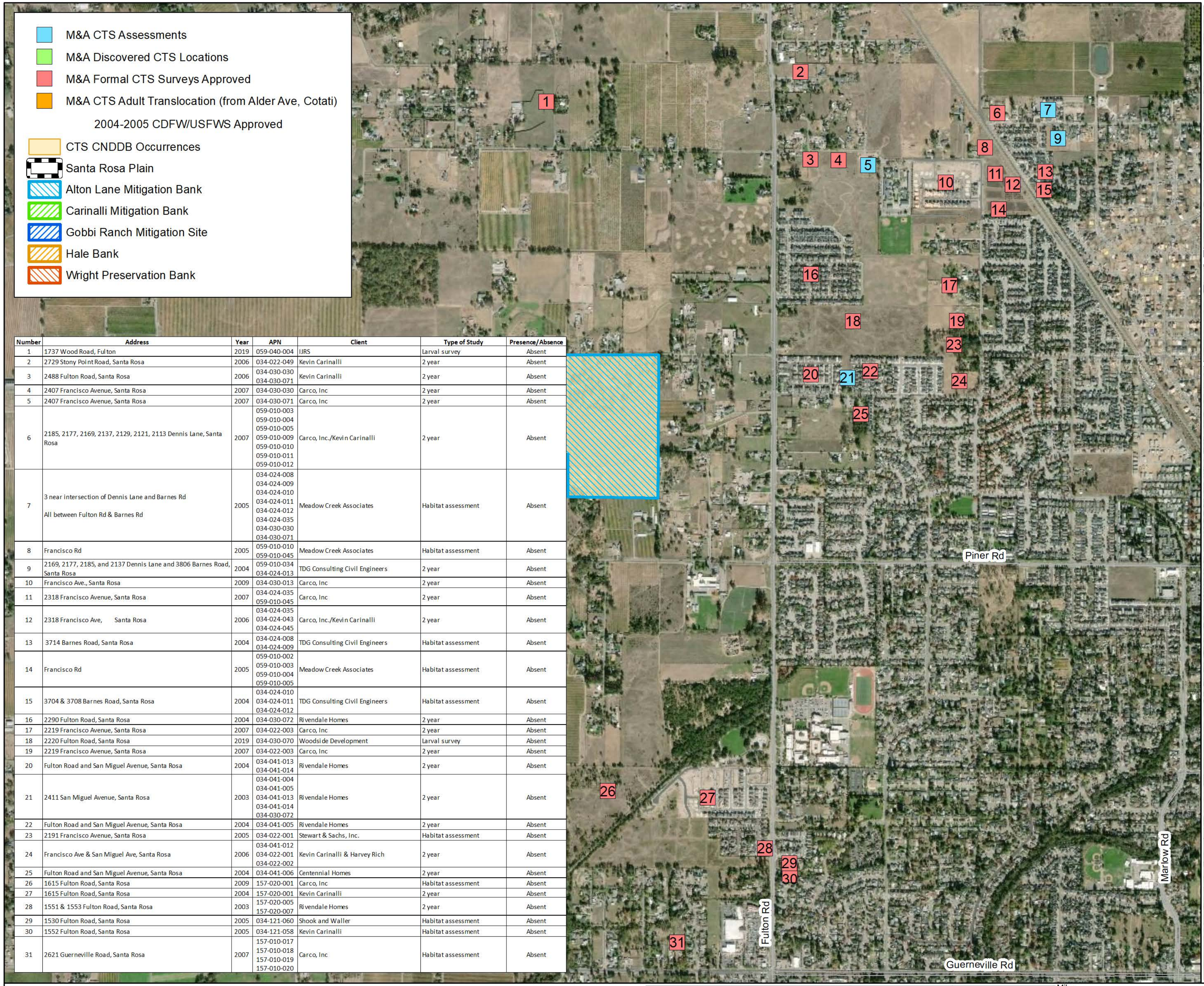
Aerial Photograph Source: ESRI
Map Preparation Date: December 30, 2019



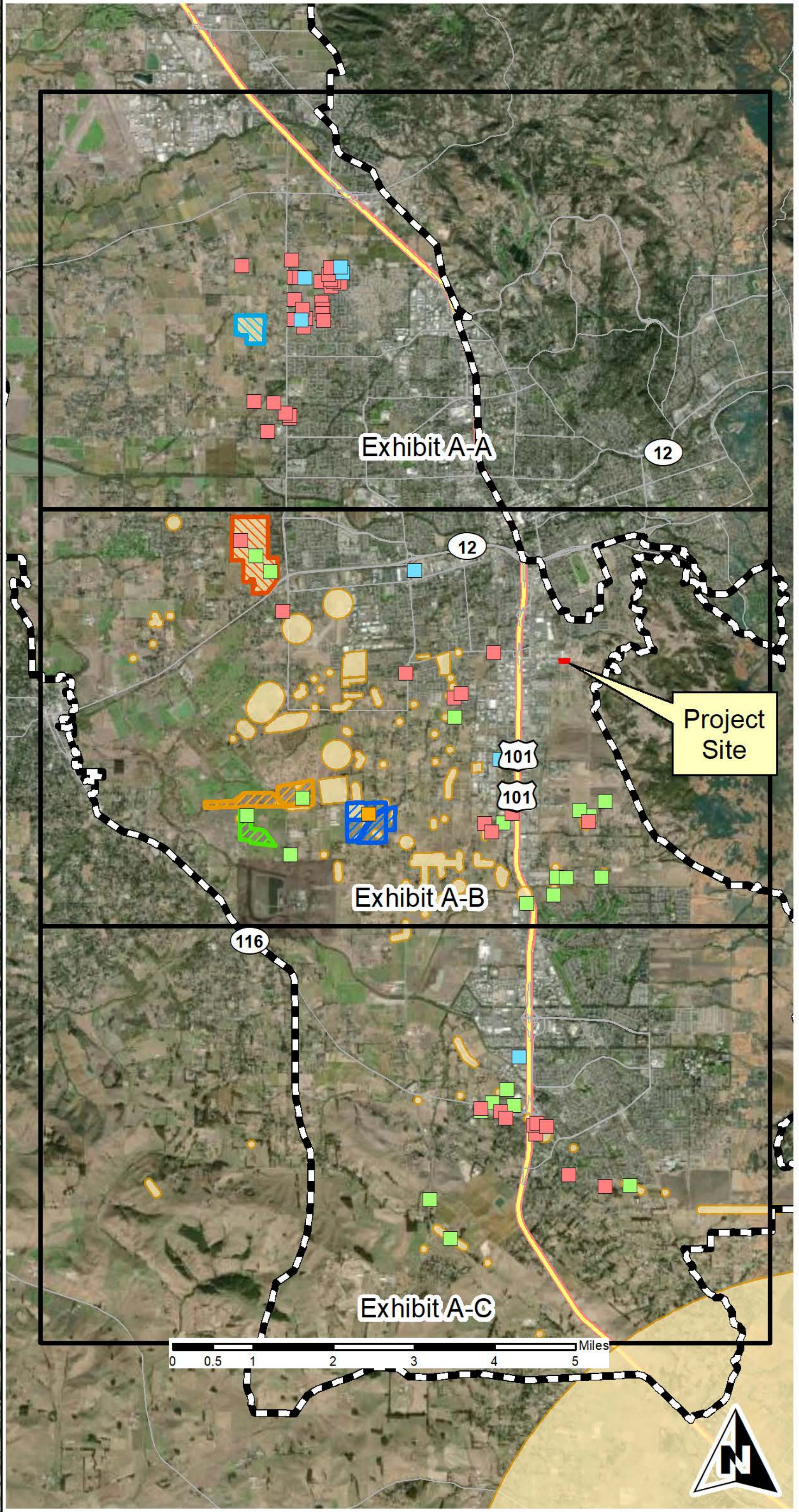
Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

Figure 8. Site Development Plan with Developed Hardpack Area
800 Yolanda Avenue Project Site
Santa Rosa, California

Map Preparation Date: April 1, 2020



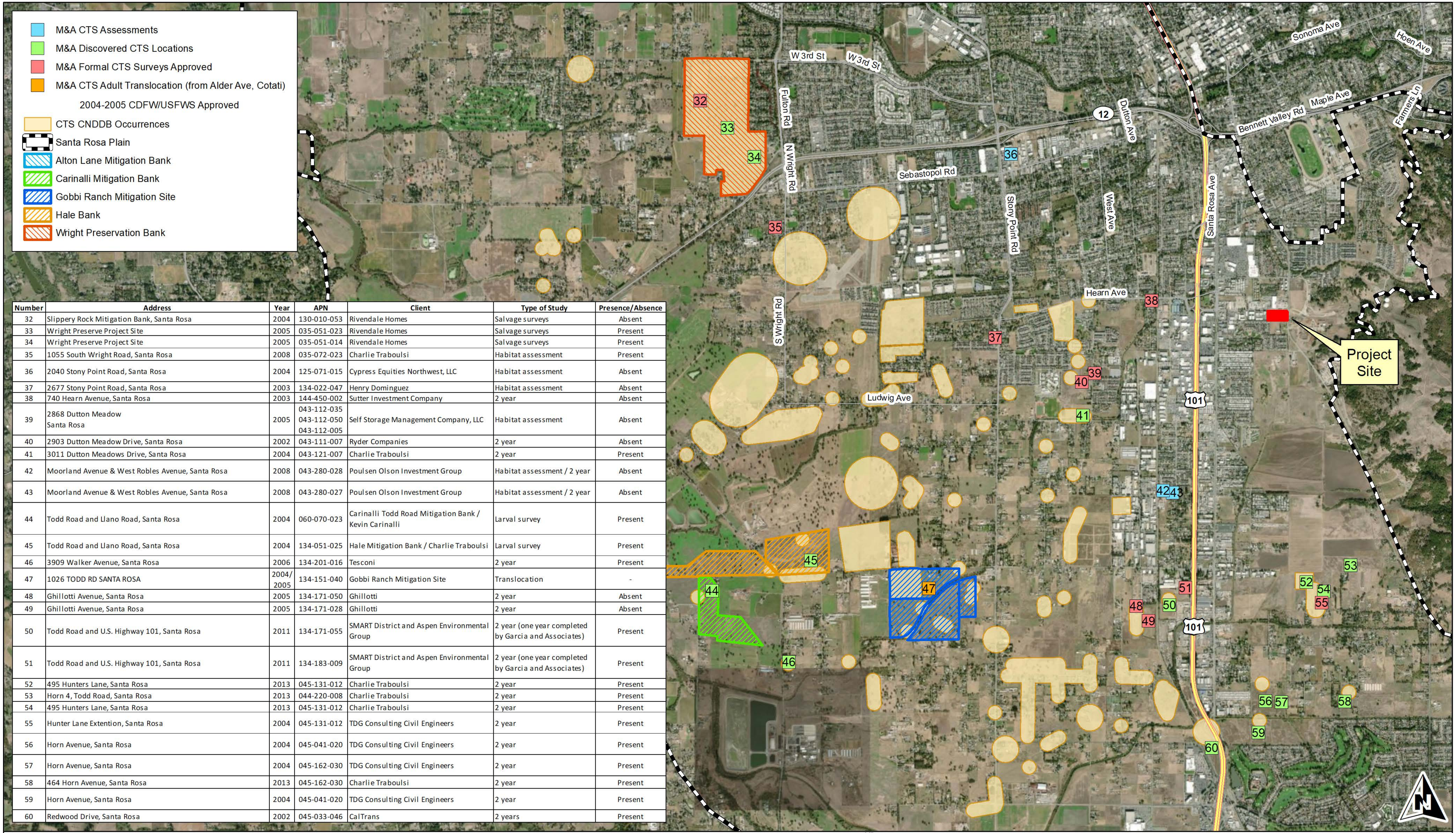
Number	Address	Year	APN	Client	Type of Study	Presence/Absence
1	1737 Wood Road, Fulton	2019	059-040-004	IJRS	Larval survey	Absent
2	2729 Stony Point Road, Santa Rosa	2006	034-022-049	Kevin Carinalli	2 year	Absent
3	2488 Fulton Road, Santa Rosa	2006	034-030-030 034-030-071	Kevin Carinalli	2 year	Absent
4	2407 Francisco Avenue, Santa Rosa	2007	034-030-030	Carco, Inc	2 year	Absent
5	2407 Francisco Avenue, Santa Rosa	2007	034-030-071	Carco, Inc	2 year	Absent
6	2185, 2177, 2169, 2137, 2129, 2121, 2113 Dennis Lane, Santa Rosa	2007	059-010-003 059-010-004 059-010-005 059-010-009 059-010-010 059-010-011 059-010-012	Carco, Inc./Kevin Carinalli	2 year	Absent
7	3 near intersection of Dennis Lane and Barnes Rd All between Fulton Rd & Barnes Rd	2005	034-024-008 034-024-009 034-024-010 034-024-011 034-024-012 034-024-035 034-030-030 034-030-071	Meadow Creek Associates	Habitat assessment	Absent
8	Francisco Rd	2005	059-010-010 059-010-045	Meadow Creek Associates	Habitat assessment	Absent
9	2169, 2177, 2185, and 2137 Dennis Lane and 3806 Barnes Road, Santa Rosa	2004	059-010-034 034-024-013	TDG Consulting Civil Engineers	2 year	Absent
10	Francisco Ave., Santa Rosa	2009	034-030-013	Carco, Inc	2 year	Absent
11	2318 Francisco Avenue, Santa Rosa	2007	034-024-035 059-010-045	Carco, Inc	2 year	Absent
12	2318 Francisco Ave, Santa Rosa	2006	034-024-035 034-024-043 034-024-045	Carco, Inc./Kevin Carinalli	2 year	Absent
13	3714 Barnes Road, Santa Rosa	2004	034-024-008 034-024-009	TDG Consulting Civil Engineers	Habitat assessment	Absent
14	Francisco Rd	2005	059-010-002 059-010-003 059-010-004 059-010-005	Meadow Creek Associates	Habitat assessment	Absent
15	3704 & 3708 Barnes Road, Santa Rosa	2004	034-024-010 034-024-011 034-024-012	TDG Consulting Civil Engineers	Habitat assessment	Absent
16	2290 Fulton Road, Santa Rosa	2004	034-030-072	Rivendale Homes	2 year	Absent
17	2219 Francisco Avenue, Santa Rosa	2007	034-022-003	Carco, Inc	2 year	Absent
18	2220 Fulton Road, Santa Rosa	2019	034-030-070	Woodside Development	Larval survey	Absent
19	2219 Francisco Avenue, Santa Rosa	2007	034-022-003	Carco, Inc	2 year	Absent
20	Fulton Road and San Miguel Avenue, Santa Rosa	2004	034-041-013 034-041-014	Rivendale Homes	2 year	Absent
21	2411 San Miguel Avenue, Santa Rosa	2003	034-041-004 034-041-005 034-041-013 034-041-014 034-030-072	Rivendale Homes	2 year	Absent
22	Fulton Road and San Miguel Avenue, Santa Rosa	2004	034-041-005	Rivendale Homes	2 year	Absent
23	2191 Francisco Avenue, Santa Rosa	2005	034-022-001	Stewart & Sachs, Inc.	Habitat assessment	Absent
24	Francisco Ave & San Miguel Ave, Santa Rosa	2006	034-041-012 034-022-001 034-022-002	Kevin Carinalli & Harvey Rich	2 year	Absent
25	Fulton Road and San Miguel Avenue, Santa Rosa	2004	034-041-006	Centennial Homes	2 year	Absent
26	1615 Fulton Road, Santa Rosa	2009	157-020-001	Carco, Inc	Habitat assessment	Absent
27	1615 Fulton Road, Santa Rosa	2004	157-020-001	Kevin Carinalli	2 year	Absent
28	1551 & 1553 Fulton Road, Santa Rosa	2003	157-020-005 157-020-007	Rivendale Homes	2 year	Absent
29	1530 Fulton Road, Santa Rosa	2005	034-121-060	Shook and Waller	Habitat assessment	Absent
30	1552 Fulton Road, Santa Rosa	2005	034-121-058	Kevin Carinalli	Habitat assessment	Absent
31	2621 Guerneville Road, Santa Rosa	2007	157-010-017 157-010-018 157-010-019 157-010-020	Carco, Inc	Habitat assessment	Absent



Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

Exhibit A-A. Monk & Associates CTS Studies and CTS Discoveries
on the Santa Rosa Plain
From CDFW CNDDB & M&A Studies

County: Sonoma
Aerial Photograph Source: ESRI
Map Preparation Date: March 30, 2020



Number	Address	Year	APN	Client	Type of Study	Presence/Absence
32	Slippery Rock Mitigation Bank, Santa Rosa	2004	130-010-053	Rivendale Homes	Salvage surveys	Absent
33	Wright Preserve Project Site	2005	035-051-023	Rivendale Homes	Salvage surveys	Present
34	Wright Preserve Project Site	2005	035-051-014	Rivendale Homes	Salvage surveys	Present
35	1055 South Wright Road, Santa Rosa	2008	035-072-023	Charlie Traboulsi	Habitat assessment	Present
36	2040 Stony Point Road, Santa Rosa	2004	125-071-015	Cypress Equities Northwest, LLC	Habitat assessment	Absent
37	2677 Stony Point Road, Santa Rosa	2003	134-022-047	Henry Dominguez	Habitat assessment	Absent
38	740 Hearn Avenue, Santa Rosa	2003	144-450-002	Sutter Investment Company	2 year	Absent
39	2868 Dutton Meadow Santa Rosa	2005	043-112-035 043-112-050 043-112-005	Self Storage Management Company, LLC	Habitat assessment	Absent
40	2903 Dutton Meadow Drive, Santa Rosa	2002	043-111-007	Ryder Companies	2 year	Absent
41	3011 Dutton Meadows Drive, Santa Rosa	2004	043-121-007	Charlie Traboulsi	2 year	Present
42	Moorland Avenue & West Robles Avenue, Santa Rosa	2008	043-280-028	Poulsen Olson Investment Group	Habitat assessment / 2 year	Absent
43	Moorland Avenue & West Robles Avenue, Santa Rosa	2008	043-280-027	Poulsen Olson Investment Group	Habitat assessment / 2 year	Absent
44	Todd Road and Llano Road, Santa Rosa	2004	060-070-023	Carinalli Todd Road Mitigation Bank / Kevin Carinalli	Larval survey	Present
45	Todd Road and Llano Road, Santa Rosa	2004	134-051-025	Hale Mitigation Bank / Charlie Traboulsi	Larval survey	Present
46	3909 Walker Avenue, Santa Rosa	2006	134-201-016	Tesconi	2 year	Present
47	1026 TODD RD SANTA ROSA	2004/ 2005	134-151-040	Gobbi Ranch Mitigation Site	Translocation	-
48	Ghillotti Avenue, Santa Rosa	2005	134-171-050	Ghillotti	2 year	Absent
49	Ghillotti Avenue, Santa Rosa	2005	134-171-028	Ghillotti	2 year	Absent
50	Todd Road and U.S. Highway 101, Santa Rosa	2011	134-171-055	SMART District and Aspen Environmental Group	2 year (one year completed by Garcia and Associates)	Present
51	Todd Road and U.S. Highway 101, Santa Rosa	2011	134-183-009	SMART District and Aspen Environmental Group	2 year (one year completed by Garcia and Associates)	Present
52	495 Hunters Lane, Santa Rosa	2013	045-131-012	Charlie Traboulsi	2 year	Present
53	Horn 4, Todd Road, Santa Rosa	2013	044-220-008	Charlie Traboulsi	2 year	Present
54	495 Hunters Lane, Santa Rosa	2013	045-131-012	Charlie Traboulsi	2 year	Present
55	Hunter Lane Extention, Santa Rosa	2004	045-131-012	TDG Consulting Civil Engineers	2 year	Present
56	Horn Avenue, Santa Rosa	2004	045-041-020	TDG Consulting Civil Engineers	2 year	Present
57	Horn Avenue, Santa Rosa	2004	045-162-030	TDG Consulting Civil Engineers	2 year	Present
58	464 Horn Avenue, Santa Rosa	2013	045-162-030	Charlie Traboulsi	2 year	Present
59	Horn Avenue, Santa Rosa	2004	045-041-020	TDG Consulting Civil Engineers	2 year	Present
60	Redwood Drive, Santa Rosa	2002	045-033-046	CalTrans	2 years	Present

Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

Exhibit A-B. Monk & Associates CTS Studies and CTS Discoveries
on the Santa Rosa Plain
From CDFW CNDDB & M&A Studies

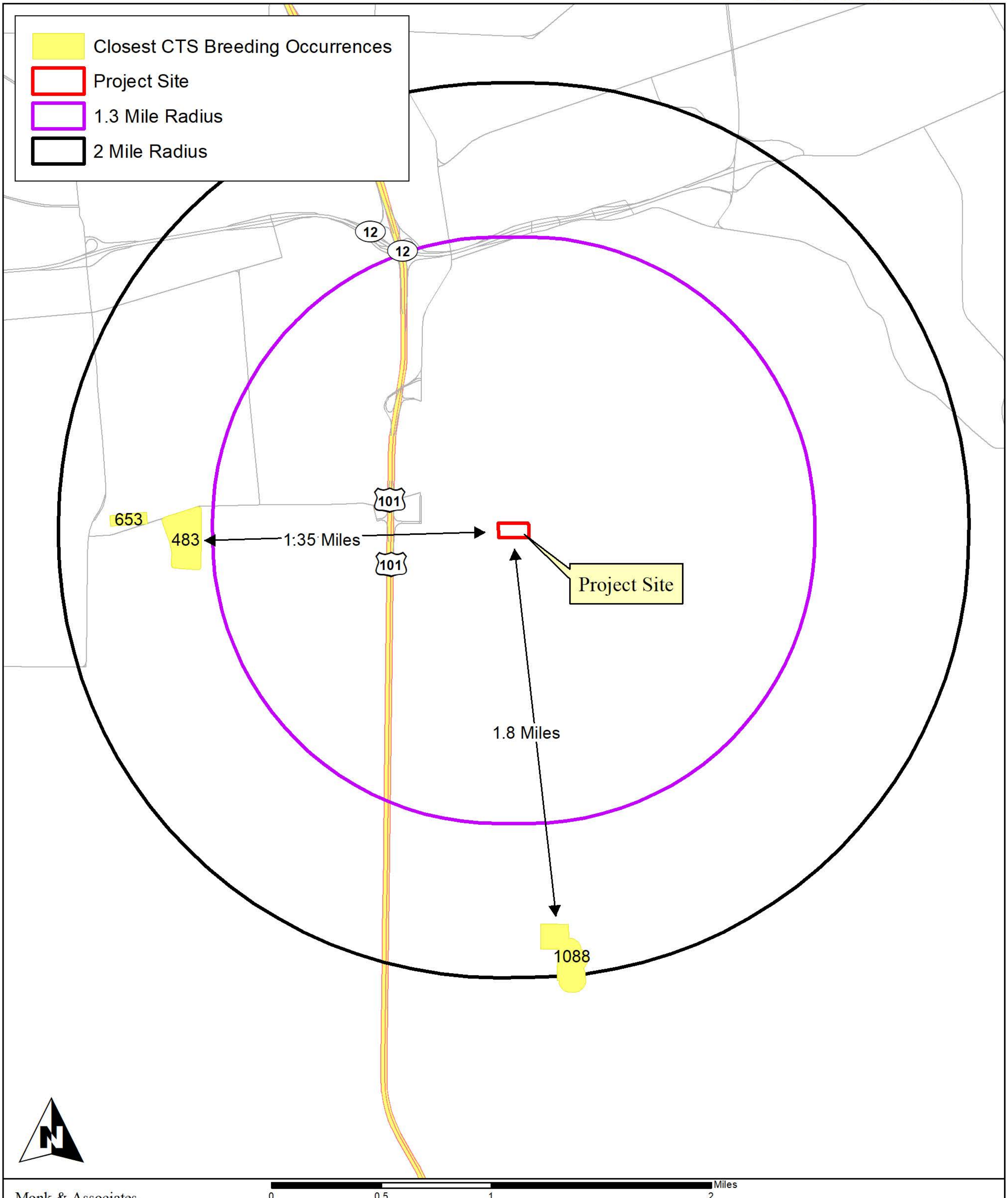
County: Sonoma
Aerial Photograph Source: ESRI
Map Preparation Date: March 30, 2020

Number	Address	Year	APN	Client	Type of Study	Presence/Absence
61	Aaron and Portal Street, Cotati	2003	144-010-018	Dennis Key	Habitat assessment	Absent
62	Cotati Village, Cotati	2004	046-113-033	Monahan Pacific Company	2 year	Present
63	Nibe-Reds, Gravenstein Hwy, Cotati	2007	144-040-011	Monahan Pacific Company	2 years	Present
64	8028 Gravenstein Highway, Cotati	2006	144-100-001	Durenberger family	Habitat assessment	Absent
65	1765 Meda Avenue, Santa Rosa	2003	144-100-001	David Durenberger	Habitat assessment	Absent
66	850 West Cotati Avenue Cotati	2003	144-110-023	Harvey Rich	Larval survey	Absent
67	Sonoma Business Park	2000	046-286-019	Bennett Consolidate	Larval survey	Present
68	780 West Cotati Avenue, Cotati	2003	144-110-001	Harvey Rich	Larval survey	Absent
69	7801 Old Redwood Highway, Cotati	2009	144-170-008	Town Green Village / Thiessen Homes	2 year	Absent
70	7801 Old Redwood Highway, Cotati	2009	144-170-006 144-170-007	Town Green Village / Thiessen Homes	2 year	Absent
71	150 St. Joseph Way, Cotati	2004	144-170-009	Saint Joseph's Church	2 year	Absent
72	7883 & 7971 Old Redwood Highway, Cotati	2004	144-200-001 144-200-004	R&O Rental	2 year	Absent
73	100 Valparaiso Avenue, Cotati	2003	144-450-002	Colvin Group LLC	2 year	Absent
74	195 Eucalyptus Avenue, Cotati	2003	046-630-047	Michael Mead	Habitat assessment	Absent
75	505 Eucalyptus Avenue, Cotati	2003	046-231-018	Unknown	Larval survey	Present
76	Roblar Road & Stony Point Road, Cotati	2004	999-999-ROW	Drive By	Drive By	Present
77	Roblar Road & Stony Point Road, Cotati	1997	999-999-ROW	Drive By	Drive By	Present

Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

Exhibit A-C. Monk & Associates CTS Studies and CTS Discoveries
on the Santa Rosa Plain
From CDFW CNDDB & M&A Studies

County: Sonoma
Aerial Photograph Source: ESRI
Map Preparation Date: March 30, 2020



Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

Exhibit B. Closest Known CNDDB
California Tiger Salamander Breeding Records
800 Yolanda Avenue Project Site

Map Preparation Date:
March 30, 2020
Source: CDFW, California
Natural Diversity Data Base, 2020

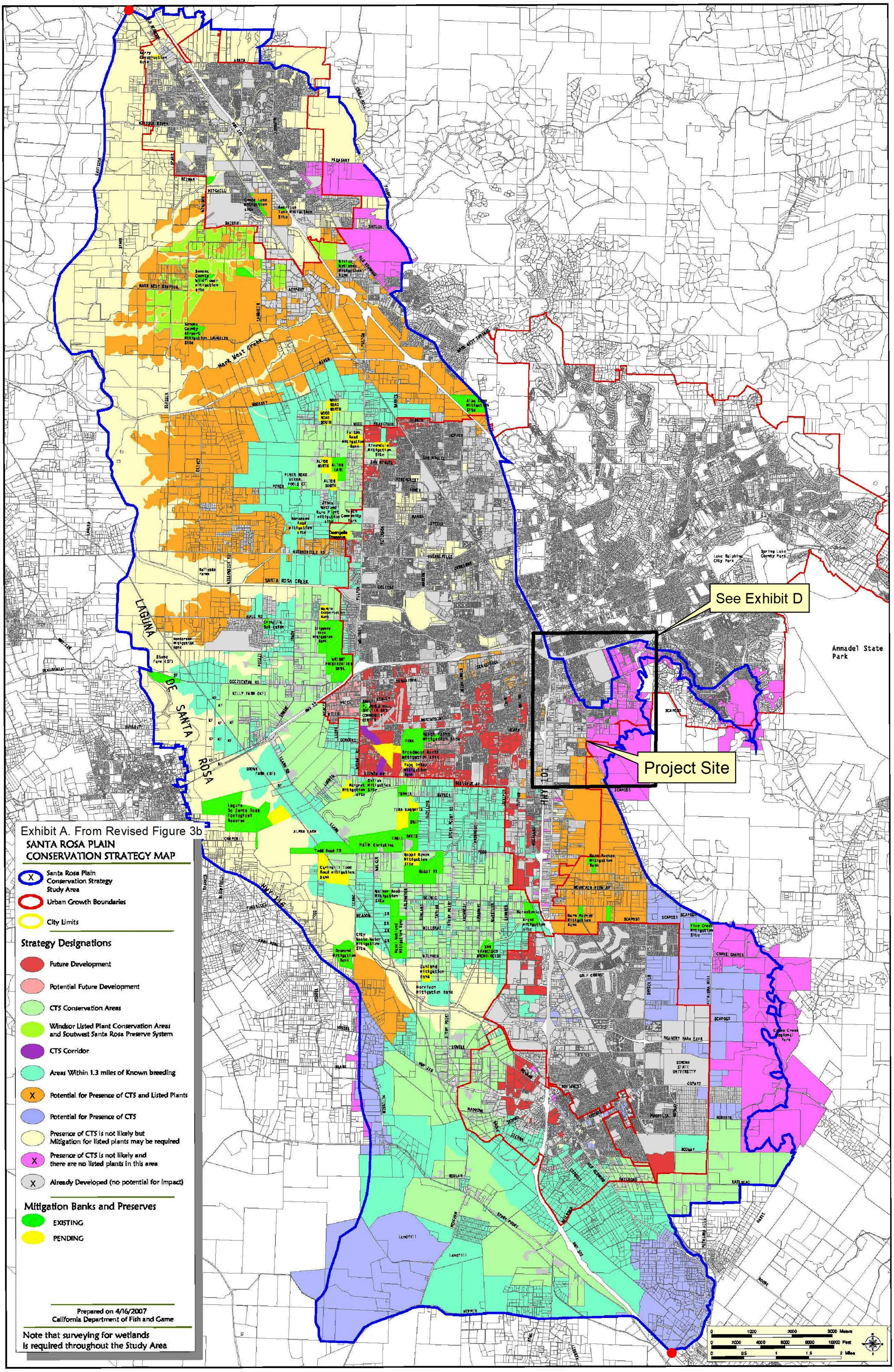


Exhibit C. Revised Figure 3 of the Conservation Strategy (USFWS et. al. 2005).

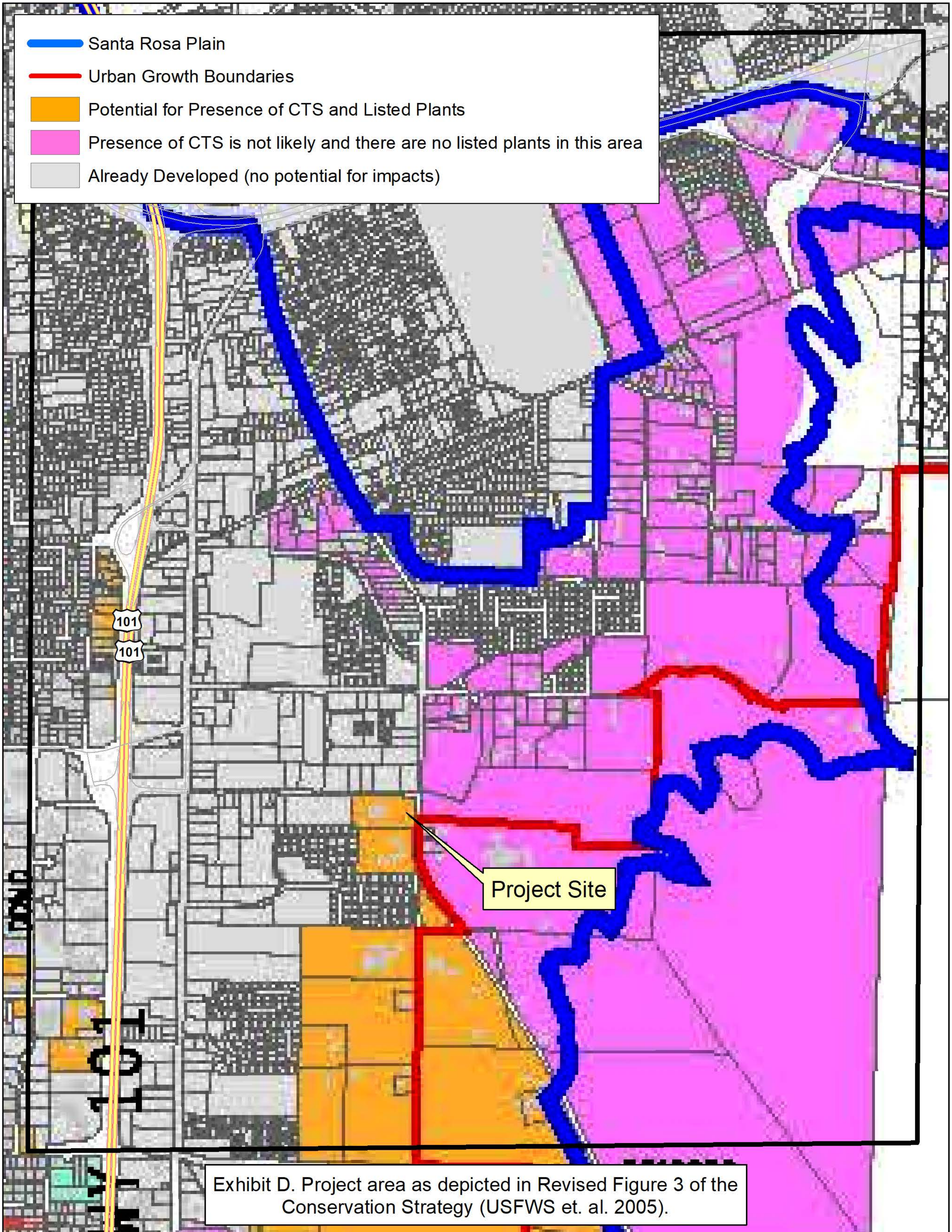


Exhibit D. Project area as depicted in Revised Figure 3 of the Conservation Strategy (USFWS et. al. 2005).

APPENDIX F

HISTORICAL RESOURCES STUDY PREPARED BY
TOM ORIGER & ASSOCIATES, SEPTEMBER 6, 2017

Historical Resources Study of the Property at 800 Yolanda Avenue (APN 044-091-063) Santa Rosa, Sonoma County, California

Julia Franco, B.S.
and
Thomas Origer, M.A./RPA

May 12, 2017
revised September 6, 2017

Historical Resources Study of the Property at 800 Yolanda Avenue (APN 044-091-063) Santa Rosa, Sonoma County, California

Prepared by:

Julia Franco, B.S.
and
Thomas Origer, M.A./RPA

Tom Origer & Associates
Post Office Box 1531
Rohnert Park, California 94927
(707) 584-8200

Prepared for:

800 Yolanda LLC
9030 National Boulevard
Los Angeles, CA 90034

May 12, 2017
revised September 6, 20177

ABSTRACT

Tom Origer & Associates conducted an historical resources survey of the property at 800 Yolanda Avenue, Santa Rosa, Sonoma County, California. The study was requested by Kevin Apodaca, 800 Yolanda, LLC. This study was conducted to meet the requirements of the City of Santa Rosa and those of the California Environmental Quality Act. The purpose of this report is to identify historical resources only (see definition of historical resources in the Regulatory Context section). This report will not address Tribal Cultural Resources as defined in Public Resources Code [PRC] 21074 (a)(1)(A)-(B).

The proposed project includes the demolition of existing buildings and development of four new buildings.

This study included archival research at the Northwest Information Center, Sonoma State University (NWIC File No. 16-1687), archival research at the University of California Museum of Paleontology, examination of the library and files of Tom Origer & Associates, Native American contact, and field inspection of the study area. No historical resources were found within the study area. No fossil localities are recorded near the study area. Documentation pertaining to this study is on file at the offices of Tom Origer & Associates (File No. 2017-048S).

Synopsis
Project: 800 Yolanda Avenue
Location: 800 Yolanda Avenue, Santa Rosa, Sonoma County
APN: 044-091-063
Quadrangles: Santa Rosa 7.5’ series
Study Type: Intensive
Scope: 5.53 acres
Finds: None

Project Personnel

Tom Origer provided project oversight for this study. Mr. Origer obtained a Master of Arts in Anthropology from San Francisco State University in 1983, after obtaining a Bachelor of Arts degree in Anthropology at Sonoma State University in 1974. He has over forty years of experience in cultural resources management throughout Northern California. His experience includes work that has been completed in compliance with local ordinances, CEQA, NEPA, and Section 106 (NHPA) requirements. Mr. Origer taught archaeological analysis and field archaeology classes at Santa Rosa Junior College from 1979 through 2009. He has been affiliated with the Society for California Archaeology (Presidential duties from April 1998 to April 2001), the International Association for Obsidian Studies (charter member and President from 1990-1992), the Archaeological Institute of America (President of the North Coast Society from 1985 to 1987), the Society for American Archaeology, the Society for Historical Archaeology, and the Register of Professional Archaeologists.

Julia Franco conducted the fieldwork for this study and authored the report. Ms. Franco holds a Bachelor of Science in Anthropology from California State Polytechnic University, Pomona. She is currently pursuing a Master of Arts in Cultural Resource Management at Sonoma State University. Professional affiliations include the Society for American Archaeology, the Society for Historical Archaeology, and the Society for California Archaeology.

Rachel Hennessy participated in the fieldwork for this study. Ms. Hennessy obtained an Associate of Arts degree in Anthropology from the Santa Rosa Junior College in 2015 and is currently pursuing a Bachelor of Arts in Anthropology from Sonoma State University. She is affiliated with the Society for California Archaeology. Ms. Hennessy has been a part of northern California archaeology since 2015.

CONTENTS

FIGURES

INTRODUCTION

This report describes an historical resources survey of the property at 800 Yolanda Avenue, Santa Rosa, Sonoma County, California. The study was requested by Kevin Apodaca, 800 Yolanda, LLC. This study was conducted in compliance with the requirements of the City of Santa Rosa and those of the California Environmental Quality Act. The proposed project includes the demolition of existing buildings and development of four new buildings. Documentation pertaining to this study is on file at Tom Origer & Associates (File No. 2017-048S).

REGULATORY CONTEXT

The California Environmental Quality Act (CEQA) requires that historical resources be considered during the environmental review process. This is accomplished by an inventory of resources within a study area and by assessing the potential that historical resources could be affected by development. The term “Historical Resources’ encompasses prehistoric and historical archaeological sites and built environment resources (e.g., buildings, bridges, canals). An additional category of resources is defined in CEQA under the term “Tribal Cultural Resources” (Public Resources Code Section 21074). They are not addressed in this report. Tribal cultural resources are resources that are of specific concern to California Native American tribes, and knowledge of such resources is limited to tribal people. Pursuant to revisions to CEQA enacted in July of 2015, such resources are to be identified by tribal people in direct, confidential consultation with the lead agency (PRC §21080.3.1).

This historical resources survey was designed to satisfy environmental issues specified in the CEQA and its guidelines (Title 14 CCR §15064.5) by: (1) identifying all historical resources within the project area; (2) offering a preliminary significance evaluation of the identified cultural resources; (3)

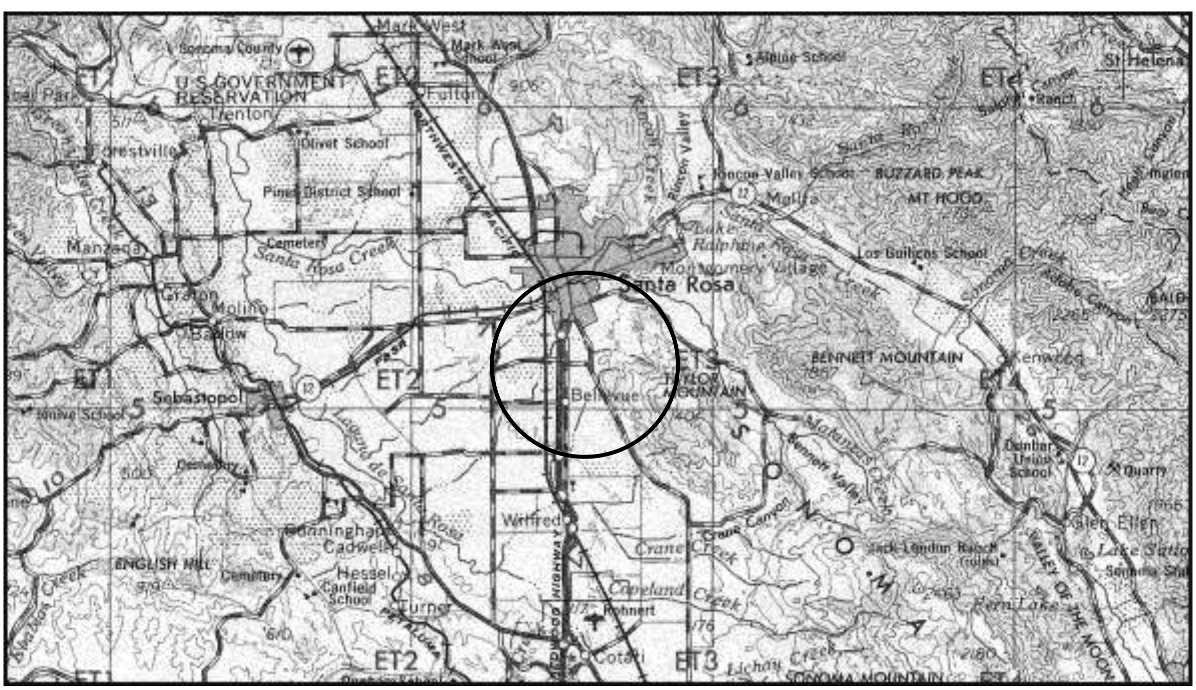


Figure 1. Project vicinity (adapted from the 1980 Santa Rosa 1:250,000-scale USGS map).

assessing resource vulnerability to effects that could arise from project activities; and (4) offering suggestions designed to protect resource integrity, as warranted.

Resource Definitions

Historical resources are classified by the State Office of Historic Preservation (OHP) as sites, buildings, structures, objects and districts, and each is described by OHP (1995) as follows.

> **Site.** A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure.
>
> **Building.** A building, such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity. "Building" may also be used to refer to a historically and functionally related unit, such as a courthouse and jail, or a house and barn.
>
> **Structure.** The term "structure" is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter.
>
> **Object.** The term "object" is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed. Although it may be, by nature or design, movable, an object is associated with a specific setting or environment.
>
> **District.** A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

Significance Criteria

When a project might affect an historical resource, the project proponent is required to conduct an assessment to determine whether the effect may be one that is significant. Consequently, it is necessary to determine the importance of resources that could be affected. The importance of a resource is measured in terms of criteria for inclusion on the California Register of Historical Resources (Title 14 CCR, §4852(a)) as listed below. A resource may be important if it meets any one of the criteria below, or if it is already listed on the California Register of Historical Resources or a local register of historical resources.

An important historical resource is one which:

1. Is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.

2. Is associated with the lives of persons important to local, California, or national history.

3. Embodies the distinctive characteristics of a type, period, region or method of construction, or represents the work of a master or possesses high artistic values.

4. Has yielded, or may be likely to yield, information important to the pre-history or history of the local area, California, or the nation.

In addition to meeting one or more of the above criteria, eligibility for the California Register requires that a resource retains sufficient integrity to convey a sense of its significance or importance. Seven elements are considered key in considering a property's integrity: location, design, setting, materials, workmanship, feeling, and association.

The OHP advocates that all historical resources over 45 years old be recorded for inclusion in the OHP filing system (OHP 1995:2), although the use of professional judgment is urged in determining whether a resource warrants documentation.

PROJECT SETTING

Study Area Location and Description

The study area is located at 800 Yolanda Avenue, Santa Rosa, Sonoma County, as shown on the Santa Rosa 7.5' USGS topographic map (Figure 2). It consists of 5.53 acres of generally level land.

The geology of the study area consists of Holocene alluvial fan deposits, which date from 11,700 years ago to the present (McLaughlin *et al.* 2004).

Soils within the study area belong to the Goulding-Toomes and Clearlake series (Miller 1972:Sheet 81). Goulding-Toomes soils are well-drained clay loams. In an uncultivated state these soils support the growth of annual and perennial grasses with scattered clumps of oak trees, mazanita, and small shrubs. Historically, Goulding-Toomes soils were used for grazing sheep and cattle (Miller 1972:38). Clearlake soils are poorly-drained soils found on basins and alluvial fans. In an uncultivated state these soils support the growth of annual and perennial grasses and forbs. Historically, Clearlake soils were used for oat-vetch hay or oat hay for feeding cattle and horses (Miller 1972:22).

The closest perennial water source, Kawana Creek, is approximately 460 meters north of the northeastern corner of the study area.

Cultural Setting

Archaeological evidence indicates that human occupation of California began at least 11,000 years ago (Erlandson *et al.* 2007). Early occupants appear to have had an economy based largely on hunting, with limited exchange, and social structures based on the extended family unit. Later, milling technology and an inferred acorn economy were introduced. This diversification of economy appears to be coeval with the development of sedentism and population growth and expansion. Sociopolitical complexity and status distinctions based on wealth are also observable in the archaeological record, as evidenced by an increased range and distribution of trade goods (e.g., shell beads, obsidian tool stone), which are possible indicators of both status and increasingly complex exchange systems.

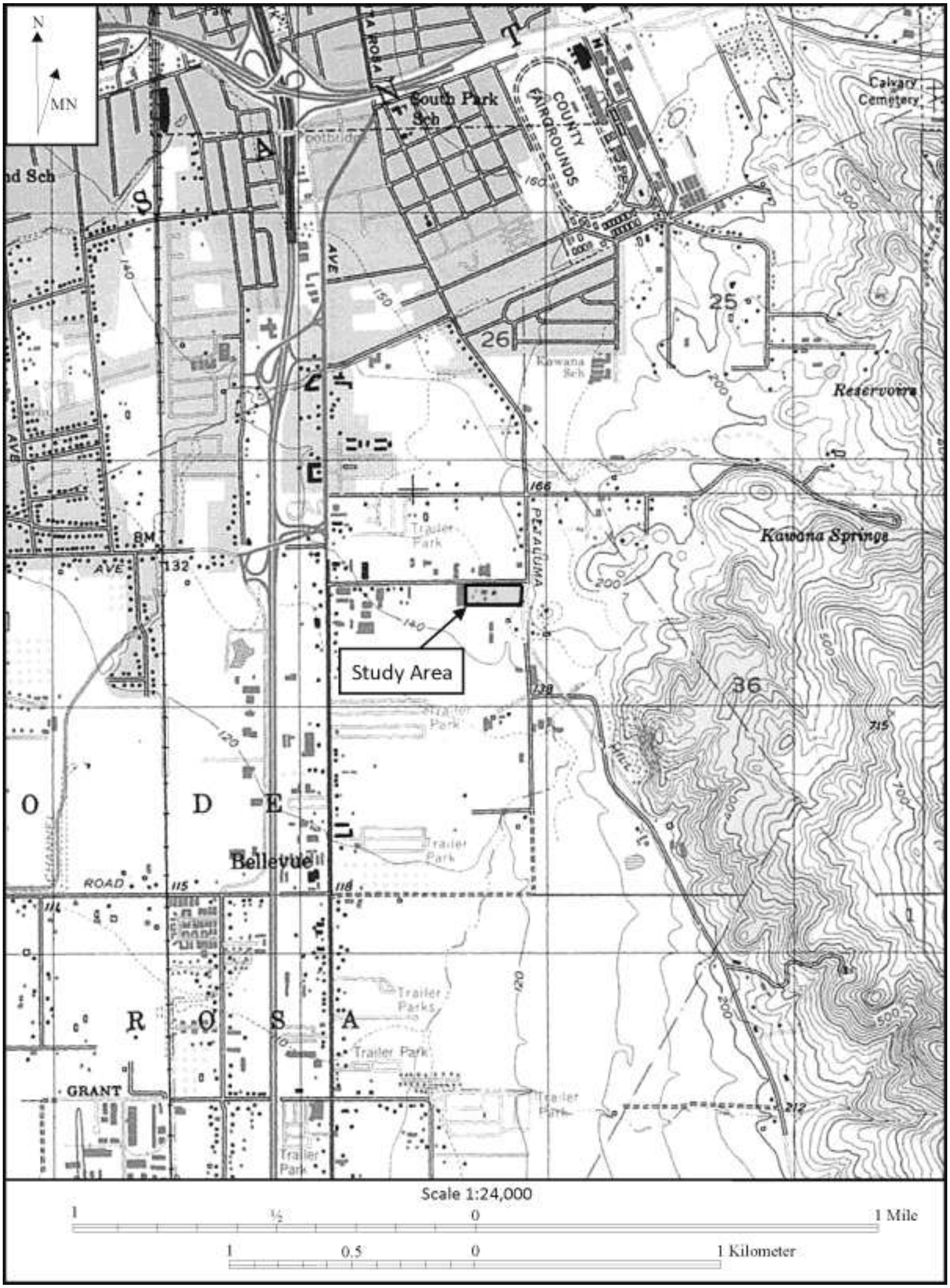


Figure 2. Study area location (adapted from the 1994 USGS Santa Rosa 7.5' USGS topographic map).

At the time of European settlement, the study area was included in the territory controlled by the Southern Pomo (Barrett 1908; McLendon and Oswalt 1978). The Pomo were hunter-gatherers who lived in rich environments that allowed for dense populations with complex social structures (Barrett 1908; Kroeber 1925). They settled in large, permanent villages about which were distributed seasonal camps and task-specific sites. Primary village sites were occupied continually throughout the year and other sites were visited in order to procure particular resources that were especially abundant or available only during certain seasons. Sites often were situated near sources of fresh water and in ecotones where plant life and animal life were diverse and abundant. For more information about the Pomo, see Bean and Theodoratus (1978), Kniffen (1939), and Stewart (1943).

Historically, the study area is within the Rancho Llano de Santa Rosa granted to Joaquin Carrillo, brother-in-law to Mariano Vallejo, in 1844 by Governor Michetorena. When granted, it consisted of 3 leagues of land, of which 13,316 acres were patented to Carrillo in 1865 (Cowan 1977:95; Hoover *et al*. 1966:533).

STUDY PROCEDURES AND FINDINGS

Native American Contact

A request was sent to the State of California's Native American Heritage Commission seeking information from the sacred lands files and the names of Native American individuals and groups that would be appropriate to contact regarding this project. Letters were also sent to the following groups:

Federated Indians of Graton Rancheria
Kashia Band of Pomo Indians of the Stewarts Point Rancheria
Lytton Rancheria of California
Mishewal-Wappo Tribe of Alexander Valley

This contact represents notification regarding the project to provide an opportunity for comment. It does not constitute consultation with tribes.

Native American Contact Results

The Native American Heritage Commission replied with a letter dated April 27, 2017, in which they indicated that the sacred land file has no information about the presence of Native American cultural resources in the immediate project area.

Buffy McQuillen, Federated Indians of Graton Rancheria, replied via email on May 10, 2017. Ms. McQuillen acknowledged receipt of the notification letter and stated that the Tribe would review the project within ten days. No other comments have been received as of the date of this report. A log of contact efforts is appended to this report, along with copies of correspondence (see Appendix A).

Archival Study Procedures

Archival research included examination of the library and project files at Tom Origer & Associates. A review (NWIC File No. 16-0094) was completed of the archaeological site base maps and records, survey reports, and other materials on file at the Northwest Information Center (NWIC), Sonoma State University, Rohnert Park. Sources of information included but were not limited to the current listings of properties on the National Register of Historic Places, California Historical Landmarks, California Register of Historical Resources, and California Points of Historical Interest as listed in the Office of Historic Preservation's *Historic Property Directory* (OHP 2012). A paleontological records search was requested from the University of California Museum of Paleontology at the University of California, Berkeley.

The Office of Historic Preservation has determined that structures in excess of 45 years of age should be considered potentially important historical resources, and former building and structure locations could be potentially important historic archaeological sites. Archival research included an examination of historical maps to gain insight into the nature and extent of historical development in the general vicinity, and especially within the study area. Maps ranged from hand-drawn maps of the 1800s (e.g., GLO) to topographic maps issued by the United States Geological Survey (USGS) and the United States Army Corps of Engineers (USACE).

In addition, ethnographic literature that describes appropriate Native American groups, county histories, and other primary and secondary sources were reviewed. Sources reviewed are listed in the "Materials Consulted" section of this report.

Archival Study Findings

Archival research found that the study area had not been previously subject to a cultural resources survey. A potential resource, consisting of a tank house, was informally recorded within the study area (Whatford 1990). Two studies have been conducted adjacent to the study area (Jones & Stokes 2000; Origer 1976). Two resources are recorded within a quarter mile of the study area (Chattan 2003, 2009). These resources do not have the potential to extend into the study area.

There are no reported ethnographic sites within one mile of the survey area (Barrett 1908).

Historical maps show no buildings within the study area prior to 1916 (Bell and Heymans 1888; Bowers 1867; GLO 1861; McIntire and Lewis 1908; Reynolds and Proctor 1898; Thompson 1877). Topographic maps show a building within the study area as early as 1916 (USGS 1916). A building in approximately the same location as the one indicated on the 1916 map continues to be shown on later maps, and in 1968 two additional buildings appear within the study area (USACE 1944, USGS 1954a, 1954b, 1968). A 1942 aerial photo shows what appears to be an orchard planted on the eastern portion of the study area.

Patricia Holroyd, University of California Museum of Paleontology, fulfilled the paleontological record search request on September 5, 2017 via email. The paleontological records search indicated that there are no fossil localities recorded near the study area.

Field Survey Procedures

An intensive field survey was completed by Julia Franco and Rachel Hennessy on May 5, 2017. The study area was surveyed by walking in a zigzag pattern within corridors measuring approximately 15 meters apart. Ground visibility ranged from moderate to poor, with vegetation, imported gravel, and buildings being the primary hindrances. A hoe was used as needed to clear small patches of vegetation so that the ground could be inspected.

Based on the results of the prefield research, it was anticipated that prehistoric and historic-period resources could be found within the study area. Prehistoric archaeological site indicators expected to be found in the region include but are not limited to: obsidian and chert flakes and chipped stone tools; grinding and mashing implements such as slabs and hand-stones, and mortars and pestles; and locally darkened midden soils containing some of the previously listed items plus fragments of bone, shellfish, and fire affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

Field Survey Findings

Archaeology

No archaeological sites were observed during the course of our survey. Fragments of ceramic were observed in a pile of rubble on the property, which may have been imported.

Built Environment

A farm complex consisting of three residential buildings and two sheds was observed within the study area. Residence 1 is a mid-century single story, side-gabled house on a rectangular plan. It cladding horizontal cladding. The windows have all been replaced with vinyl sliders.

Residence 2 is an end-gabled building on a rectangular plan attached to a former tankhouse with a shed roof addition. Cladding is a mix of vertical and horizontal boards and roofing is composite shingle. Windows are a mix of fixed, aluminum, and vinyl sliders.

Residence 3 is a single story, side-gabled building on a rectangular plan with board and batten cladding and composite shingle roof. This building appears to be a shed or workshop which has been repurposed for residential use. Late 20th century windows have been added to this building.

Shed 1 is an equipment shed or garage. It is a shed roof building on a rectangular plan with board and batten cladding. Shed 2 appears to be a pumphouse. It is a small, gable-front building on a rectangular plan with board and batten cladding and a composite shingle roof.

Topographic maps show a building within the study area by 1916 (USGS 1916). However, it is not clear which building is meant to be indicated on the map. Mid- and late- century modifications made to buildings prevent identification of the plotted building.

RECOMMENDATIONS

Known Resources

Archaeology

No archaeological sites were observed during the course of our survey.

Built Environment

Based on our research the property appears to be a rural residential complex with agricultural outbuildings. While the complex is associated with the theme of Sonoma County agriculture, the orchard no longer exists and several of the buildings have been repurposed and modified. The complex meets California Register Criterion 1, however it does not maintain sufficient integrity to be eligible for inclusion on the California Register. It is not likely associated with any people important to the Santa Rosa area, Sonoma County, or California's past, therefore the buildings on the property would not be eligible for inclusion on the California Register under Criterion 2. The house is unlikely to be eligible for inclusion on the California Register under Criterion 3 as it is architecturally indistinct and has been subject to numerous modifications (modified windows and additions). The property contains no archaeological remains and the buildings are unlikely to be eligible for inclusion on the California Register under Criterion 4.

No historical resources were observed; therefore no resource specific recommendations are required.

Potential for Buried Sites

Determining the potential for buried deposits factors includes landform age, distance to water, slope, and archaeological data (Meyer *et al.* 2017). The study area was essentially level, however it is not very near to water. The geology of the study area is made up of Holocene fan deposits. These geologic deposits date from about 11,700 years ago to the present. Buried prehistoric archaeological sites are found in or beneath Holocene-age depositional landforms (Meyer and Rosenthal 2007). Based on the study area's geologic age, our analysis of the environmental setting, and incorporating King's (2004) analysis of soil sensitivity for buried sites, the probability of identifying one site is approximately 5%.

Accidental Discovery

In keeping with the CEQA guidelines, if archaeological remains are uncovered, work at the place of discovery should be halted immediately until a qualified archaeologist can evaluate the finds (§15064.5 [f]). Prehistoric archaeological site indicators include: obsidian and chert flakes and chipped stone tools; grinding and mashing implements (e.g., slabs and handstones, and mortars and pestles); bedrock outcrops and boulders with mortar cups; and locally darkened midden soils. Midden soils may contain a combination of any of the previously listed items with the possible addition of bone and shell remains, and fire-affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

The following actions are promulgated in the CEQA Guidelines Section 15064.5(d) and pertain to the discovery of human remains. If human remains are encountered, excavation or disturbance of the location must be halted in the vicinity of the find, and the county coroner contacted. If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission. The Native American Heritage Commission will identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations regarding the treatment of the remains with appropriate dignity.

SUMMARY

Tom Origer & Associates completed an historical resources study of the property at 800 Yolanda Avenue, Santa Rosa, Sonoma County, California. The study was requested by Kevin Apodaca, 800 Yolanda, LLC. This study was conducted in compliance with the requirements of the City of Santa Rosa and with CEQA requirements. No historical resources were found within the study area and therefore no resource-specific recommendations are warranted. No fossil localities are recorded near the study area. Documentation pertaining to this study is on file at the offices of Tom Origer & Associates (File No. 2017-048S).

MATERIALS CONSULTED

Barrett, S.
1908 *The Ethno-Geography of the Pomo and Neighboring Indians*. University of California Publications in American Archaeology and Ethnology Vol. 6, No. 1:1-322. University of California Press, Berkeley.

Bean, L. and D. Theodoratus
1978 Western Pomo and Northeast Pomo. In *California*, edited by R. Heizer, Handbook of North American Indians, Vol. 8, W. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Bell and Heymans
1888 *Map of Sonoma County, California. Bell* and Heymans, San Francisco.

Bowers, A.
1867 *Map of Sonoma County, California*. 2nd ed. A. Bowers.

Byrd, B., A. Whitaker, and P. Mikkelsen
2017 *Caltrans District 4 Research Design and Treatment Plan for Native American Archaeological Resources in the San Francisco Bay-Delta Region.* On file at the Caltrans District 04 Office of Cultural Resource Studies, Oakland, California.

Chattan, C.
2003 *Primary Record for ARS 03-038-01*. Document P49-003098 on file at the Northwest Information Center, Rohnert Park.

2009 *Primary Record for ARS 09-024-01*. Document P49-004257 on file at the Northwest Information Center, Rohnert Park.

Cowan, R.
1977 *Ranchos of California: A List of Spanish Concessions 1775-1822 and Mexican Grants 1822-1846.* Academy Library Guild, Fresno, California.

Department of Parks and Recreation
1976 *California Inventory of Historical Resources*. State of California, Sacramento.

Erlandson, J. T. Rick, T. Jones, J. Porcasi
2007 One if by Land, Two if by Sea: Who Were the First Californians? In: *California Prehistory: Colonization, Culture, and Complexity*. (pp 53-62) T. Jones and K. Klar, editors. AltaMira Press. Lanham, MD.

Fredrickson, D.
1984 The North Coastal Region. In *California Archaeology*, edited by M. Moratto. Academic Press, San Francisco.

General Land Office (GLO)
1861 *Plat of the Rancho Llano de Santa Rosa.* Department of the Interior, Washington, D.C.

Hoover, M., H. Rensch, E. Rensch, and W. Abeloe
1966 *Historic Spots in California.* 3rd edition. Stanford University Press, Stanford.

Hoover, M., H. Rensch, E. Rensch, W. Abeloe, and D. Kyle
1990 *Historic Spots in California.* 4th edition. Stanford University Press, Stanford.

Hoover, M., H. Rensch, E. Rensch, W. Abeloe, and D. Kyle
2002 *Historic Spots in California.*5th edition. Stanford University Press, Stanford.

Jones & Stokes Associates, Inc.
2000 *Final Cultural Resources Inventory Report for the Proposed Fiber Optic Cable Routes between Point Arena and Robbins, and Point Arena and Sacramento, California*. Volume 1. Document S- 22736 on file at the Northwest Information Center, Rohnert Park.

Kniffen, F.
1939 *Pomo Geography*. University of California Publications in American Archaeology and Ethnology, Vol. 36. Berkeley.

Kroeber, A.
1925 *Handbook of the Indians of California.* Bureau of American Ethnology, Bulletin 78, Smithsonian Institution, Washington, D.C.

McIntire and Lewis
1908 *Official Map of the County of Sonoma, California.* County of Sonoma, Santa Rosa.

McLaughlin, R., V. Langenheim, A. Sarna-Wojcicki, R. Fleck, D. McPhee, C. Roberts, C. McCabe, and E. Wan
2008 *Geologic and Geophysical Framework of the Santa Rosa 7.5' Quadrangle, Sonoma County, California.* United States Geological Survey, Menlo Park, California.

McLendon, S. and R. Oswalt
1978 Pomo: Introduction. In *California*, edited by R. Heizer, pp. 274-288. Handbook of North American Indians, Vol. 8, W. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Meyer, J., P. Kaijankoski, and J. Rosenthal
2017 Discovering Sites: Geoarchaeological Approaches to Site Sensitivity and Predictive Modeling. In, *Caltrans District 4 Research Design and Treatment Plan for Native American Archaeological Resources in the San Francisco Bay-Delta Region.* B. Byrd, A. Whitaker, and P. Mikkelsen. Pp 4-1 through 4-13. On file at the Caltrans District 04 Office of Cultural Resource Studies, Oakland, California.

Meyer, J. and J. Rosenthal
2007 *Geoarchaeological Overview of the Nine Bay Area Counties in Caltrans District 4.* Document S-33600 on file at the Northwest Information Center, Rohnert Park.

Miller, V.
1972 *Soil Survey of Sonoma County, California*. U.S. Department of Agriculture in cooperation with the University of California Agricultural Experiment Station.

Moratto, M.
1984 *California Archaeology.* Academic Press, San Francisco.

Office of Historic Preservation
1995 *Instructions for Recording Historical Resources.* California Office of Historic Preservation, Sacramento.

2012 *Historic Property Directory*. Office of Historic Preservation, Sacramento.

Origer, T.
1976 *An Archaeological Survey of Four Segments of Roadway, Sonoma County, California*. Document S-387 on file at the Northwest Information Center, Rohnert Park.

Peugh, E.A.
1934 *Map of Sonoma County, California.* E.A. Peugh, Santa Rosa.

Reynolds, W. and T. Proctor
1898 *Illustrated Atlas of Sonoma County, California*. Reynolds and Proctor, Santa Rosa.

Thompson, T.H. & Co.
1877 *Historical Atlas Map of Sonoma County, California.* T.H. Thompson & Co., Oakland.

United States Army Corps of Engineers
1944 Santa Rosa, California 15' map. Engineer Reproduction Plant, Washington, D.C.

United States Geological Survey
1954a Santa Rosa, California 15’ map. Geological Survey, Washington, D.C.

1954b Santa Rosa, California 7.5’ map. Geological Survey, Washington, D.C.

1968 Santa Rosa 7.5’ quadrangle. Department of the Interior, Washington, D.C.

Whatford, C.
1990 Document C-888 on file at the Northwest Information Center, Rohnert Park.

APPENDIX A

Native American Contact

Copies of Correspondence

Native American Contact Efforts
800 Yolanda Avenue
Santa Rosa, Sonoma County

Organization	Contact	Action	Results
Native American Heritage Commission		Letter 4/24/17	A response was received via email stating that a search of the Sacred Lands File resulted in a negative findings. A list of additional contacts was provided.
Federated Indians of Graton Rancheria	Gene Buvelot Buffy McQuillen Peter Nelson Greg Sarris	Letter 4/24/17	A response was received via email on May 10, 2017. Ms. McQuillen stated that the Tribe would review the project within ten days.
Lytton Band of Pomo Indians	Marjorie Mejia	Letter 4/24/17	No response received as of the date of this report.
Kashia Band of Pomo Indians of the Stewarts Point Rancheria	Reno Franklin	Letter 5/2/17	No response received as of the date of this report.
Mishewal-Wappo of Alexander Valley	Scott Gabaldon	Letter 5/2/17	No response received as of the date of this report.

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: 800 Yolanda Avenue
County: Sonoma

USGS Quadrangles
Name: Santa Rosa
Township T7N Range R8W Section(s) N/A (Llano de Santa Rosa land grant) MDBM

Date: April 24, 2017
Company/Firm/Agency: Tom Origer & Associates
Contact Person: Julia Franco

Address: P.O. Box 1531
City: Rohnert Park Zip: 94927
Phone: (707) 584-8200 Fax: (707) 584-8300
Email: julia@origer.com

Project Description: We are conducting a cultural resources study of a 5.53-acre property in southeast Santa Rosa, Sonoma County.

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
Fax (916) 373-5471

April 27, 2017

Julia Franco
Tom Origer & Associates

Sent by Email: Julia@origer.com
Number of Pages: 2

RE: 800 Yolanda Avenue, Santa Rosa, Sonoma County

Dear Ms. Franco:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results. **Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.**

I suggest you contact all of those listed, if they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. **By contacting all those on the list, your organization will be better able to respond to claims of failure to consult.** If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: Sharaya.souza@nahc.ca.gov.

Sincerely,

Sharaya Souza
Staff Services Analyst

Native American Heritage Commission
Native American Contacts
4/27/2017

Federated Indians of Graton Rancheria
Greg Sarris, Chairperson
6400 Redwood Drive, Ste 300 Coast Miwok
Rohnert Park , CA 94928 Southern Pomo
(707) 566-2288 Office
(707) 566-2291 Fax

Federated Indians of Graton Rancheria
Gene Buvelot
6400 Redwood Drive, Ste 300 Coast Miwok
Rohnert Park , CA 94928 Southern Pomo
gbuvelot@gratonrancheria.
(415) 279-4844 Cell
(707) 566-2288 ext 103

Kashia Band of Pomo Indians of the Stewarts Point
Reno Keoni Franklin, Chairperson
1420 Guerneville Rd. Ste 1 Pomo
Santa Rosa , CA 95403
reno@stewartspoint.org
(707) 591-0580 Office

(707) 591-0583 Fax

Lytton Rancheria of California
Marjorie Mejia, Chairperson
437Aviation Blvd Pomo
Santa Rosa , CA 95403
margiemejia@aol.com
(707) 575-5917
(707) 575-6974 - Fax

Mishewal-Wappo Tribe of Alexander Valley
Scott Gabaldon, Chairperson
2275 Silk Road Wappo
Windsor , CA 95492
scottg@mishewalwappotribe.com
(707) 494-9159

This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources assessments for the updated contact list for 800 Yolanda Avenue, Santa Rosa, Sonoma County.

April 24, 2017

Peter Nelson
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928

Re: 800 Yolanda Avenue, Santa Rosa, Sonoma County.

Dear Mr. Nelson:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 5.53 acres in Santa Rosa. The City of Santa Rosa is reviewing the project for CEQA compliance.

Enclosed is a portion of the Santa Rosa, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Julia Franco
Associate

April 24, 2017

Greg Sarris
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928

Re: 800 Yolanda Avenue, Santa Rosa, Sonoma County.

Dear Mr. Sarris:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 5.53 acres in Santa Rosa. The City of Santa Rosa is reviewing the project for CEQA compliance.

Enclosed is a portion of the Santa Rosa, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Julia Franco
Associate

April 24, 2017

Buffy McQuillen
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928

Re: 800 Yolanda Avenue, Santa Rosa, Sonoma County.

Dear Ms. McQuillen:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 5.53 acres in Santa Rosa. The City of Santa Rosa is reviewing the project for CEQA compliance.

Enclosed is a portion of the Santa Rosa, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Julia Franco
Associate

Tom Origer & Associates
Archaeology / Historical Research

April 24, 2017

Gene Buvelot
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928

Re: 800 Yolanda Avenue, Santa Rosa, Sonoma County.

Dear Mr. Buvelot:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 5.53 acres in Santa Rosa. The City of Santa Rosa is reviewing the project for CEQA compliance.

Enclosed is a portion of the Santa Rosa, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Julia Franco
Associate

April 24, 2017

Marjorie Mejia
Lytton Rancheria of California
437 Aviation Blvd
Santa Rosa, CA 95403

Re: 800 Yolanda Avenue, Santa Rosa, Sonoma County.

Dear Ms. Mejia:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 5.53 acres in Santa Rosa. The City of Santa Rosa is reviewing the project for CEQA compliance.

Enclosed is a portion of the Santa Rosa, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Julia Franco
Associate

Tom Origer & Associates
Archaeology / Historical Research

May 2, 2017

Reno Franklin
Kashia Band of Pomo Indians of the Stewarts Point
1420 Guerneville Rd., Ste 1
Santa Rosa, CA 95403

Re: 800 Yolanda Avenue, Santa Rosa, Sonoma County.

Dear Mr. Franklin:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 5.53 acres in Santa Rosa. The City of Santa Rosa is reviewing the project for CEQA compliance.

Enclosed is a portion of the Santa Rosa, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Julia Franco
Associate

May 2, 2017

Scott Gabaldon
Mishewal-Wappo Tribe of Alexander Valley
2275 Silk Road
Windsor, CA 95492

Re: 800 Yolanda Avenue, Santa Rosa, Sonoma County.

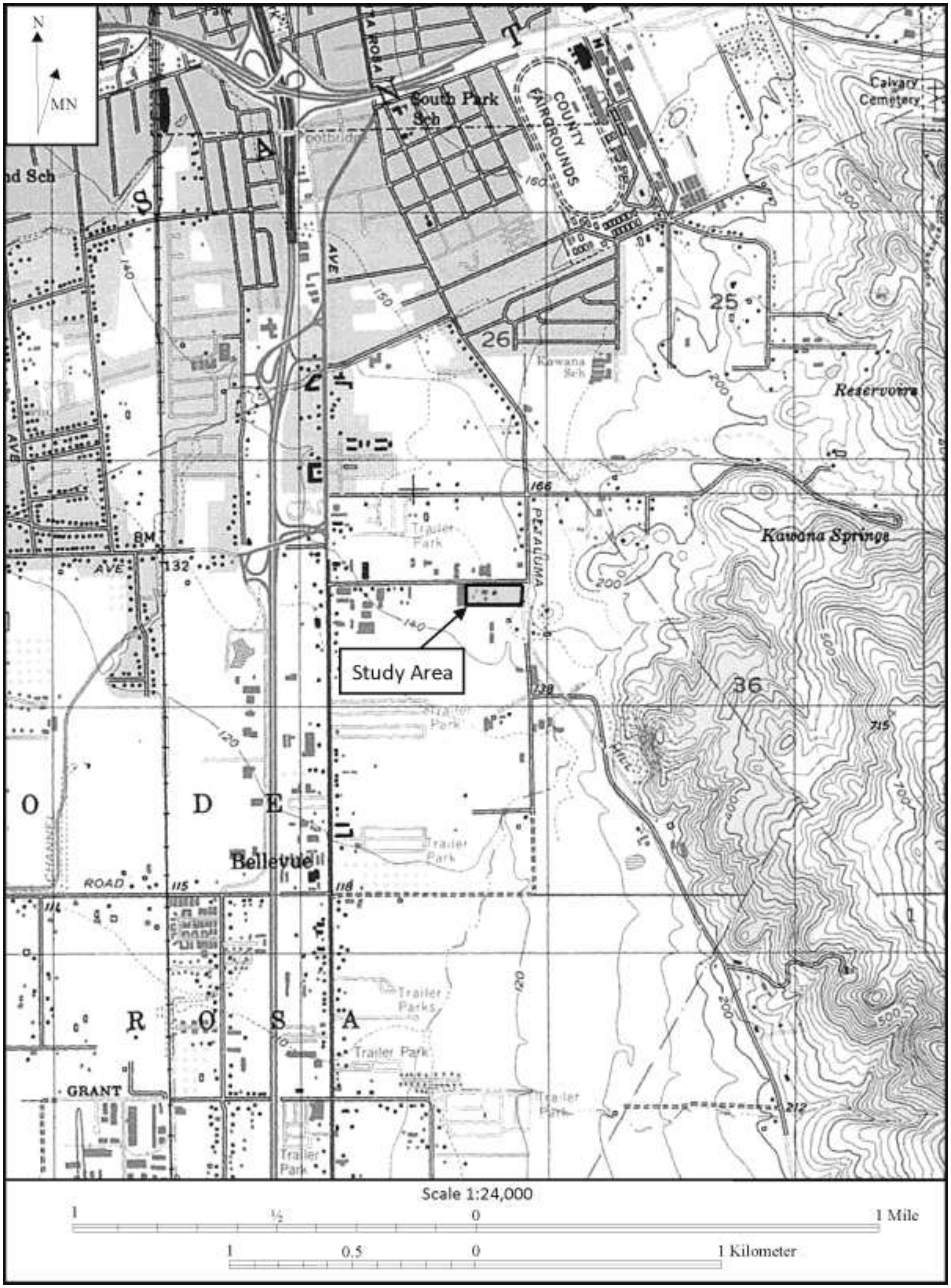
Dear Mr. Gabaldon:

I write to notify you of a proposed project within Sonoma County, for which our firm is conducting an historical resources study. This letter does not constitute formal consultation. We are conducting a survey of 5.53 acres in Santa Rosa. The City of Santa Rosa is reviewing the project for CEQA compliance.

Enclosed is a portion of the Santa Rosa, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Julia Franco
Associate


N
MN
South Park Sch
COUNTY FAIRGROUNDS
Calvary Cemetery
nd Sch
25
26
Kawana Sch
Reservoirs
166
PETALUMA
Trailer Park
Kawana Springs
AVE
132
BM
200
140
Study Area
36
139
715
120
700
500
O
D
E
Bellevue
ROAD
115
118
R
O
S
A
Trailer Parks
Trailer Park
GRANT
212
Scale 1:24,000
1
½
0
1 Mile
1
0.5
0
1 Kilometer

Julia

From:	THPO@gratonrancheria.com
Sent:	Wednesday, May 10, 2017 9:54 AM
To:	Julia@Origer.com
Subject:	800 Yolanda Avenue, Santa Rosa, Sonoma County
Attachments:	Tom Origer, 800 Yolonda Avenue, Santa Rosa, Sonoma County.pdf

Dear Julia Franco,

Thank you for notifying the Federated Indians of Graton Rancheria about 800 Yolanda Avenue, Santa Rosa, Sonoma County, a project within the Tribe's Ancestral Territory. We appreciate being notified and will review your project within 10 business days. If you have an immediate request please contact the Tribal Heritage Preservation Office for assistance by phone at (707) 566-2288 or by email at thpo@gratonrancheria.com.

Sincerely,
Buffy McQuillen
Tribal Heritage Preservation Officer (THPO)
Native American Graves Protection and Repatriation Act (NAGPRA)
Office: 707.566.2288; ext. 137
Cell: 707.318.0485
FAX: 707.566.2291

Antonette Tomic
THPO Administrative Assistant
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928
Office: 707.566.2288, ext. 143
Fax: 707.566.2291
atomic@gratonrancheria.com

APPENDIX G

SANTA ROSA FARM GROUP -
CANNABIS CULTIVATION FACILITY PROJECT NOISE STUDY
PREPARED BY RINCON CONSULTANTS, INC., DECEMBER 2019

Santa Rosa Farm Group – Cannabis Cultivation Facility Project

Noise Study

prepared for

Danny Abdelmalak, 800 Yolanda LLC

800 Yolanda Avenue

Santa Rosa, California 95404

prepared by

Rincon Consultants

449 15th Street, Suite 303

Oakland, California 94612

December 2019

Rincon Consultants, Inc.

Environmental Scientists Planners Engineers

www.rinconconsultants.com

This page left intentionally blank.

Table of Contents

Tables

Figures

Appendices

1 Project Description

1.1 Introduction

This study is an analysis of the potential noise impacts of a proposed cannabis cultivation and processing facility located at 800 Yolanda Avenue in Santa Rosa, California. Rincon Consultants, Inc. has prepared this report under contract to Danny Abdelmalak, 800 Yolanda LLC for use by the City of Santa Rosa, in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). The purpose of this study is to analyze the proposed project's potential noise impacts related to both temporary construction activity and long-term operation of the cannabis facility.

1.2 Project Summary

The proposed project would involve the construction of an industrial structure used for indoor cultivation and processing of medical cannabis on an approximately 5.53-acre site located at 800 Yolanda Avenue in the City of Santa Rosa. The project would involve the demolition of existing unoccupied structures, including a single-family residence, a wood-framed garage, a "well-shed," a two-story water tower, a mobile office trailer, and a wood-framed shed. The project would involve the construction of a three-story, approximately 120,000 square-foot (sf) building in the southwest portion of the site, used for cannabis cultivation and processing. This building would be set back 70 feet from the southern property line.

The proposed building's second and third stories would be equipped with grow rooms used for cannabis cultivation, and the ground floor would be used for manufacturing, drying and trimming, packing and labeling, distribution, and warehousing and receiving. The ground floor would also include offices, conference rooms, lounge, restrooms, breakrooms, vaults, laboratory, kitchen, and lobby. An approximately 3,200 sf single-story utility building would also be constructed on the central portion of the project site that would include an enclosure for the natural gas co-generator. Supplementary proposed structures include two security booths along the northern site boundary.

The proposed supply of 85 parking spaces, including three handicap accessible stalls, is less than required by the City Code, but is expected to be more than sufficient for the proposed use based on the anticipated number of employees. Approximately half the parking spaces would be located on the south side of the building. Three bicycle stalls would also be installed. To minimize the exposure of nearby residents to noise from parking lot activity, motorcycles would be required to park in stalls north of the proposed main building during all work shifts.

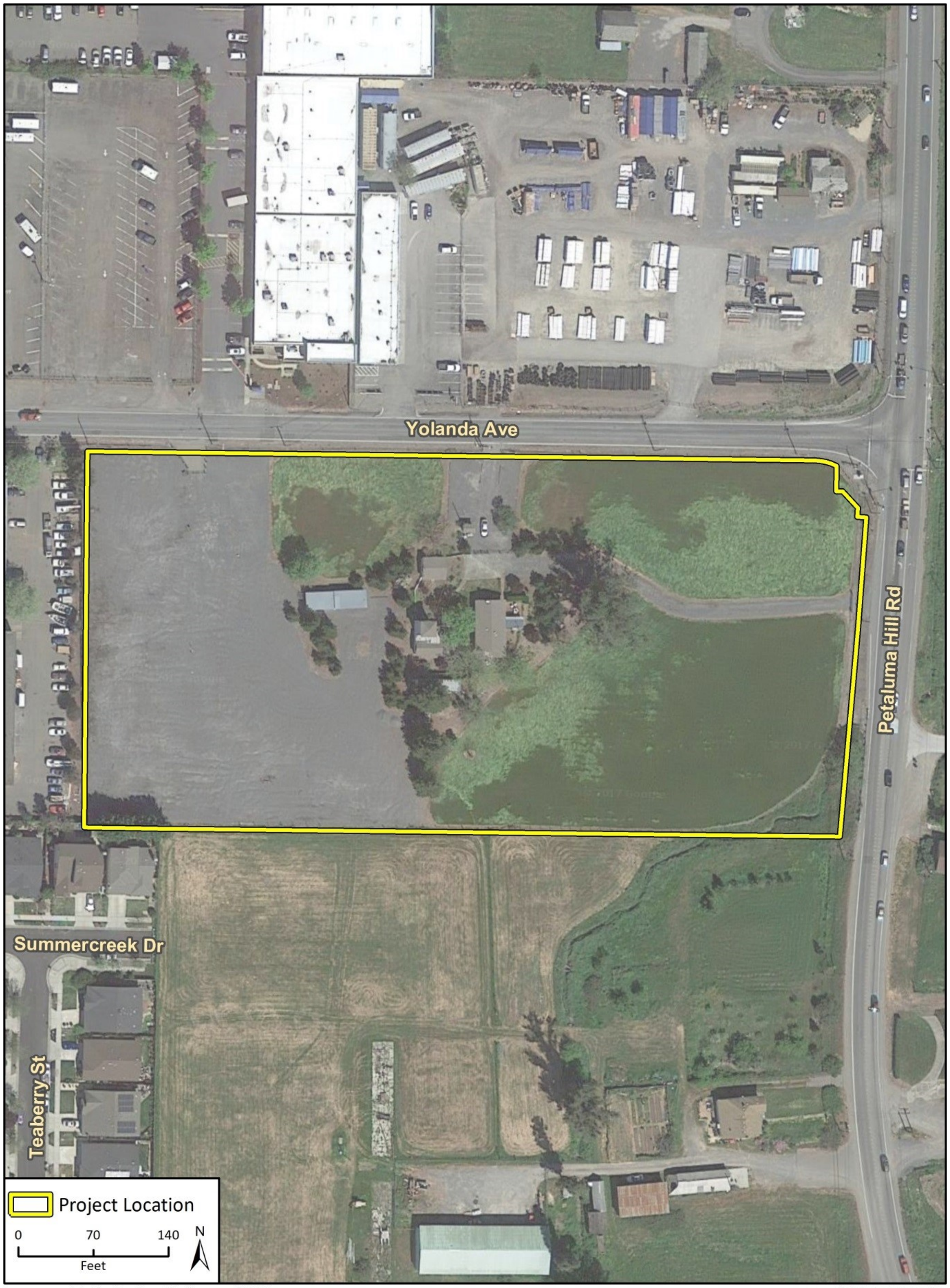
Truck bays, used for pickups and deliveries, would be located on the eastern side of the main building, opposite from nearby residences. Additional proposed site modifications would include a boundary wall along the entire site perimeter, small tree and shrub removal, and grading and utility trenching. The boundary wall would be approximately 7 feet tall along the southern property line and made of solid materials. Site ingress and egress would be provided by two driveways, both located on Yolanda Avenue on the northern site boundary.

Proposed operations of the facility involve approximately 105 full-time employees, including security personnel. However, work would be performed in shifts as cultivation operations will run continuously:

- Up to 45 employees parking south of the main building during the primary day shift from 9:30 AM to 6:30 PM
- Up to 25 employees parking north of the main building during the early night shift from 6:30 PM to 3:30 AM
- Up to 10 employees parking north of the main building during the night shift from 7:00 PM to 4:00 AM
- Up to 25 employees parking north of the main building during the early morning shift from 4:00 AM to 10:00 AM

Suppliers would generally make truck deliveries once a week during typical business hours (day shift), and delivery pickups would be between 10:00 AM and 5:00 PM by appointment only.
The project site is located in a light industrial, residential, and commercial area. The project site is bound to the north by Yolanda Avenue, with commercial properties, including Wyatt Irrigation and Goodwill. Residential properties are located along Petaluma Hill Road south and southeast of the project site, as well as along Summercreek Drive and Teaberry Street southwest of the project site. Figure 1 shows the project site location.

Figure 1 Project Site Location



Imagery provided by Google and its licensors © 2017.

2 Background

2.1 Overview of Noise and Vibration Measurement

Noise

Noise is defined as unwanted sound that disturbs human activity. Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz).

Sound pressure level is measured on a logarithmic scale with the 0 dBA level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA and a sound that is 10 dBA less than the ambient sound level has no effect on ambient noise. Because of the nature of the human ear, a sound must be about 10 dBA greater than the ambient noise level to be judged as twice as loud. In general, a 3 dBA change in the ambient noise level is noticeable, while 1-2 dBA changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while areas adjacent to arterial streets are typically in the 50-60+ dBA range. Normal conversational levels are usually in the 60-65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations.

Noise levels typically attenuate (or drop off) at a rate of 6 dBA per doubling of distance from point sources (such as industrial machinery). Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dBA per doubling of distance. Noise from heavily traveled roads typically attenuates at about 3 dBA per doubling of distance. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA (Federal Transit Administration [FTA] 2018). The manner in which modern structures in California are constructed generally provides a reduction of exterior-to-interior noise levels of about 25 dBA with windows closed (Illingworth & Rodkin 2018).

One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, Leq is summed over a one-hour period. Lmax is the highest RMS (root mean squared) sound pressure level within the measuring period and Lmin is the lowest RMS sound pressure level within the measuring period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using Day-Night Average Level (Ldn), which is the 24-hour average noise level with a 10-dBA penalty for noise occurring during nighttime (10 PM to 7 AM) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 PM to 10 PM and a 10 dBA penalty for noise occurring from 10 PM to 7 AM. Noise levels described by

Ldn and CNEL typically do not differ by more than 1 dBA. In practice, CNEL and Ldn are often used interchangeably.

The relationship between peak hourly Leq values and associated Ldn values depends on the distribution of traffic over the entire day. There is no precise way to convert a peak hourly Leq to Ldn. However, in urban areas near heavy traffic, the peak hourly Leq is typically 2-4 dBA lower than the daily Ldn or CNEL. In less heavily developed areas, such as suburban areas, the peak hourly Leq is often roughly equal to the daily Ldn or CNEL. For rural areas with little nighttime traffic, the peak hourly Leq will often be 3-4 dBA greater than the daily Ldn or CNEL value (California State Water Resources Control Board [CSWRCB] 1999).

Vibration

Vibration is a unique form of noise because its energy is carried through buildings, structures, and the ground, whereas noise is simply carried through the air. Thus, vibration is generally felt rather than heard. Some vibration effects can be caused by noise; e.g., the rattling of windows from passing trucks. This phenomenon is caused by the coupling of the acoustic energy at frequencies that are close to the resonant frequency of the material being vibrated. Typically, groundborne vibration generated by manmade activities attenuates rapidly as distance from the source of the vibration increases. The ground motion caused by vibration is measured as particle velocity in inches per second and is referenced as vibration decibels (VdB) in the U.S. Another measure of vibration is peak particle velocity (PPV), which is defined as the maximum instantaneous positive or negative peak of the vibration signal.

The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel wheeled trains, and traffic on rough roads.

2.2 Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Typically, noise sensitive land uses include single family residential, multiple family residential, churches, hospitals and nursing/convalescent homes, hotels and lodging, libraries, schools, and day care centers. Noise-sensitive receptors closest to the project site include the backyards at only two existing residences located adjacent to a small portion of the south-western corner of the project site. There are also residential uses further down Summercreek Drive. The other land uses around the project site are similarly-zoned industrial uses to the west and north, which are not sensitive receptors. The eastern half of the project site would not be developed by the project and is fronted by Petaluma Hill Road. Thus, in totality, the project site has limited sensitive receptors along or adjacent to the majority of the project site boundary.

2.3 Existing Noise Conditions

The most common and primary sources of noise in the project site vicinity are motor vehicles (e.g., automobiles, buses, trucks, and motorcycles) along Yolanda Avenue and Petaluma Hill Road. Additional vehicle traffic is present on adjacent residential roadways (e.g., Summercreek Drive), but these roadways have substantially lower traffic volumes and do not substantially contribute to overall ambient noise in the vicinity. Motor vehicle noise is of concern because it is characterized by a high number of individual events, which often create a sustained noise level, and its proximity to noise sensitive uses. Additional sources of noise in the project site vicinity include activities associated with the nearby commercial and light industrial uses to the north and west of the project site, and nearby residential uses.

To determine existing ambient noise levels on the project site, three peak-hour weekday afternoon 15-minute noise measurements (Leq[15] dBA) were taken on and near the project site using an ANSI Type II integrating sound level meter. Figure 2 shows the locations of noise measurements taken on July 19, 2017. These noise measurements are representative of existing ambient sound levels from rush-hour traffic activity on Yolanda Avenue and Petaluma Hill Road. The noise monitoring results are provided in Appendix A and the findings are summarized in Table 1. Noise measurement 1 was taken at the northern border of the project site on Yolanda Avenue. Noise measurement 2 was taken adjacent to nearby residences along Petaluma Hill Road. Noise measurement 3 was taken at the end of Summercreek Drive to represent the current ambient noise levels at the closest residential area, just southwest of the project site.

Table 1 Project Vicinity Noise Monitoring Results - PM Peak Hour

Measurement Location	Measurement Location	Sample Times	Approximate Distance to Primary Noise Source	Leq[15] (dBA)[1]
1	Yolanda Avenue	4:18 PM – 4:33 PM	25 feet from centerline of Yolanda Avenue	67.1
2	Petaluma Hill Road	5:06 PM – 5:21 PM	20 feet from centerline of Petaluma Hill Road	77.7[2]
3	Summercreek Drive	5:32 PM – 5:47 PM	670 feet from centerline of Petaluma Hill Road[3]	53.0

See Figure 2 for a map of Noise Measurement Locations.

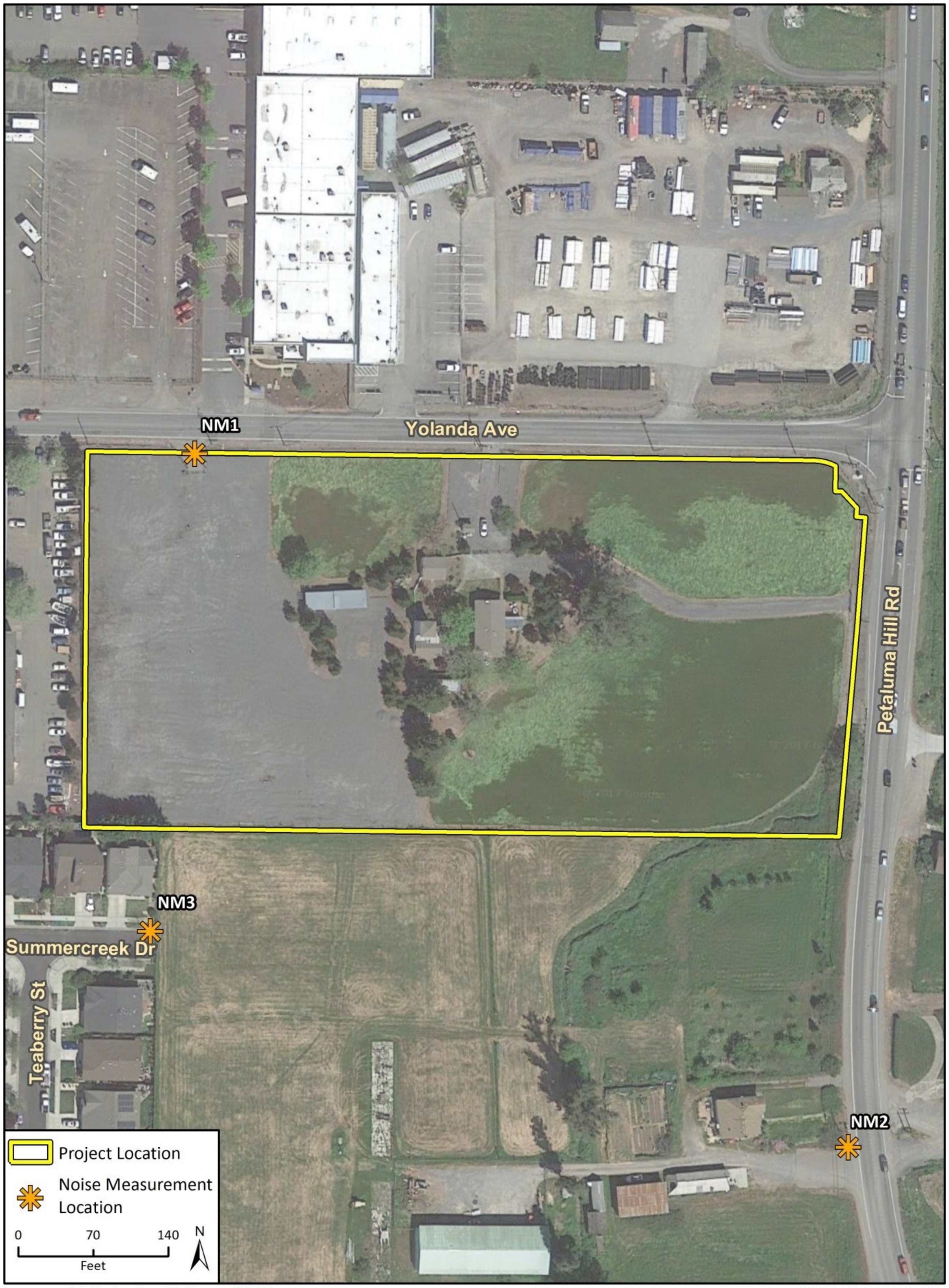
[1] The equivalent noise level (Leq) is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). For this measurement, the Leq was over a 15-minute period (Leq[15]).

[2] Noise levels at measurement location 2 exceeded 75 dBA Leq due to the proximity to a major road, which includes a slight grade change. Cars accelerating uphill result in louder noise levels than on flat terrain.

[3] While measurement 3 was taken on Summercreek Drive, the primary noise source was observed to be traffic along Petaluma Hill Road.

Source: Field measurements conducted on July 19, 2017, using ANSI Type II Integrating sound level meter. See Appendix A.

Figure 2 Noise Measurement Locations



Imagery provided by Google and its licensors © 2017.

2.4 Regulatory Setting

City of Santa Rosa General Plan Noise & Safety Element

The Noise and Safety Element of the City of Santa Rosa General Plan 2035, adopted in November 2009, focuses on reducing excessive noise that can cause annoyance, health problems, economic loss, and ultimately hearing impairment. This element sets goals and policies in order to maintain an acceptable community noise level to protect the health and comfort of people living, working, and/or visiting in Santa Rosa, while maintaining a visually appealing community. General Plan policies relating to noise, and which are applicable to the proposed project, are listed below:

- **NS-B-1** Do not locate noise-sensitive uses in proximity to major noise sources, except residential is allowed near rail to promote future ridership.
- **NS-B-3** Prevent new stationary and transportation noise sources from creating a nuisance in existing developed areas. Use a comprehensive program of noise prevention through planning and mitigation, and consider noise impacts as a crucial factor in project approval.
- **NS-B-4** Require new projects in the following categories to submit an acoustical study, prepared by a qualified acoustical consultant:
    - All new projects proposed for areas with existing noise above 60 dBA DNL. Mitigation shall be sufficient to reduce noise levels below 45 dBA DNL in habitable rooms and 60 dBA DNL in private and shared recreational facilities. Additions to existing housing units are exempt.
    - All new projects that could generate noise whose impacts on other existing uses would be greater than those normally acceptable (as specified in the Land Use Compatibility Standards).
- **NS-B-5** Pursue measures to reduce noise impacts primarily through site planning. Engineering solutions for noise mitigation, such as sound walls, are the least desirable alternative.
- **NS-B-6** Do not permit existing uses to generate new noises exceeding normally acceptable levels unless:
    - Those noises are mitigated to acceptable levels; or
    - The activities are specifically exempted by the City Council on the basis of community health, safety, and welfare.
- **NS-B-9** Encourage developers to incorporate acoustical site planning into their projects. Recommended measures include:
    - Incorporating buffers and/or landscaped earth berms;
    - Orienting windows and outdoor living areas away from unacceptable noise exposure;
    - Using reduced-noise pavement (rubberized-asphalt);
    - Incorporating traffic calming measures, alternative intersection designs, and lower speed limits; and
    - Incorporating state-of-the-art structural sound attenuation and setbacks.

- **NS-B-10** Work with private enterprises to reduce or eliminate nuisance noise from industrial and commercial sources that impact nearby residential areas. If progress is not made within a reasonable time, the city shall issue abatement orders or take other legal measures.
- **NS-B-14** Discourage new projects that have potential to create ambient noise levels more than 5 dBA DNL above existing background, within 250 feet of sensitive receptors.

Santa Rosa City Code

Chapter 17-16 of the Santa Rosa City Code (SRCC) outlines standards relating to noise. The following criteria, shown in Table 2, are used as base ambient noise levels from which noise levels can be compared.

Table 2 Ambient Base Noise Level Criteria

Zone	Daytime (7 AM to 7 PM) Level (dBA)	Evening (7 PM to 10 PM) Level (dBA)	Nighttime (10 PM to 7 AM) Level (dBA)
Single Family Residential, Medium Density Multi-Family Residential	55	50	45
Multi-Family Residential	55	55	50
Office and Commercial	60	60	55
Intensive Commercial	65	65	55
Industrial	70	70	70

Source: City of Santa Rosa City Code

SRCC Section 17-16.040 states that ”it is unlawful for any person to wilfully make or continue, or cause to be made or continued any loud, unnecessary, or unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area. It also states that the standards which shall be considered in determining whether a violation of this section exist include but are not limited to the following:

- The level of noise
- The intensity of the noise
- Whether the nature of the noise is usual or unusual
- Whether the origin of the noise is natural or unnatural
- The level and intensity of the background noise, if any
- The proximity of the noise to residential sleeping facilities
- The nature and zoning of the area within which the noise emanates
- The time of day or night the noise occurs
- The duration of the noise
- Whether the noise is recurrent, intermittent or constant
- Whether the noise is produced by a commercial or noncommercial activity

In addition, the SRCC contains a section that relates to machinery and equipment; and Section 17-16.120 states that it is unlawful for any person to operate any machinery, equipment, pump, fan, air-conditioning apparatus or similar mechanical device so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient base noise level by more than five (5) decibels. The SRCC does not state that this quantitative standard applies to temporary construction activities and this quantitative standard for mechanical devices is similarly not applicable to intermittent noise from typical parking lot activity on properties. In addition, Section 20-30.090 provides that no operational ground vibration shall be generated that is perceptible without instruments by a reasonable person at the property lines of the project site, except for vibrations from temporary construction or demolition activities, and motor vehicle operations.

3 Impact Analysis

3.1 Methodology and Significance Thresholds

The analysis of noise impacts in this report considers the effects of both temporary construction-related noise and long-term noise associated with operation of the project. Impacts from the project would be considered significant based on the thresholds of significance set forth in Appendix G of the *State CEQA Guidelines*, which questions whether the project would result in:

1. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
2. Generation of excessive groundborne vibration or groundborne noise levels?
3. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The closest airports to the project site are (1) Sonoma County airport, which is located approximately 8.5 miles northwest of the proposed project, and (2) Graywood Ranch Airport-CA39 on Gray Road in Santa Rosa, which is approximately 7.8 miles east of the proposed project. The project site is not located within the boundaries of the land use compatibility plans for either airport. The project site is not located on or in the vicinity of a private strip. Therefore, the project would not expose people residing or working in the project area to excessive noise. The project would have no impacts relevant to this threshold of significance. Therefore, there are no noise impacts related to airports (CEQA Threshold 3) and no further analysis of this threshold is required.

Impacts related to CEQA thresholds 1 and 2 are discussed below.

Temporary Construction Noise and Vibration

For the purpose of this analysis, it is assumed that construction equipment would typically operate no closer than 50 feet from the residences adjacent to the project site, for two reasons. First, although the project would involve construction of a wall at the property lines, only a small portion of this boundary wall would be located adjacent to residences. Furthermore, most activity during the construction period would occur in the body of the site, rather than at property lines. Second, when calculating construction noise and vibration based on reference levels that apply to a 50-foot distance, noise and vibration levels begin to artificially inflate at much closer distances approaching zero feet from the source equipment. Therefore, to maintain accurate technical modeling of potential noise impacts this 50-foot reference distance is appropriate to produce a conservative quantitative analysis of construction noise impacts.

Groundborne Vibration Threshold

The City has not adopted numerical thresholds for groundborne vibration impacts. The Federal Transit Administration's (FTA) vibration impact thresholds in the *Transit Noise and Vibration Impact*

Assessment Manual are commonly used and applied here as thresholds for potential groundborne vibration impacts. (FTA 2018). There are two types of thresholds applied to people and buildings.

First, the vibration threshold established by the FTA for disturbance of people is 72 VdB at for the residential land use category, which includes residences and buildings where people normally sleep. This study applies the 72 VdB threshold during nighttime hours because the *Transit Noise and Vibration Impact Assessment Manual* states that the residential criteria should be applied at locations with nighttime sensitivity.

Second, regarding groundborne vibration impacts on structures, the FTA manual states that groundborne vibration levels in excess of 94 VdB or 0.2 PPV could damage non-engineered timber and masonry buildings such as residential structures. Thus, construction vibration impacts would be considered significant for residential buildings if groundborne vibration exceeds the numeric thresholds mentioned in this paragraph.

Construction Noise Threshold

Construction noise levels were estimated based on the type of expected construction equipment and the modeled distance between sensitive receptors and construction activities. Reference noise levels for expected construction equipment were derived from the Roadway Construction Noise Model (RCNM). These reference noise levels for a distance of 50 feet from the source were assumed to represent construction noise at adjacent residences located southwest of the project site. Construction noise level estimates do not account for the presence of intervening structures, fences, or topography, which could reduce noise levels at receptor locations.

Additional factors to consider are that the estimated construction noise levels analyze a worst case scenario and do not take into account the fact that equipment is dispersed in various areas of the site in both time and space. Due to site and equipment limitations, only a limited amount of equipment can operate near a given location at a particular time. In addition, construction equipment estimates used for the analysis for demolition, site preparation, building construction, architectural coating, and paving noise levels are representative of worst case conditions, since it is assumed that all equipment would operate simultaneously. Therefore, the noise levels presented herein represent a conservative estimate of actual construction noise.

As explained above, the City's noise ordinance does not provide a quantitative threshold for construction activity per se. As a result, this analysis applies the qualitative criteria contained in SRCC Section 17-16.040 to analyze potential construction noise impacts. Thus, the project would have a potentially significant impact if construction generates loud, unnecessary, or unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area. Analysis of this threshold utilizes the qualitative criteria contained in Section 17-16.040.

Long-Term Operational Noise

Roadway Noise

This analysis estimates the project's effect on noise-sensitive receptors adjacent to roadways which may be affected by an increase in roadway traffic noise from the project. Roadway noise impacts were analyzed for Yolanda Avenue, because all vehicles would access the site through entrances along Yolanda Avenue and Petaluma Hill Road as these roadways are located directly adjacent to the site and would be used by vehicles traveling to and from the site.

Trip generation for the project was estimated by Fehr & Peers (2019). The proposed project would generate an estimated 285 daily trips of which 63 trips would occur during the AM peak hour and 78 trips would occur during the PM peak hour. Modeling of traffic noise indicates that, in general, a 10 percent increase in traffic volume would raise traffic noise by approximately 0.4 dBA, while a 20 percent increase would raise traffic noise by about 0.8 dBA.

Because the City has not adopted standards that regulate increases in roadway noise caused by projects, this analysis uses recommendations contained in the FTA's *Transit Noise and Vibration Impact Assessment* (2018). These federal guidelines are used to determine whether or not the project's effect on roadway noise would represent a substantial permanent increase. Using the FTA criteria, the allowable noise exposure increase is based on the existing ambient noise level. Roadways with lower ambient noise levels have a higher allowable increase, while roadways with a higher ambient noise level are allowed a lower noise increase. Traffic-related noise increases would constitute a significant impact if roadway noise exposure for nearby receptors would increase by more than the levels indicated in Table 3.

Table 3 Significance of Changes in Operational Roadway Noise Exposure

Existing Noise Exposure (dBA Ldn or Leq)	Allowable Noise Exposure Increase (dBA Ldn or Leq)
45-50	7
50-55	5
55-60	3
60-65	2
65-74	1
75+	0

Source: FTA 2018.

On-Site Operational Noise

On-site noise due to operation of the project may include noise associated with parking lot activity, mechanical equipment, and delivery and trash trucks. This analysis applies General Plan and City Code standards in determining the significance of impacts from on-site operational noise.

Santa Rosa General Plan Noise and Safety Element Policy NS-B-14 discourages new projects that have potential to create ambient noise levels more than 5 dBA DNL above existing background, within 250 feet of sensitive receptors. Pursuant to SRCC Section 16.120, it is a violation of the noise ordinance to operate machinery, equipment, pump, fan, air-conditioning apparatus or similar mechanical devices that would cause the noise level at the property line of any property to exceed the ambient base noise level by more than 5 dBA. Therefore, the threshold of significance for operational noise impacts of the proposed project is whether on-site noise from the project would cause a permanent 5 dBA increase over the ambient base level at the property line.

3.2 Project Impacts

Temporary Construction Impacts

Groundborne Vibration

As stated above, the CEQA Guidelines threshold is whether the project would result in the generation of excessive groundborne vibration or groundborne noise levels.

Construction of the proposed project would temporarily generate groundborne vibration. The construction equipment that is expected to cause vibration includes large and small bulldozers, loaded trucks, and jackhammers. Table 4 shows estimated vibration levels at the nearest sensitive receptors, which are adjacent to the southwest of the project site.

Table 4 Vibration Source Levels for Construction Equipment

Equipment	Approximate VdB at Nearest Sensitive Receptors at 50 feet	Approximate inches/second (PPV) at Nearest Sensitive Receptors at 50 feet
Large Bulldozer	81	0.031
Loaded Trucks	80	0.027
Jackhammer	68	0.012
Small Bulldozer	52	0.001

Source: FTA 2018.

Based on the information presented in Table 4, construction activities could generate maximum vibration levels of approximately 81 VdB or 0.031 PPV at the closest reference distance. For a conservative vibration estimate, the analysis assumed that a backhoe has similar vibration levels as a small bulldozer, paving equipment has similar vibration levels as a large bulldozer, and that loaded trucks and a jackhammer would be used on the project site during construction. Also, it was assumed that vibration-generating equipment, including bulldozers, loaded trucks, and jackhammers, is a limited subset of construction equipment and would typically operate at different times and locations across the project site. The structures that are closest to the project site, and could be impacted by construction vibration are the residential uses which are considered category 2 uses that are non-engineered timber and masonry structures. The threshold of significance for damage to these structures is 94 VdB or 0.2 PPV. Therefore, the project would not have a significant vibration impact (based on the building damage thresholds) on the adjacent residential uses.

Regarding human annoyance or disturbance impacts from construction, the City limits construction activity to the hours of 7:00 AM – 4:00 PM Monday through Friday, 8:00 AM – 4:00 PM Saturday, and none on Sunday. Therefore, no construction activity can occur during nighttime hours when people normally sleep. These code-based timing restrictions would prevent any construction activity from occurring during nighttime hours and thus the project would not expose adjacent residences to vibration during normal sleeping hours. In addition, construction activities are temporary and would cease once project construction is complete. The construction activities are typical of construction methods and do not involve excessive construction durations or unique methods of construction that could cause excessive vibration. There are a limited number of sensitive receptors around the site, and the site itself is zoned for light industrial uses. Furthermore, there are a limited number of sensitive receptors adjacent to the project site. Taken together, these facts demonstrate that the project would not result in the generation of excessive groundborne vibration or groundborne noise levels. Therefore, potential impacts of the project, regarding building damage and human annoyance, are considered less than significant.

Construction Noise

As stated above, the CEQA Guidelines threshold for noise impacts is whether the project would result in the 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.

This report applies Section 17-16.040 from the City's noise ordinance as the construction noise threshold, in part because the SRCC does not have a specific quantitative construction noise threshold. Hence, the project could have a potentially significant impact if construction generates loud, unnecessary, or unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area pursuant to the factors listed in SRCC Section 17-16.040.

Table 5 shows estimated noise levels from each phase of construction.

Table 5 Construction Noise Levels by Project Phase and Construction Phase

Construction Phase	Equipment	Estimated Noise at 50 feet (dBA Leq)	Estimated Noise at 50 feet (dBA Lmax)
Demolition	Backhoe, Dozer, Loader, Saw	85	90
Site Preparation	Grader, Loader	82	85
Grading	Backhoe, Dozer, Loader, Saw	85	90
Building Construction	Backhoe, Crane, Forklift, Loader	79	81
Architectural Coating	Air Compressor	74	78
Paving	Concrete Mixer, Loader, Paver, Roller	80	80

Source: See Appendix B for equipment noise impact data sheets and assumptions.

As shown in Table 5, the estimated noise levels during construction would range from 74 Leq and 78 dBA Lmax to 85 dBA Leq and 90 dBA Lmax at reference distances of 50 feet from receptors. This is a conservative assumption of noise level because not all receptors are within 50 feet of noise sources and construction activities would typically be spread out around the site. Nonetheless, temporary construction noise would be clearly audible at adjacent residential receptors during construction hours. Project construction is estimated to occur over approximately one year. During this period, noise-sensitive residences southwest of the project site would be exposed to temporary noise from construction activity. The nearest residences are located adjacent to the southwest part of the project site.

The existing ambient noise level during peak traffic hours was measured at 53 dBA Leq at the residences adjacent to the project site. Estimated construction noise reaching 85 dBA Leq during the demolition and grading phases would exceed this existing ambient noise level by 32 dBA Leq. The intensity of the noise would not come from high-impact construction activities because there is no pile driving associated with construction. The noise level and intensity would be typical of normal construction activities at a reference distance of 50 feet. This type of construction noise is not unusual. Neither is this type of noise unusual for properties (like most of the surrounding uses) that are zoned light industrial or manufacturing. The origin of the noise is also not unusual, and instead is commonplace for construction sites. Construction equipment would typically operate within the body of the project site and set back from the property line adjacent to residential uses, which would reduce their exposure to construction noise. The proximity of the construction noise to residential sleeping facilities would vary depending on construction activities. However, for the most part, construction activities to develop the structures on the project site would be set back from the property line and thereby distanced from adjacent residential uses. In addition, the zoning for the site also allows industrial and manufacturing facilities and is thus consistent with the type of noise that could be produced during construction of such facilities. Similarly, the density of the site and surrounding areas is dominated by commercial uses along Yolanda Avenue.

Importantly, the City code requires, and the City imposes a standard condition of approval on, development projects to limit construction to the hours of 7:00 AM – 4:00 PM Monday through Friday, 8:00 AM – 4:00 PM Saturday, and none on Sunday. These timing restrictions would ensure that adjacent residences are not exposed to construction noise during evenings, nighttime, and Sundays, when residences are most sensitive to disturbance. The duration of the noise would be temporary and would end with conclusion of construction activities, which are approximately 12 months. Construction noise during this time would also be intermittent during different times of the day and vary accordingly to the construction phase. Construction noise would not be permanent or constant.

Therefore, based on the relevant qualitative criteria in Section 17-16.040, which is the threshold of significance used herein, the project would not result in the 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 noise ordinance. Impacts from construction noise would be less than significant.

Long-Term Operational Noise Impacts

Cannabis operations on the project site would generate noise from the following sources: vehicle trips on roadways to and from the project site, parking lot activities, mechanical equipment, and trash hauling trucks. Operational noise from these sources could increase existing ambient noise levels near the project site.

Roadway Noise

Table 6 shows the estimated number of daily vehicle trips generated by the project.

Table 6 Project-Generated Traffic

Land Use	Size	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
Primary Day Shift	45 employees	100	45	45
Early Night Shift	25 employees	60	0	25
Night Shift	10 employees	25	0	0
Early Morning Shift	25 employees	60	10	0
Product Deliveries	1 round trip per hour	20	2	2
Other Activities	--	20	6	6
	Total Project Trips	**285**	**63**	**78**

Source: Fehr & Peers 2019

Based on Figure 5 of the project traffic study (Fehr & Peers 2019), there are an estimated 6,740 existing daily trips on Yolanda Avenue. As shown in on Table 1, the existing noise level on Yolanda Avenue during peak traffic hours was measured at 67.1 dBA Leq at 25 feet from the roadway centerline. The nearest noise-sensitive receptors along this roadway are several single-family residences located approximately 50 feet south of the roadway centerline. Based on a standard attenuation of rate of 3 dBA per doubling of distance from typical roadways, it is estimated these residences are exposed to traffic noise of approximately 64 dBA.

All new vehicle trips would access the project site directly from Yolanda Avenue. Thus, as shown on Table 7, the addition of 285 daily trips would increase daily traffic on this roadway by approximately 4.2 percent. As discussed in Section 2.1, modeling of traffic noise by Rincon Consultants, Inc. indicates that regardless of the existing traffic volume on a given roadway, a 10 percent increase in traffic volume would raise traffic noise by approximately 0.4 dBA, while a 20 percent increase would raise traffic noise by about 0.8 dBA. The estimated 4.2 percent increase in traffic volume would increase the overall noise level along Yolanda Avenue by less than 0.4 dBA, which would not exceed the 1 dBA threshold that applies on this roadway (per Table 3). This minimal increase in average ambient roadway noise on Yolanda Avenue would not be noticeable to nearby residents.

Table 7 Daily Trips on Yolanda Avenue

Road Segment	Existing Daily Trips	Project Generated Trips	Daily Trips with Project	Percent Change in Daily Trips
Yolanda Avenue	6,740[1]	285	7,025	+4.2

[1]Existing daily trips estimated based on peak-hour traffic counts conducted by Fehr & Peers (Fehr & Peers 2019)

The project also would generate new vehicle trips on Petaluma Hill Road. The nearest noise-sensitive receptors along this roadway are residences located as close as approximately 75 feet from its centerline to the north and south of Yolanda Avenue. As shown in Table 1, the existing peak-hour noise level was measured at 77.7 dBA Leq at a distance of 20 feet from the centerline of Petaluma Hill Road. At a 75-foot distance, it is estimated that residences are currently exposed to traffic noise reaching 72 dBA Leq. Based on this existing traffic noise level, a 1 dBA threshold would apply to the project’s effect on traffic noise (per Table 3).

The Draft Transportation Impact Analysis prepared by Fehr & Peers (February 2019) estimates that 10 percent of new trips would be distributed on the segment of Petaluma Hill Road north of Yolanda Avenue, which would amount to about 29 additional daily trips, and 15 percent of new trips would be distributed on the segment of Petaluma Hill Road south of Yolanda Avenue, or 43 trips. This trip generation would increase the road segment’s current estimated traffic volume of 17,140 ADT on the segment north of Yolanda Avenue by approximately 0.17 percent, and would increase the estimated traffic volumes of 17,960 ADT on the segment south of Yolanda Avenue by approximately 0.24 percent. As explained above, a 10 percent increase in traffic volumes would increase traffic noise by approximately 0.4 dBA. Therefore, an increase in traffic volumes by up to 0.24 percent would not result in a perceptible increase in traffic noise levels. Vehicle trips generated by the project would not result in a noticeable increase in traffic noise along Petaluma Hill Road and would not exceed the 1 dBA threshold that applies on this roadway.

Therefore, the project would not expose nearby sensitive receptors to increases in roadway noise that exceed the FTA criteria shown in Table 3, and this impact would be less than significant.

Parking Lot Noise

Typical noise sources associated with parking lots include tire squealing, door slamming, car alarms, horns, and engine start-ups. The proposed project includes 85 parking stalls located in various areas of the site. Approximately half of these parking stalls would be located along the southern property line approximately 50 feet from adjacent residences. Table 8 shows typical sound levels at this distance from various noise sources on parking lots.

Table 8 Maximum Noise Levels from Parking Lot Activity

Source	Maximum Noise Level (dBA) at 50 Feet
Autos at 14 mph	50
Car Alarm Signal	69
Car Alarm Chirp	54
Car Horns	69
Door Slams or Radios	64
Talking	36
Tire Squeals	66

Source: Gordan Bricken & Associates, 1996. Estimates are based on actual noise measurements taken at various parking lots.

As shown in Table 8, parking lot noise could reach an estimated 69 dBA at adjacent residences. The proposed 7-foot solid wall on the southern property line would block line-of-sight between on-site parking activity and the ground floor of adjacent residences, reducing their exposure to parking lot noise by up to 10 dBA (FTA 2018). However, second-floor living areas at these residences could be directly exposed to noise from parking lot activity. Because the proposed cannabis facility would operate continuously, parking lot activity would generate noise during both daytime and nighttime hours.

As the Court of Appeal, First Appellate District, recently held in *Jensen v. City of Santa Rosa* (May 24, 2018, A144782) Cal.App.5th, “The City Code dictates no standard numeric measure expressed in decibel levels for other types of noise… such as parking lot noise.” Instead of a numeric threshold, the Court ruled that the City’s noise ordinance provides “a more flexible and qualitative approach” to evaluating the impact of parking lot noise on residential neighborhoods, based on the set of criteria in SRCC Section 17-16.040.

The isolated, intermittent sounds generated by parking lot activity do not typically count against the City’s ambient base noise thresholds identified in SRCC Section 17-16.030 (Streeter 2018). The City defines “ambient noise” as a noise level “averaged over a period of 15 minutes without inclusion of noise from isolated, identifiable sources, at the location and time of day near that at which a comparison is to be made” (SRCC Section 17-16.010). Therefore, parking lot activity would not be subject to the City’s standard of 5 dBA above ambient base noise thresholds for mechanical noise. Instead, as the court of appeal recently held in *Jensen v. City of Santa Rosa* (May 24, 2018, A144782) Cal.App.5th, the qualitative noise standards in SRCC Section 17-16.040 would apply to parking lot activity. These standards prohibit the generation of “any loud, unnecessary, or unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area.”

Although activity in the proposed southern parking lot would generate noise in proximity to adjacent residences, the location, type, frequency, and loudness of parking lot activity would not substantially disturb the peace and quiet of people of normal sensitivity to noise. The two entrances to the parking lot would be located on the northern property line, no closer than approximately 375 feet from the nearest residences southwest of the project site. Approximately half of the proposed 85 parking spaces would be located north of the main building. Vehicles entering and exiting parking lot, and employees parking on the north side of the main building, would not generate noise in the southern parking lot which would be adjacent to residences. Parking lot activity is also a typical noise source in Santa Rosa, even near residential uses. For example, parking lots at auto repair uses to the immediate west of the project site are located adjacent to the north side of residences. In addition, parking lot activities such as door slams, car alarm chirps, and engine starting would only generate intermittent noise when vehicles are used. The loudest individual noise sources in parking lot areas shown in Table 8, including car horns, car alarm signals, and tire squeals, would occur rarely. Average noise levels from parking lot activity would be substantially lower than the maximum noise level of 69 dBA shown in Table 8. Estimated intermittent noise levels of up to 69 dBA also would not be unusually loud and intense. Therefore, the project would have a less than significant impact from parking lot noise.

For informational purposes only, Rincon Consultants also prepared an evaluation of noise from parking lot activity based on the City’s numeric thresholds described in City Code Section 17-16.120 do apply to parking lot noise. To be clear, this analysis is not required by law, and is for informational purposes only. The code analysis that follows is only for illustrative purposes and the code applied here is not a threshold of significance for parking lot noise. Accordingly, as described above, Section 17-16.120 prohibits any operation of machinery, equipment, pump, fan, air-conditioning apparatus or similar mechanical devices that would cause the noise level at the property line of any property to exceed the ambient base noise level by more than five decibels.

Given a mechanical noise standard of 5 dBA above the ambient base noise level criteria for the Single Family Residential zone, noise from parking lot activity would be subject to the following standards:

- Daytime (7 AM to 7PM): 60 dBA Leq
- Evening (7 to 10 PM): 55 dBA Leq
- Nighttime (10 PM to 7 AM): 50 dBA Leq

To compare noise from parking lot activity to these standards, estimated parking lot noise was combined with background ambient noise levels over representative 15-minute daytime, evening, and nighttime periods. Under a conservative scenario, it was assumed that one car alarm signal, 10 car door slams, and 10 car alarm chirps would occur over one-second intervals during a given 15-minute period. The background ambient noise level at residences along Summercreek Drive was measured at 53.0 dBA Leq during peak traffic hours. This measured noise level was assumed to be representative of existing daytime and evening conditions at the residences. During nighttime hours, the background ambient noise level was assumed to be 45 dBA Leq, which is typical of suburban residential areas when nearby traffic activity is low.

Adding parking lot activity to the background ambient noise level results in a combined noise level of 53.7 dBA Leq during daytime and evening hours, and 48.5 dBA Leq during nighttime hours. Estimated parking lot noise would not exceed the standards of 60 dBA Leq and 55 dBA Leq during daytime and evening hours, nor would it exceed the nighttime standard of 50 dBA Leq. Therefore, even if the City's mechanical noise standards were applicable to parking lot activity (which they are not), this impact would be less than significant.

Mechanical Equipment Noise

New mechanical equipment that would generate noise during operation of the cannabis facility includes Avus 550 kW natural gas co-generation units and equipment associated with the Heating Ventilation Air Condition (HVAC) system. HVAC equipment would involve up to three 500-ton adsorption chillers, up to two 5,000 BTU boilers, two cooling towers, and associated pumps, compressors, and ancillary equipment. It is assumed that this mechanical equipment would operate 24 hours per day, seven days per week. Because the individual pieces of equipment listed above would operate simultaneously, this analysis assumes their noise generation would be additive, resulting in a cumulative noise level from all mechanical equipment. The cumulative noise level is calculated below by summing the estimated noise levels from individual types of mechanical equipment at the property line facing the nearest residences.

Pursuant to SRCC Section 17-16.120, the threshold of significance for mechanical equipment noise is 5 dBA above the ambient base noise level criteria. (Those criteria are set forth above in Table 2.) For residential uses, the thresholds are 50 dBA at nighttime, 55 dBA during the evening, and 60 dBA during the daytime. The co-generation units would be housed in a utility building with solid walls located approximately 400 feet away from residences located to the southwest and east of the project site. The co-generation units would generate noise levels estimated at 70 dBA Leq external to the utility building from the silencer exhaust pipe, based on the manufacturer's specifications. At a distance of 400 feet to the nearest residences, this external noise level would attenuate to an estimated 44 dBA Leq, without accounting for further attenuation by the proposed main building, or perimeter walls around the project site. The utility building's placement relative to the proposed main building would further reduce the exposure of residents to co-generation equipment noise: the main building would serve as a single building row that obstructs line of sight from the utility building to residences located southwest of the site, reducing cogeneration noise by an estimated 5 dBA. Therefore, the nearest residences would be exposed to an estimated noise level of 39 dBA Leq from the use of cogeneration units. This noise level would be less than the measured ambient noise level of 53 dBA Leq at the nearest residences, and less than the most stringent 50 dBA nighttime threshold set by City code.

Other equipment housed inside the utility building would include chillers, boilers, and associated pumps, compressors, and ancillary equipment. Because this equipment would be fully enclosed by the utility building, it would not generate noise that noticeably contributes to ambient noise levels at the property line facing nearby residences. Modern exterior building materials typically attenuate noise by about 25 dBA, which would substantially reduce noise levels outside the utility building. For example, the chillers would generate a noise level of 74 dBA Leq at the source, based on manufacturer's specifications provided by Atlas Copco. A reduction of 25 dBA from inside to outside the utility building would result in an estimated noise level of 49 dBA Leq. At a distance of 400 feet to residences, this noise level would decrease to an estimated 31 dBA Leq, which is far below the measured ambient noise level of 53 dBA Leq at that location, and less than the most stringent 50 dBA nighttime threshold set by City code.

Two cooling towers would be installed outside the proposed utility building, although their precise location has not yet been determined. The cooling towers would either be manufactured by Evapco or another brand that generates comparable sound levels to the Evapco LPT 8312 model. Based on the manufacturer's specifications, this model of cooling tower generates a noise level of up to 64 dBA Leq at a distance of 50 feet to the side. Two cooling towers would generate a combined noise level of an estimated 67 dBA Leq. At a distance of 400 feet to the nearest residences, this external noise level would attenuate to an estimated 49 dBA Leq. If the cooling towers were located next to the west, north, or east side of the utility building, the main building would block line of sight to the nearest residences to the southwest of the project site. It is estimated that placement of the cooling towers in these areas would reduce noise exposure by 5 dBA.

In combination, the cogeneration units and cooling towers would generate an estimated cumulative noise level of 49 dBA Leq at the property line facing the nearest residences, which does not exceed the measured ambient noise level of 53 dBA Leq at these residences. In addition, the combined noise level from mechanical equipment (49 dBA Leq) would not be 5 dBA or more above the City's base ambient noise levels of 55 dBA from 7:00 AM to 7:00 PM, 50 dBA from 7:00 PM to 10:00 PM, and 45 dBA from 10:00 PM to 7:00 AM. Additionally, the proposed 7-foot solid wall on the southern property line would block line-of-sight between mechanical equipment and the ground floor of adjacent residences, further reducing their exposure to mechanical noise (FTA 2018). Because mechanical noise would not exceed applicable standards in the City's noise ordinance, it would have a less than significant impact on sensitive receptors.

Delivery and Trash Truck Noise

On-site activities would include the use of delivery trucks and trash hauling trucks. Delivery and trash truck trips to the site would be a periodic source of operational noise. Maximum noise levels generated by passages of medium duty delivery trucks generally range from 61 to 70 dBA Leq at a distance of 25 feet, depending on the speed at which the truck is driving (Olson 1972). However, delivery and trash truck activity would occur at the trash enclosure and truck bays along the east side of the proposed building, located approximately 250 feet from the nearest residences to the southwest. Based on an attenuation rate of 6 dBA per doubling of distance, the maximum anticipated noise levels from delivery and trash trucks would be about 50 dBA at a distance of 250 feet. This noise level would not exceed the measured background ambient noise level of 53 dBA Leq at residences adjacent to the project site.

The proposed three-story building would obstruct line of sight between residences and the truck activity area, further reducing their exposure to on-site truck noise. It is also assumed that trucks would enter and exit the project site by the eastern proposed driveway on Yolanda Avenue, which is located approximately 450 feet from the nearest residences to the southwest of the site. Loading and delivery trucks circulating the project site to and from the trash enclosure and truck bays would not typically use the southern parking lot nearest to residences. In addition, trash pick-up would occur during daytime hours only, and pickup and delivery would occur during typical business hours, between 10:00 AM and 5:00 PM. Truck activity would not generate noise during the most sensitive evening and nighttime hours.

Because truck noise at sensitive receptors would not exceed the measured ambient noise level at sensitive receptors, would be reduced by the location of truck activity on-site, and would not occur during evening or nighttime hours, on-site truck noise would not substantially disturb the peace and quiet of neighboring residences. Therefore, the impact from on-site truck noise would be less than significant.

3.3 Recommendations

As discussed in Section 3.2, all noise impacts would be less than significant according to the applicable thresholds of significance. Therefore, no mitigation is required.

There are voluntary measures that could be applied to reduce construction noise. These measures include the following:

- **Staging Areas.** Staging areas may be provided on-site to minimize off-site transportation of heavy construction equipment. These areas should be located in an area on-site that maximizes, to the extent feasible, the distance between staging activity and sensitive receptors.
- **Solid Noise Attenuation Barrier.** A temporary sound attenuation barrier capable of reducing noise may be located between the construction site and sensitive receptors at a height up to 10 feet to break the grade-level line of site from residences to operational construction equipment.
- **Power Construction Equipment and Mufflers.** The power construction equipment should be equipped with noise shielding and muffling devices. During construction, all equipment, fixed or mobile, should be operated with closed engine doors and equipped with properly operating and maintained mufflers consistent with manufacturers' standards.

4 References

California Department of Transportation (Caltrans). 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. Available at: http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013B.pdf. Accessed January 2017.

California State Water Resources Control Board (CSWRCB). 1999. Appendix G: Background Information on Acoustics.

Institute of Transportation Engineers (ITE) . 2012. Trip Generation Manual, 9th Edition.

Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. Available at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

Fehr & Peers. 2019. Transportation impact Analysis for the 800 Yolanda Avenue Project.

Illingworth & Rodkin, Inc. 2018. Multi-family Residential Project at 425 1st Street, Los Altos, CA – Environmental Noise Assessment. Available at: https://www.losaltosca.gov/sites/default/files/fileattachments/community_development/page/48263/f_-_noise_assessment.pdf

Olson, N. 1972. Survey of motor vehicle noise. J. Acoustical Soc. Amer. 52, 1291–1306.

Santa Rosa, City of. 2017. Fulton Road Widening Improvement Project Initial Study/Proposed Mitigated Negative Declaration. Available at: https://srcity.org/DocumentCenter/View/16130/Fulton-Road-IS-MND-Public-Review?bidId=

---. 2009. General Plan 2035. Noise and Safety Element. Available at: https://srcity.org/DocumentCenter/View/3095

---. City Code. Chapter 17-16 – Environmental Protection. Available at: http://qcode.us/codes/santarosa/

Streeter, Patrick. Senior Planner, City of Santa Rosa Department Planning and Economic Development. Personal communications. April 2, 2018.

Whitsitt, Michelle. Vice President, Conservation Mechanical Systems, Inc. Personal communications. April 18, 2018.

Noise Study - Appendix A

Noise Measurements

AMBIENT NOISE SURVEY DATA SHEET

Project: 800 Yolanda

Job Number: 17-04254

Date: 7/19/17

Operator: Josephine Fong

Station: 1

Begin: 4:18pm

Measurement No. 7

Finish: 4:33pm

Wind: 5 mph

Direction: SSE

Temperature: 84°F

Cloud Cover Class

Daytime
- ☐ 1 - Overcast >80%
- ☐ 2 - Light 20-80%
- ☑ 3 - Sunny <20%

Nighttime
- ☐ 4 - Clear <50%
- ☐ 5 - Overcast >50%

Primary Noise Source: Cars on Yolanda Ave.

Distance: ~~[illegible]~~ 25ft from centerline

Secondary Noise Sources: Birds

Notes:

Traffic *LDA/T*:

MDT: |||

HDT: ||

Leq:	67.1	L(10):	71.4
Lmin:	49.4	L(33):	
Lmax:	80.6	L(50):	59.5
Peak:		L(90):	52.9

Calibration Start: 94.0 dB End: 94.0 dB

Response:
- ☐ Slow
- ☑ Fast
- ☐ Peak
- ☐ Impulse

Weighting:
- ☑ A
- ☐ B
- ☐ C
- ☐ Linear

Octave Filter:
- ☑ NA
- ☐ ____ Hz

LDA/T: (continued)

Station: 2

Begin: 5:06pm

Measurement No. 8

Finish: 5:21pm

Wind: 5 mph

Direction: SSE

Temperature: 84°F

Cloud Cover Class

Daytime
- ☐ 1 - Overcast >80%
- ☐ 2 - Light 20-80%
- ☑ 3 - Sunny <20%

Nighttime
- ☐ 4 - Clear <50%
- ☐ 5 - Overcast >50%

Primary Noise Source: Cars on Petaluma Hill Rd

Distance: 20ft from centerline

Secondary Noise Sources: Cars accelerating downhill, birds

Notes:

Traffic *LDA/T*:

MDT: |||

HDT:

Leq:	77.7	L(10):	
Lmin:		L(33):	
Lmax:		L(50):	
Peak:		L(90):	

Calibration Start: 94.0 dB End: 94.0 dB

Response:
- ☐ Slow
- ☑ Fast
- ☐ Peak
- ☐ Impulse

Weighting:
- ☑ A
- ☐ B
- ☐ C
- ☐ Linear

Octave Filter:
- ☑ NA
- ☐ ____ Hz

LDA/T: (continued)

Note: Provide Sketch of Location on Back.

AMBIENT NOISE SURVEY DATA SHEET

Project: 800 Yolanda

Date: 7/19/17

Operator: Josephine Fong

Job Number: 17-04254

Station: 3	Station:
Begin: 5:32pm	Begin:
Measurement No. 9	Measurement No.
Finish: 5:47pm	Finish:
Wind: 6 mph	Wind: mph
Direction: SSW	Direction:
Temperature: 84F	Temperature:
Cloud Cover Class	Cloud Cover Class
Daytime ☐ 1 - Overcast >80%	*Daytime* ☐ 1 - Overcast >80%
☐ 2 - Light 20-80%	☐ 2 - Light 20-80%
☑ 3 - Sunny <20%	☐ 3 - Sunny <20%
Nighttime ☐ 4 - Clear <50%	*Nighttime* ☐ 4 - Clear <50%
☐ 5 - Overcast >50%	☐ 5 - Overcast >50%
Primary Noise Source: Cars from Petaluma Hill Rd	Primary Noise Source:
Distance: 670ft from centerline of Petaluma Hill Rd	Distance:
Secondary Noise Sources: Wind chimes at 2431 Summercreek Dr.	Secondary Noise Sources:
Notes: birds	Notes:
Traffic *LDA/T*:	Traffic *LDA/T*:
MDT:	*MDT*:
HDT:	*HDT*:
Leq: 53.0	Leq:
L(10): 55.2	L(10):
Lmin: 45.9	Lmin:
L(33):	L(33):
Lmax: 62.3	Lmax:
L(50): 52.7	L(50):
Peak:	Peak:
L(90): 49.6	L(90):
Calibration Start: 94.0 dB	Calibration Start: dB
End: 94.0 dB	End: dB
Response: ☐ Slow ☑ Fast ☐ Peak ☐ Impulse	Response: ☐ Slow ☐ Fast ☐ Peak ☐ Impulse
Weighting: ☑ A ☐ B ☐ C ☐ Linear	Weighting: ☐ A ☐ B ☐ C ☐ Linear
Octave Filter: ☑ NA ☐ ____ Hz	Octave Filter: ☐ NA ☐ ____ Hz

Note: Provide Sketch of Location on Back.

Rincon Consultants

- Freq Weight : A
- Time Weight : FAST
- Level Range : 40-100
- Max dB : 87.3 - 2017/07/19 16:29:35
- Level Range : 40-100
- SEL : 97.5
- Leq : 68.0
-

No.s	Date Time	(dB)				
1	2017/07/19 16:18:06	55.8	54.7	54.4	55.9	58.5
6	2017/07/19 16:18:11	59.8	75.1	75.5	66.0	66.9
11	2017/07/19 16:18:16	70.4	70.3	65.9	63.3	64.7
16	2017/07/19 16:18:21	63.6	64.4	75.5	73.8	72.4
21	2017/07/19 16:18:26	62.3	58.6	57.4	59.2	71.7
26	2017/07/19 16:18:31	73.2	62.3	61.7	72.1	69.4
31	2017/07/19 16:18:36	73.4	70.1	66.2	74.9	70.2
36	2017/07/19 16:18:41	67.0	64.8	60.5	56.6	56.3
41	2017/07/19 16:18:46	57.6	57.5	57.9	58.3	57.6
46	2017/07/19 16:18:51	58.7	59.8	66.2	71.8	72.1
51	2017/07/19 16:18:56	73.8	66.4	61.6	63.5	67.3
56	2017/07/19 16:19:01	72.0	68.6	68.7	67.0	67.1
61	2017/07/19 16:19:06	67.8	75.2	80.1	76.7	69.7
66	2017/07/19 16:19:11	68.5	67.9	68.4	69.1	67.5
71	2017/07/19 16:19:16	67.2	66.1	59.6	55.5	54.1
76	2017/07/19 16:19:21	55.1	56.9	57.4	63.1	70.2
81	2017/07/19 16:19:26	69.9	61.5	57.9	57.7	60.1
86	2017/07/19 16:19:31	63.2	61.5	56.6	55.3	55.2
91	2017/07/19 16:19:36	54.9	54.7	56.0	56.7	53.9
96	2017/07/19 16:19:41	51.4	52.5	53.7	54.1	54.0
101	2017/07/19 16:19:46	58.7	55.3	54.2	56.4	54.1
106	2017/07/19 16:19:51	54.0	53.4	53.2	52.5	52.5
111	2017/07/19 16:19:56	54.1	53.3	53.2	53.6	54.0
116	2017/07/19 16:20:01	56.5	62.2	78.0	75.1	72.4
121	2017/07/19 16:20:06	72.1	68.0	68.6	67.8	69.1
126	2017/07/19 16:20:11	73.9	74.4	74.7	68.9	72.9
131	2017/07/19 16:20:16	73.4	71.9	72.0	68.4	65.2
136	2017/07/19 16:20:21	59.1	56.3	55.9	55.7	56.7
141	2017/07/19 16:20:26	64.7	74.2	64.6	59.5	56.5
146	2017/07/19 16:20:31	56.4	59.1	67.4	72.9	65.0
151	2017/07/19 16:20:36	62.2	58.1	57.4	57.1	57.8
156	2017/07/19 16:20:41	59.9	57.8	57.5	57.0	59.3
161	2017/07/19 16:20:46	62.4	69.2	77.7	71.6	69.6
166	2017/07/19 16:20:51	67.7	61.1	59.9	58.0	58.4
171	2017/07/19 16:20:56	57.3	56.6	57.8	54.4	53.9
176	2017/07/19 16:21:01	51.5	52.7	53.2	51.2	50.4
181	2017/07/19 16:21:06	51.1	52.8	53.2	60.5	76.3
186	2017/07/19 16:21:11	68.2	61.8	58.3	58.2	61.3
191	2017/07/19 16:21:16	64.1	69.1	67.6	67.9	68.2
196	2017/07/19 16:21:21	74.3	71.2	64.7	69.8	71.3
201	2017/07/19 16:21:26	71.0	69.4	67.0	66.6	67.3
206	2017/07/19 16:21:31	68.9	65.4	66.5	65.7	73.2
211	2017/07/19 16:21:36	62.3	57.5	55.8	57.2	55.7
216	2017/07/19 16:21:41	59.4	67.6	68.9	62.7	56.0
221	2017/07/19 16:21:46	54.8	54.7	55.5	54.6	55.1
226	2017/07/19 16:21:51	55.5	54.7	55.3	61.5	74.1
231	2017/07/19 16:21:56	66.7	61.8	57.6	55.7	54.8
236	2017/07/19 16:22:01	53.3	52.7	54.1	52.4	57.0
241	2017/07/19 16:22:06	61.9	62.5	58.1	58.0	58.3
246	2017/07/19 16:22:11	54.8	57.6	58.9	57.7	58.3
251	2017/07/19 16:22:16	57.4	54.8	53.5	53.0	57.4
256	2017/07/19 16:22:21	63.4	68.7	69.1	68.4	77.5
261	2017/07/19 16:22:26	71.9	69.3	67.4	66.7	68.1
266	2017/07/19 16:22:31	68.8	65.1	72.0	70.5	72.9
271	2017/07/19 16:22:36	74.4	74.9	73.4	66.6	61.3
276	2017/07/19 16:22:41	57.6	53.8	53.3	53.6	50.9
281	2017/07/19 16:22:46	52.8	53.5	53.5	56.0	59.0
286	2017/07/19 16:22:51	64.1	70.2	68.9	62.2	66.7
291	2017/07/19 16:22:56	67.6	62.6	55.4	54.8	55.3
296	2017/07/19 16:23:01	56.4	61.7	72.8	67.0	61.4
301	2017/07/19 16:23:06	63.8	64.1	67.2	72.5	63.5
306	2017/07/19 16:23:11	59.5	61.7	70.6	68.4	57.6
311	2017/07/19 16:23:16	57.0	55.3	57.9	64.6	70.8
316	2017/07/19 16:23:21	69.4	69.8	67.1	59.2	55.6
321	2017/07/19 16:23:26	53.2	51.3	51.9	54.4	53.7
326	2017/07/19 16:23:31	55.9	54.5	54.6	55.3	55.1
331	2017/07/19 16:23:36	53.1	56.6	54.9	56.1	56.5
336	2017/07/19 16:23:41	59.2	65.0	65.3	62.3	66.6
341	2017/07/19 16:23:46	67.5	59.5	57.4	54.9	55.8
346	2017/07/19 16:23:51	55.0	56.2	53.5	53.7	52.3
351	2017/07/19 16:23:56	52.2	54.3	55.5	57.6	56.5
356	2017/07/19 16:24:01	61.6	71.5	71.4	64.9	68.8
361	2017/07/19 16:24:06	71.0	66.5	68.6	68.4	71.2
366	2017/07/19 16:24:11	60.7	57.3	54.6	54.5	52.2
371	2017/07/19 16:24:16	51.4	51.7	53.6	55.1	55.2
376	2017/07/19 16:24:21	54.0	60.9	73.3	71.7	71.6
381	2017/07/19 16:24:26	66.9	58.1	56.5	58.2	60.2
386	2017/07/19 16:24:31	67.5	67.9	69.4	68.4	68.9
391	2017/07/19 16:24:36	66.6	67.6	75.6	66.4	65.6
396	2017/07/19 16:24:41	65.8	62.5	64.6	65.1	61.4
401	2017/07/19 16:24:46	62.7	64.6	71.7	65.5	58.9
406	2017/07/19 16:24:51	55.9	54.0	52.2	52.6	51.9
411	2017/07/19 16:24:56	52.0	51.8	52.2	53.7	54.1
416	2017/07/19 16:25:01	58.2	74.4	72.1	61.3	57.3
421	2017/07/19 16:25:06	58.2	56.6	55.3	54.6	53.7

426	2017/07/19	16:25:11	53.6	51.5	51.0	53.8	59.3
431	2017/07/19	16:25:16	70.8	71.7	60.9	57.5	57.3
436	2017/07/19	16:25:21	59.9	62.2	72.0	72.2	74.1
441	2017/07/19	16:25:26	67.5	69.8	69.6	74.0	65.6
446	2017/07/19	16:25:31	59.4	59.0	58.8	56.1	61.0
451	2017/07/19	16:25:36	67.8	65.7	61.7	63.1	66.0
456	2017/07/19	16:25:41	73.4	68.8	63.5	67.1	67.3
461	2017/07/19	16:25:46	68.1	68.6	62.1	56.3	52.9
466	2017/07/19	16:25:51	52.3	53.3	52.9	52.1	52.3
471	2017/07/19	16:25:56	51.1	53.2	57.1	66.2	73.2
476	2017/07/19	16:26:01	65.8	59.6	54.3	55.2	56.6
481	2017/07/19	16:26:06	55.2	59.6	68.0	63.9	56.7
486	2017/07/19	16:26:11	58.2	55.5	57.9	65.3	67.7
491	2017/07/19	16:26:16	64.4	58.8	64.9	70.2	62.9
496	2017/07/19	16:26:21	61.5	67.4	63.5	57.8	60.5
501	2017/07/19	16:26:26	60.0	67.4	72.0	63.3	64.7
506	2017/07/19	16:26:31	71.0	63.8	60.8	55.9	56.5
511	2017/07/19	16:26:36	57.2	57.7	59.4	64.0	67.5
516	2017/07/19	16:26:41	64.4	70.3	65.6	62.1	67.0
521	2017/07/19	16:26:46	68.0	68.0	69.5	68.1	67.6
526	2017/07/19	16:26:51	64.6	58.0	53.5	55.3	64.4
531	2017/07/19	16:26:56	52.8	53.1	54.0	54.0	54.8
536	2017/07/19	16:27:01	54.8	55.4	53.4	53.4	52.8
541	2017/07/19	16:27:06	52.0	52.3	53.4	53.6	55.8
546	2017/07/19	16:27:11	55.9	55.5	56.7	60.3	66.3
551	2017/07/19	16:27:16	74.3	72.2	70.9	76.5	71.3
556	2017/07/19	16:27:21	68.1	66.0	72.1	66.7	62.9
561	2017/07/19	16:27:26	72.4	67.5	60.8	59.5	56.9
566	2017/07/19	16:27:31	56.6	56.5	63.4	56.1	55.5
571	2017/07/19	16:27:36	55.2	57.0	56.4	62.4	71.7
576	2017/07/19	16:27:41	65.6	61.1	61.7	68.2	75.9
581	2017/07/19	16:27:46	70.3	67.2	72.0	69.2	69.8
586	2017/07/19	16:27:51	70.1	62.8	57.3	56.0	54.6
591	2017/07/19	16:27:56	55.7	58.9	54.0	57.6	53.0
596	2017/07/19	16:28:01	53.2	52.9	52.8	50.8	52.5
601	2017/07/19	16:28:06	54.4	54.1	53.9	52.2	55.7
606	2017/07/19	16:28:11	50.9	51.8	50.0	51.8	50.9
611	2017/07/19	16:28:16	51.4	52.2	52.6	52.3	52.3
616	2017/07/19	16:28:21	54.9	54.5	58.4	57.3	65.0
621	2017/07/19	16:28:26	62.0	59.0	59.6	54.7	52.3
626	2017/07/19	16:28:31	54.0	56.4	51.6	51.3	52.2
631	2017/07/19	16:28:36	53.5	51.0	55.0	56.6	51.7
636	2017/07/19	16:28:41	53.7	54.2	55.1	64.8	51.8
641	2017/07/19	16:28:46	53.2	50.9	51.6	51.8	51.7
646	2017/07/19	16:28:51	52.2	53.5	51.6	52.7	54.8
651	2017/07/19	16:28:56	56.6	64.2	77.5	66.2	59.9
656	2017/07/19	16:29:01	58.5	59.6	69.7	71.0	61.7
661	2017/07/19	16:29:06	59.6	59.2	60.2	63.9	70.7
666	2017/07/19	16:29:11	70.9	73.4	77.5	71.4	63.9
671	2017/07/19	16:29:16	61.5	58.2	56.0	56.5	58.7
676	2017/07/19	16:29:21	60.7	58.3	58.8	64.2	68.2
681	2017/07/19	16:29:26	71.0	69.6	68.7	69.3	73.2
686	2017/07/19	16:29:31	72.1	72.3	80.1	85.8	85.2
691	2017/07/19	16:29:36	78.2	74.3	69.9	66.3	61.3
696	2017/07/19	16:29:41	58.4	57.4	56.9	56.6	54.3
701	2017/07/19	16:29:46	62.2	57.8	64.2	66.0	66.1
706	2017/07/19	16:29:51	58.5	54.0	51.7	51.9	52.8
711	2017/07/19	16:29:56	52.1	51.4	51.1	50.6	54.2
716	2017/07/19	16:30:01	50.2	49.3	50.0	50.1	50.9
721	2017/07/19	16:30:06	51.4	49.7	51.5	52.2	55.8
726	2017/07/19	16:30:11	51.7	52.0	50.7	50.9	55.0
731	2017/07/19	16:30:16	50.3	49.5	54.6	48.9	49.2
736	2017/07/19	16:30:21	49.9	50.2	49.5	53.1	53.2
741	2017/07/19	16:30:26	50.1	51.4	51.6	51.3	51.8
746	2017/07/19	16:30:31	52.8	53.0	57.4	59.7	65.0
751	2017/07/19	16:30:36	65.0	65.1	72.0	68.9	65.1
756	2017/07/19	16:30:41	67.0	64.9	59.2	55.5	54.1
761	2017/07/19	16:30:46	57.2	58.8	57.3	59.9	54.2
766	2017/07/19	16:30:51	54.9	58.3	56.5	60.5	58.2
771	2017/07/19	16:30:56	60.5	65.5	74.0	80.7	72.3
776	2017/07/19	16:31:01	68.6	70.7	71.7	74.4	64.3
781	2017/07/19	16:31:06	68.5	74.7	65.2	60.8	59.5
786	2017/07/19	16:31:11	57.1	59.1	62.4	73.1	66.3
791	2017/07/19	16:31:16	75.6	68.1	63.0	64.7	63.7
796	2017/07/19	16:31:21	61.5	58.3	59.0	66.9	68.8
801	2017/07/19	16:31:26	61.8	67.8	69.5	64.0	61.9
806	2017/07/19	16:31:31	67.7	68.6	68.8	67.5	60.5
811	2017/07/19	16:31:36	59.7	59.2	58.3	58.8	62.1
816	2017/07/19	16:31:41	68.7	71.6	69.5	73.3	67.3
821	2017/07/19	16:31:46	61.2	57.6	55.9	56.3	55.8
826	2017/07/19	16:31:51	56.2	55.4	54.9	55.3	57.0
831	2017/07/19	16:31:56	56.2	58.0	71.9	70.0	65.3
836	2017/07/19	16:32:01	68.8	68.7	70.7	67.7	61.6
841	2017/07/19	16:32:06	61.8	68.7	67.0	60.4	58.9
846	2017/07/19	16:32:11	61.6	70.7	75.1	64.8	61.3
851	2017/07/19	16:32:16	61.3	63.2	62.0	61.0	58.8
856	2017/07/19	16:32:21	60.4	61.0	62.5	67.3	67.0
861	2017/07/19	16:32:26	65.4	68.4	71.5	76.4	82.2
866	2017/07/19	16:32:31	80.9	71.6	66.4	71.1	70.7
871	2017/07/19	16:32:36	66.5	67.5	66.3	62.2	57.5
876	2017/07/19	16:32:41	56.8	55.0	54.9	54.3	56.1
881	2017/07/19	16:32:46	56.1	58.1	69.7	74.6	67.7
886	2017/07/19	16:32:51	75.6	65.6	61.3	60.5	61.4
891	2017/07/19	16:32:56	62.8	67.5	78.2	78.1	68.0
896	2017/07/19	16:33:01	62.6	61.2	57.5	59.2	57.0

- Freq Weight : A
- Time Weight : FAST
- Level Range : 40-100
- Max dB : 91.0 - 2017/07/19 17:14:17
- Level Range : 40-100
- SEL : 107.2
- Leq : 77.7
-

No.s	Date Time	(dB)				
1	2017/07/19 17:05:44	81.2	82.5	75.0	83.4	80.3
6	2017/07/19 17:05:49	76.2	76.8	83.6	80.9	82.1
11	2017/07/19 17:05:54	79.3	73.9	75.7	74.2	82.4
16	2017/07/19 17:05:59	77.2	76.9	81.6	83.2	84.9
21	2017/07/19 17:06:04	83.1	84.3	82.8	82.0	81.7
26	2017/07/19 17:06:09	83.0	79.2	80.3	76.8	82.5
31	2017/07/19 17:06:14	81.6	82.6	81.4	78.9	77.7
36	2017/07/19 17:06:19	81.9	81.1	78.3	74.7	70.6
41	2017/07/19 17:06:24	72.1	69.3	66.1	66.1	70.3
46	2017/07/19 17:06:29	75.5	79.4	79.5	74.4	67.7
51	2017/07/19 17:06:34	64.1	68.4	81.5	81.1	71.7
56	2017/07/19 17:06:39	70.5	70.0	72.3	72.6	73.7
61	2017/07/19 17:06:44	76.0	79.2	85.0	78.5	78.4
66	2017/07/19 17:06:49	77.6	83.8	77.2	83.6	77.4
71	2017/07/19 17:06:54	81.1	78.4	84.7	79.8	82.4
76	2017/07/19 17:06:59	83.3	79.7	75.8	72.8	72.7
81	2017/07/19 17:07:04	73.2	82.1	80.5	73.7	75.0
86	2017/07/19 17:07:09	79.6	76.7	72.8	69.7	67.4
91	2017/07/19 17:07:14	67.4	69.8	74.2	78.5	75.3
96	2017/07/19 17:07:19	66.2	72.4	79.6	77.9	80.8
101	2017/07/19 17:07:24	77.1	79.3	72.3	70.2	74.2
106	2017/07/19 17:07:29	81.0	75.8	76.5	73.3	75.6
111	2017/07/19 17:07:34	78.7	77.9	75.5	78.5	76.2
116	2017/07/19 17:07:39	72.4	76.9	75.8	77.6	77.9
121	2017/07/19 17:07:44	75.6	72.6	73.5	77.9	73.8
126	2017/07/19 17:07:49	69.7	68.1	70.7	78.3	82.1
131	2017/07/19 17:07:54	83.3	80.2	79.3	84.9	80.3
136	2017/07/19 17:07:59	80.5	76.7	82.2	77.7	75.6
141	2017/07/19 17:08:04	75.1	80.9	83.5	82.5	82.1
146	2017/07/19 17:08:09	81.4	83.8	79.5	78.0	79.2
151	2017/07/19 17:08:14	78.4	76.3	77.1	74.5	73.8
156	2017/07/19 17:08:19	74.6	73.3	71.8	73.4	77.7
161	2017/07/19 17:08:24	80.1	77.4	75.0	79.6	83.6
166	2017/07/19 17:08:29	76.5	79.2	78.5	77.0	74.8
171	2017/07/19 17:08:34	73.3	71.3	68.9	70.1	74.8
176	2017/07/19 17:08:39	74.4	74.0	75.7	71.9	72.5
181	2017/07/19 17:08:44	72.8	75.1	77.0	74.5	73.9
186	2017/07/19 17:08:49	72.5	73.0	74.7	73.8	74.7
191	2017/07/19 17:08:54	73.8	70.0	68.8	67.9	70.0
196	2017/07/19 17:08:59	72.9	83.4	83.6	78.1	80.3
201	2017/07/19 17:09:04	79.1	81.6	81.1	81.6	82.4
206	2017/07/19 17:09:09	76.2	74.1	76.8	82.1	79.9
211	2017/07/19 17:09:14	83.2	81.4	83.5	80.4	81.4
216	2017/07/19 17:09:19	80.9	75.5	83.3	80.1	86.0
221	2017/07/19 17:09:24	84.3	82.2	83.2	81.6	83.6
226	2017/07/19 17:09:29	80.6	76.7	76.8	82.2	83.6
231	2017/07/19 17:09:34	78.2	78.0	75.5	75.6	75.4
236	2017/07/19 17:09:39	73.9	71.9	78.4	72.3	71.8
241	2017/07/19 17:09:44	77.6	79.4	74.8	81.3	72.8
246	2017/07/19 17:09:49	72.8	81.3	73.8	69.4	70.7
251	2017/07/19 17:09:54	71.0	73.0	77.5	76.8	75.1
256	2017/07/19 17:09:59	79.0	75.9	72.8	78.6	80.0
261	2017/07/19 17:10:04	76.7	74.3	69.2	70.9	76.2
266	2017/07/19 17:10:09	76.6	70.0	67.3	73.3	76.7
271	2017/07/19 17:10:14	77.0	75.7	74.8	72.3	70.1
276	2017/07/19 17:10:19	76.1	79.4	71.1	79.1	74.0
281	2017/07/19 17:10:24	79.1	78.8	80.8	77.9	80.6
286	2017/07/19 17:10:29	73.8	84.8	83.6	83.2	83.4
291	2017/07/19 17:10:34	78.0	76.6	72.4	76.1	72.1
296	2017/07/19 17:10:39	72.4	74.5	78.2	80.0	77.6
301	2017/07/19 17:10:44	78.0	78.6	78.4	73.6	71.2
306	2017/07/19 17:10:49	74.5	84.7	66.9	61.1	69.9
311	2017/07/19 17:10:54	58.8	59.7	60.4	62.9	67.7
316	2017/07/19 17:10:59	75.1	78.8	76.9	75.6	77.2
321	2017/07/19 17:11:04	76.2	75.1	72.7	64.5	61.4
326	2017/07/19 17:11:09	60.1	57.6	61.9	62.7	62.9
331	2017/07/19 17:11:14	63.7	64.0	66.4	70.4	75.4
336	2017/07/19 17:11:19	78.2	76.5	70.8	71.4	77.4
341	2017/07/19 17:11:24	77.6	78.1	76.2	80.3	78.2
346	2017/07/19 17:11:29	79.3	82.0	76.8	82.6	81.6
351	2017/07/19 17:11:34	78.1	82.1	78.5	79.7	80.8
356	2017/07/19 17:11:39	75.5	72.4	73.5	75.6	78.8
361	2017/07/19 17:11:44	76.0	77.0	77.6	75.8	75.3
366	2017/07/19 17:11:49	75.9	75.4	72.2	73.8	80.5
371	2017/07/19 17:11:54	82.5	82.9	82.3	77.1	76.1
376	2017/07/19 17:11:59	79.2	75.3	73.2	80.9	80.3
381	2017/07/19 17:12:04	74.9	73.2	76.1	73.0	74.6
386	2017/07/19 17:12:09	73.2	72.6	71.6	69.5	69.9
391	2017/07/19 17:12:14	69.9	66.5	65.1	64.5	66.0
396	2017/07/19 17:12:19	67.3	67.0	67.5	72.6	76.6
401	2017/07/19 17:12:24	75.8	78.2	72.6	69.8	73.7
406	2017/07/19 17:12:29	81.0	78.7	77.9	82.4	82.6
411	2017/07/19 17:12:34	83.5	82.0	78.9	83.6	82.1
416	2017/07/19 17:12:39	81.9	82.7	78.9	81.2	81.6
421	2017/07/19 17:12:44	76.9	81.9	75.6	72.9	74.5

426	2017/07/19 17:12:49	69.3	69.9	65.1	62.0	62.1
431	2017/07/19 17:12:54	60.9	62.7	70.2	71.0	71.8
436	2017/07/19 17:12:59	75.4	80.7	80.7	77.4	77.1
441	2017/07/19 17:13:04	81.8	76.8	72.6	77.5	77.1
446	2017/07/19 17:13:09	70.6	69.9	75.6	72.7	76.6
451	2017/07/19 17:13:14	77.3	68.3	66.2	72.4	78.5
456	2017/07/19 17:13:19	80.5	75.2	67.2	60.7	57.8
461	2017/07/19 17:13:24	56.5	57.5	59.5	57.0	58.9
466	2017/07/19 17:13:29	58.7	61.0	65.0	71.0	82.5
471	2017/07/19 17:13:34	74.5	78.4	82.2	76.9	76.6
476	2017/07/19 17:13:39	79.3	78.4	82.7	78.6	81.1
481	2017/07/19 17:13:44	80.3	80.1	78.6	80.6	78.3
486	2017/07/19 17:13:49	83.3	82.1	78.4	73.6	76.0
491	2017/07/19 17:13:54	76.9	77.0	74.7	74.0	75.6
496	2017/07/19 17:13:59	76.1	80.3	78.0	74.6	74.5
501	2017/07/19 17:14:04	75.0	74.3	69.4	69.3	71.4
506	2017/07/19 17:14:09	71.2	71.1	74.8	70.9	63.0
511	2017/07/19 17:14:14	66.0	77.3	88.3	79.8	76.2
516	2017/07/19 17:14:19	76.3	77.2	75.9	76.9	83.3
521	2017/07/19 17:14:24	75.2	78.1	79.2	74.6	79.3
526	2017/07/19 17:14:29	80.1	69.7	65.6	65.7	67.3
531	2017/07/19 17:14:34	71.1	75.6	71.9	68.1	72.2
536	2017/07/19 17:14:39	82.5	79.1	83.8	79.4	81.7
541	2017/07/19 17:14:44	78.4	81.8	80.9	80.3	81.7
546	2017/07/19 17:14:49	78.4	82.0	77.4	84.2	83.0
551	2017/07/19 17:14:54	84.7	78.4	79.0	81.1	81.9
556	2017/07/19 17:14:59	79.3	79.0	77.7	84.7	79.7
561	2017/07/19 17:15:04	77.8	78.9	77.0	78.7	84.2
566	2017/07/19 17:15:09	82.4	76.7	73.9	74.1	72.2
571	2017/07/19 17:15:14	70.4	68.6	69.2	74.0	77.7
576	2017/07/19 17:15:19	74.1	66.5	63.0	65.3	69.2
581	2017/07/19 17:15:24	72.1	68.8	63.6	61.2	62.6
586	2017/07/19 17:15:29	67.7	68.1	70.1	74.4	75.6
591	2017/07/19 17:15:34	72.0	74.3	75.8	74.7	75.1
596	2017/07/19 17:15:39	75.4	79.1	73.6	74.2	78.9
601	2017/07/19 17:15:44	79.5	85.4	81.8	80.7	81.8
606	2017/07/19 17:15:49	81.6	75.1	79.8	80.6	73.1
611	2017/07/19 17:15:54	77.2	80.1	80.1	80.3	79.4
616	2017/07/19 17:15:59	82.5	81.1	80.6	73.9	73.6
621	2017/07/19 17:16:04	72.1	75.1	76.2	75.1	74.5
626	2017/07/19 17:16:09	75.7	74.3	67.3	65.1	67.1
631	2017/07/19 17:16:14	72.4	85.2	75.9	78.0	77.2
636	2017/07/19 17:16:19	74.4	67.3	67.4	70.7	77.7
641	2017/07/19 17:16:24	77.5	74.8	79.3	74.3	69.0
646	2017/07/19 17:16:29	72.4	73.2	72.1	74.7	73.2
651	2017/07/19 17:16:34	73.1	72.9	75.8	73.9	73.9
656	2017/07/19 17:16:39	74.3	73.7	74.6	74.1	70.7
661	2017/07/19 17:16:44	70.1	70.8	72.2	67.8	63.4
666	2017/07/19 17:16:49	69.3	86.7	83.7	79.7	79.0
671	2017/07/19 17:16:54	84.0	79.1	83.2	77.3	81.5
676	2017/07/19 17:16:59	81.4	77.2	77.9	76.7	78.6
681	2017/07/19 17:17:04	84.2	78.8	79.4	81.7	76.5
686	2017/07/19 17:17:09	80.0	83.5	76.3	73.4	76.3
691	2017/07/19 17:17:14	74.7	75.1	75.8	72.5	66.3
696	2017/07/19 17:17:19	64.8	69.6	75.8	82.8	79.9
701	2017/07/19 17:17:24	76.2	76.4	76.7	77.8	75.4
706	2017/07/19 17:17:29	72.8	71.3	70.2	68.5	63.9
711	2017/07/19 17:17:34	64.1	80.7	78.4	75.4	74.2
716	2017/07/19 17:17:39	76.4	69.4	72.1	72.7	73.2
721	2017/07/19 17:17:44	72.1	71.3	70.5	70.3	70.0
726	2017/07/19 17:17:49	70.6	70.9	70.4	70.5	69.9
731	2017/07/19 17:17:54	70.2	68.3	66.8	67.5	76.7
736	2017/07/19 17:17:59	83.5	77.3	78.6	80.8	78.1
741	2017/07/19 17:18:04	80.5	80.4	77.9	76.6	77.2
746	2017/07/19 17:18:09	79.3	74.1	74.1	74.6	73.8
751	2017/07/19 17:18:14	73.1	76.9	83.9	76.7	81.7
756	2017/07/19 17:18:19	76.1	71.9	71.4	69.0	69.2
761	2017/07/19 17:18:24	66.5	65.9	76.6	80.8	75.0
766	2017/07/19 17:18:29	71.6	75.4	85.2	75.2	74.3
771	2017/07/19 17:18:34	70.5	72.0	70.4	68.6	66.9
776	2017/07/19 17:18:39	64.8	63.8	62.9	63.5	64.7
781	2017/07/19 17:18:44	65.2	65.4	64.7	64.0	64.8
786	2017/07/19 17:18:49	66.4	67.1	68.2	67.7	68.5
791	2017/07/19 17:18:54	68.1	69.5	69.6	69.8	67.8
796	2017/07/19 17:18:59	65.5	62.1	64.3	68.5	71.7
801	2017/07/19 17:19:04	72.5	72.1	75.1	83.0	76.5
806	2017/07/19 17:19:09	74.9	74.6	74.6	80.9	80.9
811	2017/07/19 17:19:14	84.3	79.3	80.7	81.7	76.1
816	2017/07/19 17:19:19	79.4	79.1	78.1	81.0	80.0
821	2017/07/19 17:19:24	85.4	77.5	79.1	81.2	77.4
826	2017/07/19 17:19:29	72.6	74.4	76.5	83.9	75.4
831	2017/07/19 17:19:34	73.4	72.9	74.8	71.3	69.2
836	2017/07/19 17:19:39	70.2	66.5	68.8	69.3	69.5
841	2017/07/19 17:19:44	65.5	65.5	65.7	65.7	66.2
846	2017/07/19 17:19:49	67.0	65.9	66.6	66.0	64.8
851	2017/07/19 17:19:54	63.2	63.7	64.5	63.9	64.5
856	2017/07/19 17:19:59	62.6	64.3	64.8	60.2	63.4
861	2017/07/19 17:20:04	64.3	66.0	67.2	67.4	66.7
866	2017/07/19 17:20:09	67.5	67.3	66.8	66.9	69.5
871	2017/07/19 17:20:14	79.4	79.4	74.7	75.8	80.6
876	2017/07/19 17:20:19	78.2	81.7	76.2	79.5	81.6
881	2017/07/19 17:20:24	82.5	78.5	81.0	79.2	82.8
886	2017/07/19 17:20:29	75.1	79.9	77.7	76.2	80.7
891	2017/07/19 17:20:34	79.9	82.0	78.4	77.8	76.6
896	2017/07/19 17:20:39	73.4	77.2	82.5	74.3	73.6

- Freq Weight : A
- Time Weight : FAST
- Level Range : 40-100
- Max dB : 67.7 - 2017/07/19 17:45:14
- Level Range : 40-100
- SEL : 82.6
- Leq : 53.1
-

No.s	Date Time	(dB)				
1	2017/07/19 17:32:11	54.0	57.9	54.6	55.2	55.4
6	2017/07/19 17:32:16	56.8	55.6	54.6	54.5	55.4
11	2017/07/19 17:32:21	52.2	51.9	54.4	52.7	52.5
16	2017/07/19 17:32:26	52.8	53.2	54.7	53.5	51.6
21	2017/07/19 17:32:31	49.8	50.3	50.2	50.4	52.9
26	2017/07/19 17:32:36	54.5	53.5	50.2	55.5	52.8
31	2017/07/19 17:32:41	50.3	51.6	49.4	49.9	49.0
36	2017/07/19 17:32:46	48.8	50.3	49.7	49.9	49.4
41	2017/07/19 17:32:51	48.9	50.5	50.2	49.2	48.6
46	2017/07/19 17:32:56	52.4	50.2	49.2	50.7	49.9
51	2017/07/19 17:33:01	52.1	50.1	50.1	50.0	49.1
56	2017/07/19 17:33:06	50.9	52.1	55.4	55.7	54.4
61	2017/07/19 17:33:11	54.0	54.1	54.8	55.3	53.2
66	2017/07/19 17:33:16	52.4	53.8	53.0	52.5	52.7
71	2017/07/19 17:33:21	51.8	52.5	52.5	53.2	54.5
76	2017/07/19 17:33:26	57.7	56.6	54.2	56.8	53.1
81	2017/07/19 17:33:31	52.6	51.7	53.1	52.3	60.3
86	2017/07/19 17:33:36	51.6	50.7	49.7	47.9	47.6
91	2017/07/19 17:33:41	48.5	49.5	48.1	50.1	50.4
96	2017/07/19 17:33:46	50.1	48.4	52.1	48.7	50.8
101	2017/07/19 17:33:51	51.6	51.1	52.2	50.1	50.4
106	2017/07/19 17:33:56	51.4	54.3	52.9	54.9	54.2
111	2017/07/19 17:34:01	52.2	53.6	52.8	50.7	52.8
116	2017/07/19 17:34:06	55.0	51.8	54.0	53.3	51.6
121	2017/07/19 17:34:11	51.8	53.5	53.7	55.7	54.7
126	2017/07/19 17:34:16	53.0	53.7	55.7	56.4	56.2
131	2017/07/19 17:34:21	54.8	54.0	53.3	55.0	55.0
136	2017/07/19 17:34:26	54.2	56.4	55.5	54.9	55.4
141	2017/07/19 17:34:31	54.3	53.5	54.1	57.7	52.7
146	2017/07/19 17:34:36	53.1	54.8	55.6	53.4	55.0
151	2017/07/19 17:34:41	53.3	52.6	52.9	52.7	53.1
156	2017/07/19 17:34:46	53.3	50.7	49.6	53.4	52.9
161	2017/07/19 17:34:51	52.2	52.4	50.5	53.0	52.1
166	2017/07/19 17:34:56	52.3	50.2	48.6	47.8	49.9
171	2017/07/19 17:35:01	48.5	47.9	46.7	47.2	47.6
176	2017/07/19 17:35:06	46.3	46.9	46.6	46.9	48.6
181	2017/07/19 17:35:11	47.7	49.6	50.5	49.4	49.6
186	2017/07/19 17:35:16	50.3	51.8	51.6	50.6	51.1
191	2017/07/19 17:35:21	50.7	53.1	54.0	53.9	51.5
196	2017/07/19 17:35:26	51.8	50.8	50.4	52.6	53.9
201	2017/07/19 17:35:31	52.2	51.5	51.9	50.4	48.5
206	2017/07/19 17:35:36	50.6	49.7	49.2	50.2	49.6
211	2017/07/19 17:35:41	49.7	50.7	49.9	48.3	49.8
216	2017/07/19 17:35:46	52.2	50.0	53.4	55.2	53.9
221	2017/07/19 17:35:51	52.5	53.2	51.7	52.6	52.4
226	2017/07/19 17:35:56	53.1	54.2	54.1	52.8	51.8
231	2017/07/19 17:36:01	52.9	53.6	52.3	51.8	51.6
236	2017/07/19 17:36:06	51.9	50.1	50.8	50.2	50.9
241	2017/07/19 17:36:11	54.1	52.6	53.8	53.4	53.2
246	2017/07/19 17:36:16	54.4	57.1	56.2	55.5	54.8
251	2017/07/19 17:36:21	54.2	54.7	56.6	53.6	56.3
256	2017/07/19 17:36:26	54.7	53.9	53.8	52.7	55.5
261	2017/07/19 17:36:31	54.5	55.0	53.0	53.5	53.3
266	2017/07/19 17:36:36	55.1	54.9	55.1	54.7	53.6
271	2017/07/19 17:36:41	53.9	52.5	52.3	51.3	51.5
276	2017/07/19 17:36:46	53.0	52.0	52.9	52.7	51.2
281	2017/07/19 17:36:51	50.4	51.8	51.8	57.4	54.4
286	2017/07/19 17:36:56	54.2	55.1	50.8	50.8	54.5
291	2017/07/19 17:37:01	50.9	51.9	51.1	52.7	54.4
296	2017/07/19 17:37:06	53.5	53.6	51.8	51.1	52.9
301	2017/07/19 17:37:11	50.8	51.6	50.1	50.7	53.7
306	2017/07/19 17:37:16	53.6	56.2	53.9	55.4	53.9
311	2017/07/19 17:37:21	52.5	54.0	53.0	54.5	53.4
316	2017/07/19 17:37:26	50.8	51.2	52.2	50.1	50.1
321	2017/07/19 17:37:31	50.1	51.0	49.8	49.8	50.8
326	2017/07/19 17:37:36	50.1	50.7	51.0	51.8	51.3
331	2017/07/19 17:37:41	50.8	51.1	53.7	53.6	53.5
336	2017/07/19 17:37:46	54.9	53.5	55.0	55.5	54.2
341	2017/07/19 17:37:51	52.8	53.9	54.6	53.1	54.3
346	2017/07/19 17:37:56	54.7	55.0	54.2	54.6	57.3
351	2017/07/19 17:38:01	54.8	51.9	55.0	53.5	54.4
356	2017/07/19 17:38:06	55.0	54.8	54.6	56.1	56.6
361	2017/07/19 17:38:11	54.3	53.9	53.9	54.6	54.8
366	2017/07/19 17:38:16	53.9	52.7	53.8	52.7	53.0
371	2017/07/19 17:38:21	51.2	51.8	53.0	57.2	53.9
376	2017/07/19 17:38:26	51.1	51.3	50.9	49.7	50.9
381	2017/07/19 17:38:31	49.7	51.3	53.0	51.1	51.4
386	2017/07/19 17:38:36	52.0	50.7	52.5	52.3	51.7
391	2017/07/19 17:38:41	53.9	53.9	53.0	53.2	53.9
396	2017/07/19 17:38:46	52.3	52.9	51.8	52.0	53.7
401	2017/07/19 17:38:51	53.2	52.0	52.9	53.8	54.8
406	2017/07/19 17:38:56	53.5	54.4	51.6	51.9	53.0
411	2017/07/19 17:39:01	53.4	56.3	53.7	52.5	51.1
416	2017/07/19 17:39:06	52.9	51.0	50.8	50.7	50.4
421	2017/07/19 17:39:11	50.7	51.0	50.1	50.2	51.9

426	2017/07/19 17:39:16	51.5	52.1	53.0	53.2	51.8
431	2017/07/19 17:39:21	51.8	51.2	51.1	53.2	53.2
436	2017/07/19 17:39:26	54.3	55.1	54.7	53.8	52.0
441	2017/07/19 17:39:31	51.3	52.2	53.0	53.2	55.9
446	2017/07/19 17:39:36	55.4	53.5	52.6	54.5	53.2
451	2017/07/19 17:39:41	53.4	52.6	55.4	54.4	53.5
456	2017/07/19 17:39:46	53.7	54.0	53.5	55.2	54.4
461	2017/07/19 17:39:51	52.5	54.8	52.8	52.8	52.1
466	2017/07/19 17:39:56	51.6	53.4	53.5	54.0	54.8
471	2017/07/19 17:40:01	52.8	53.2	53.0	52.4	56.0
476	2017/07/19 17:40:06	51.7	53.2	52.5	49.3	49.6
481	2017/07/19 17:40:11	50.8	51.5	50.5	50.0	51.4
486	2017/07/19 17:40:16	50.4	51.7	49.8	50.9	50.9
491	2017/07/19 17:40:21	50.2	51.6	53.7	52.5	52.9
496	2017/07/19 17:40:26	54.1	53.4	53.3	54.8	56.2
501	2017/07/19 17:40:31	53.5	53.8	55.2	54.3	56.8
506	2017/07/19 17:40:36	55.1	54.3	56.3	54.6	54.3
511	2017/07/19 17:40:41	52.4	53.8	50.6	48.4	50.2
516	2017/07/19 17:40:46	48.0	48.6	49.2	48.8	48.0
521	2017/07/19 17:40:51	48.8	47.7	48.5	47.1	49.0
526	2017/07/19 17:40:56	52.9	48.8	49.0	48.6	51.5
531	2017/07/19 17:41:01	52.1	53.1	49.7	52.1	52.1
536	2017/07/19 17:41:06	53.6	50.1	50.5	51.4	50.0
541	2017/07/19 17:41:11	49.6	50.3	49.9	51.0	54.6
546	2017/07/19 17:41:16	55.2	53.7	56.5	55.0	54.8
551	2017/07/19 17:41:21	55.5	53.0	53.1	53.9	55.3
556	2017/07/19 17:41:26	53.6	52.9	54.3	54.4	55.2
561	2017/07/19 17:41:31	54.7	57.6	55.7	55.7	55.7
566	2017/07/19 17:41:36	56.6	56.2	54.4	53.7	55.2
571	2017/07/19 17:41:41	54.2	55.3	56.7	54.7	54.1
576	2017/07/19 17:41:46	54.8	53.9	51.0	52.5	53.9
581	2017/07/19 17:41:51	53.6	54.4	52.0	52.6	50.9
586	2017/07/19 17:41:56	50.5	50.5	50.6	50.5	48.0
591	2017/07/19 17:42:01	48.4	48.8	50.6	48.6	52.4
596	2017/07/19 17:42:06	51.9	50.1	50.4	50.1	49.0
601	2017/07/19 17:42:11	49.2	48.8	49.7	50.7	49.9
606	2017/07/19 17:42:16	51.1	50.2	49.4	50.4	55.5
611	2017/07/19 17:42:21	53.2	56.8	53.0	52.4	52.1
616	2017/07/19 17:42:26	54.4	53.4	53.6	55.0	54.2
621	2017/07/19 17:42:31	54.5	55.5	56.5	55.2	53.4
626	2017/07/19 17:42:36	53.6	53.6	55.4	55.9	53.4
631	2017/07/19 17:42:41	53.2	55.9	54.8	54.1	55.4
636	2017/07/19 17:42:46	53.5	55.2	57.9	53.9	53.6
641	2017/07/19 17:42:51	53.3	51.0	52.9	53.0	51.5
646	2017/07/19 17:42:56	50.8	50.0	49.8	49.1	51.0
651	2017/07/19 17:43:01	50.6	46.8	46.1	47.8	47.8
656	2017/07/19 17:43:06	49.8	49.5	51.3	48.5	50.4
661	2017/07/19 17:43:11	49.9	50.2	52.3	50.8	54.1
666	2017/07/19 17:43:16	52.1	51.8	56.4	50.0	49.4
671	2017/07/19 17:43:21	50.2	48.4	49.5	50.5	51.1
676	2017/07/19 17:43:26	51.1	53.6	51.9	52.2	53.6
681	2017/07/19 17:43:31	51.9	53.9	54.6	55.0	55.4
686	2017/07/19 17:43:36	52.9	54.2	54.7	53.3	52.9
691	2017/07/19 17:43:41	52.7	55.6	53.7	52.7	53.1
696	2017/07/19 17:43:46	53.0	53.9	56.5	56.0	56.6
701	2017/07/19 17:43:51	53.6	54.2	54.8	51.8	52.6
706	2017/07/19 17:43:56	50.8	53.2	50.8	50.2	51.9
711	2017/07/19 17:44:01	50.5	51.2	51.7	49.5	50.5
716	2017/07/19 17:44:06	49.6	52.8	50.1	50.8	50.6
721	2017/07/19 17:44:11	51.5	51.3	51.1	49.8	50.1
726	2017/07/19 17:44:16	49.7	50.6	50.6	51.6	51.4
731	2017/07/19 17:44:21	53.9	51.7	49.7	50.3	50.6
736	2017/07/19 17:44:26	49.4	49.3	49.3	50.8	51.1
741	2017/07/19 17:44:31	50.6	52.7	51.9	53.3	55.4
746	2017/07/19 17:44:36	55.8	53.8	53.0	54.2	52.1
751	2017/07/19 17:44:41	51.8	51.6	52.6	54.8	52.0
756	2017/07/19 17:44:46	52.5	51.3	51.9	51.2	52.9
761	2017/07/19 17:44:51	51.2	51.2	50.4	51.3	51.8
766	2017/07/19 17:44:56	52.1	51.6	51.8	51.9	54.4
771	2017/07/19 17:45:01	51.1	51.6	52.0	54.6	55.7
776	2017/07/19 17:45:06	55.6	54.8	53.6	54.7	54.7
781	2017/07/19 17:45:11	53.1	53.4	53.8	57.0	53.8
786	2017/07/19 17:45:16	53.3	52.2	53.0	52.7	53.7
791	2017/07/19 17:45:21	53.8	52.2	52.5	51.9	49.6
796	2017/07/19 17:45:26	50.6	51.0	53.1	52.0	58.2
801	2017/07/19 17:45:31	53.4	52.9	52.0	56.5	60.2
806	2017/07/19 17:45:36	56.4	55.5	56.5	55.0	52.4
811	2017/07/19 17:45:41	54.2	56.6	54.1	55.8	54.4
816	2017/07/19 17:45:46	55.2	52.4	52.3	52.9	54.1
821	2017/07/19 17:45:51	53.3	56.4	54.4	52.9	57.4
826	2017/07/19 17:45:56	56.1	53.7	53.5	53.5	55.0
831	2017/07/19 17:46:01	52.3	53.0	54.3	52.8	52.5
836	2017/07/19 17:46:06	55.2	54.6	53.9	56.1	52.4
841	2017/07/19 17:46:11	53.5	50.6	50.6	50.6	51.5
846	2017/07/19 17:46:16	51.9	52.6	50.0	52.1	52.9
851	2017/07/19 17:46:21	55.2	55.8	58.9	53.9	56.0
856	2017/07/19 17:46:26	56.8	52.5	52.6	52.0	50.6
861	2017/07/19 17:46:31	53.4	53.2	53.3	53.9	51.3
866	2017/07/19 17:46:36	54.1	52.2	52.4	51.7	53.7
871	2017/07/19 17:46:41	54.1	53.0	52.2	52.3	55.2
876	2017/07/19 17:46:46	54.7	53.7	53.7	53.6	54.7
881	2017/07/19 17:46:51	53.8	53.9	54.1	53.4	53.0
886	2017/07/19 17:46:56	52.0	54.7	53.3	56.5	56.0
891	2017/07/19 17:47:01	55.7	54.9	55.3	55.1	51.6
896	2017/07/19 17:47:06	50.8	51.0	53.1	53.8	54.4

Noise Study - Appendix B

Construction Noise Sheets

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/21/2017
Case Description: 800 Yolanda -- Grading

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residences	Residential	53.0	53.0	53.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Compressor (air)	No	40		77.7	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	77.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	77.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/21/2017
Case Description: 800 Yolanda -- Grading

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residences	Residential	53.0	53.0	53.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0
Man Lift	No	20		74.7	50.0	0.0
Crane	No	16		80.6	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	74.7	67.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.6	79.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/21/2017
Case Description: 800 Yolanda -- Demolition

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residences	Residential	53.0	53.0	53.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0
Concrete Saw	No	20		89.6	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.6	84.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/21/2017
Case Description: 800 Yolanda -- Site Prep

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residences	Residential	53.0	53.0	53.0

Equipment

Description	Impact Device	Spec Usage (%)	Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0
Concrete Saw	No	20		89.6	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.6	84.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/21/2017
Case Description: 800 Yolanda -- Architectural Coating

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences	Residential	53.0	53.0	53.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Concrete Mixer Truck	No	40	78.8	50.0	0.0	
Paver	No	50	77.2	50.0	0.0	
Front End Loader	No	40	79.1	50.0	0.0	
Roller	No	20	80.0	50.0	0.0	

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	78.8	74.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	80.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.0	80.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/21/2017
Case Description: 800 Yolanda -- Site Prep

**** Receptor #1 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences	Residential	53.0	53.0	53.0

Equipment

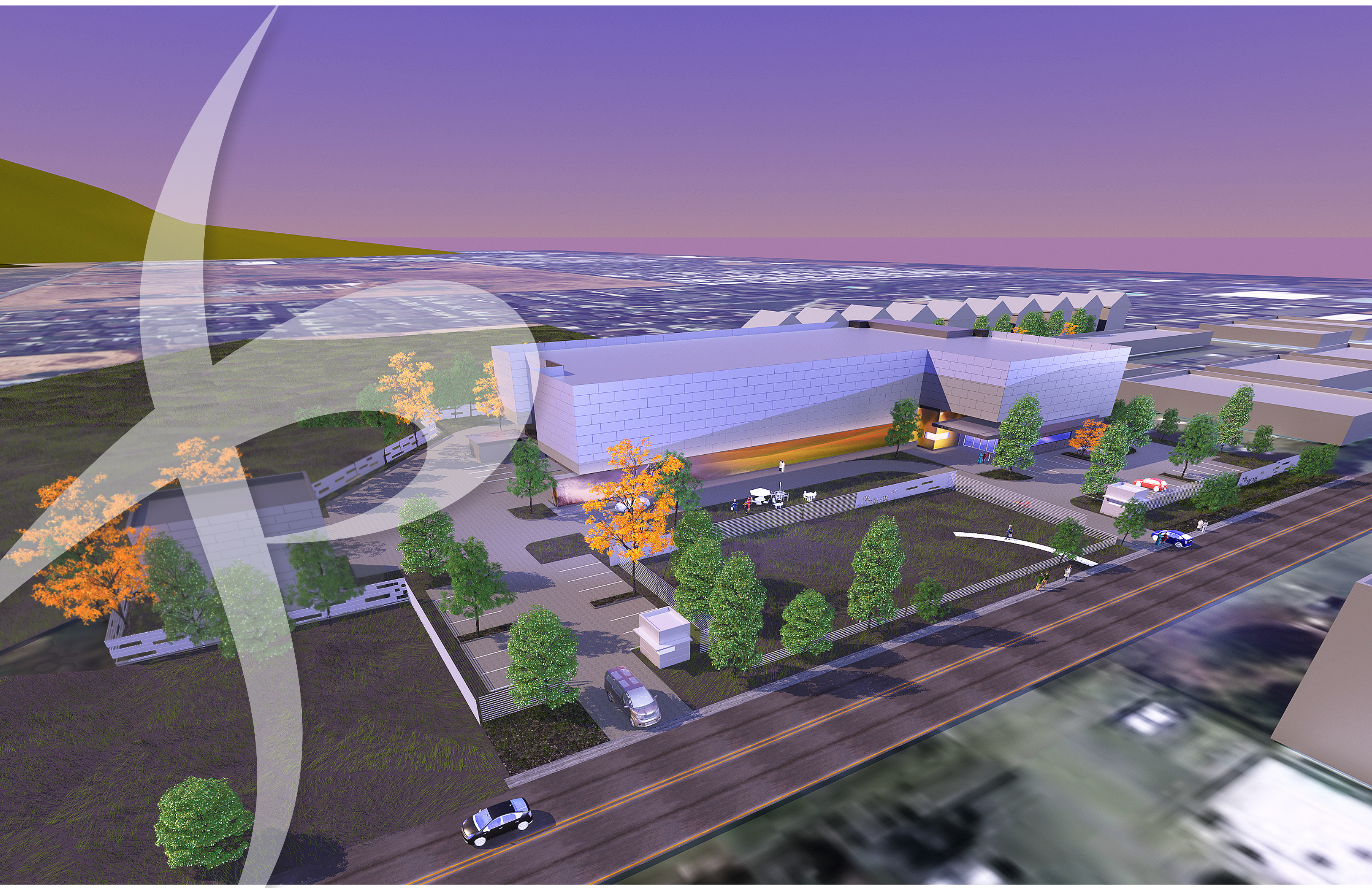
Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	50.0	0.0
Grader	No	40	85.0		50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	85.0	82.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX H

TRANSPORTATION IMPACT ANALYSIS REPORT
PREPARED BY FEHR & PEERS, JULY 28, 2019



Prepared by

FEHR PEERS

100 Pringle Avenue
Suite 600
Walnut Creek, CA 94596

July 2019

Final

Transportation Impact Analysis

800 Yolanda Avenue Project

Prepared for:
Santa Rosa Farm Group
City of Santa Rosa

800 Yolanda Avenue

Transportation Impact Analysis Report

Prepared for:
Santa Rosa Farm Group

July 28, 2019

WC18-3529

FEHR & PEERS

Table of Contents

Appendices

List of Figures

List of Tables

1.0 EXECUTIVE SUMMARY

This report presents the results of the transportation impact analysis (TIA) prepared for the proposed Santa Rosa Farm Group indoor cannabis cultivation facility located at 800 Yolanda Avenue in southeastern Santa Rosa, California. The majority of the project site is currently undeveloped; adjacent uses include agricultural, residential and industrial/commercial uses. The proposed project includes construction of approximately 120,000 square feet of uses on site, served by 85 parking spaces. The project proposes an employee shift schedule that minimizes the number of trips generated during the morning and evening peak commute periods. To present a conservative evaluation of potential transportation impacts, however, this analysis assumes that project employee trips occur during the morning and evening peak commute hours.

1.1 PROJECT TRIP GENERATION

At full buildout, the proposed project is estimated to generate the following vehicle trips assuming, as noted above, that employee access and egress trips occur during standard weekday morning and evening commute hours:

- 285 daily trips
- 63 AM peak hour trips (54 inbound, 9 outbound)
- 78 PM peak hour trips (29 inbound, 49 outbound)

The project trips are distributed and assigned to the transportation network, and added to the Existing plus Approved Projects and Cumulative (Year 2040) baseline traffic volumes, to determine the "with Project" conditions. More detailed information is presented in **Chapter 4**.

1.2 INTERSECTION LEVEL OF SERVICE ANALYSIS

The impacts of the proposed project to the surrounding transportation system were evaluated using the Synchro software analysis package and methodologies from the *2010 Highway Capacity Manual*. The City of Santa Rosa *General Plan* and the City of Santa Rosa's *Standard Guidance for the Preparation of Traffic Impact Analysis* outline the intersection Level of Service (LOS) standards for City intersections and provide significance criteria information for the evaluation of intersection operations impacts.

Intersection operations at seven key intersections were evaluated during the weekday morning (AM) and afternoon (PM) peak hours. Based on the analysis, the project does not result in LOS impacts at any study intersection based on the City's CEQA intersection operations impact criteria. Therefore, the project's impacts to intersection operations are ***less-than-significant***. This analysis is presented in **Chapters 5 and 6** for the Existing plus Approved Projects (near term) scenario and the Cumulative (Year 2040) scenario, respectively.

1.3 OTHER TRANSPORTATION ANALYSIS

The TIA also analyzed multimodal (pedestrian, bicycle, public transit, emergency access, and community character/cut-through) impacts. Impacts to these modes were found to be ***less-than-significant***. This analysis is presented in **Chapters 5 and 6** for the Existing plus Approved Projects (near term) scenario and the Cumulative (Year 2040) scenario, respectively.

A detailed site plan review was conducted and recommendations are identified to improve site access and internal circulation for vehicles, pedestrians, bicycles and transit vehicles. Details are provided in **Chapter 7**.

2.0 INTRODUCTION

This report presents the results of the transportation impact analysis (TIA) conducted by Fehr & Peers for the proposed Santa Rosa Farm Group indoor cannabis cultivation project (the project) located at 800 Yolanda Avenue in southeast Santa Rosa, California. This chapter provides a detailed project description and describes the study area, analysis methodologies, analysis scenarios, and CEQA significance impact criteria.

2.1 TRANSPORTATION IMPACT ANALYSIS (TIA) PURPOSE

The purpose of this TIA is to identify potentially significant adverse impacts of the proposed project on the surrounding transportation system and to recommend mitigation measures, if needed. This TIA was conducted in accordance with the City of Santa Rosa's *Standard Guidance for the Preparation of Traffic Impact Analysis*. This TIA follows the standards set in the most recent General Plan Transportation (Circulation) Element for the City of Santa Rosa, as well as other local plans and policies.

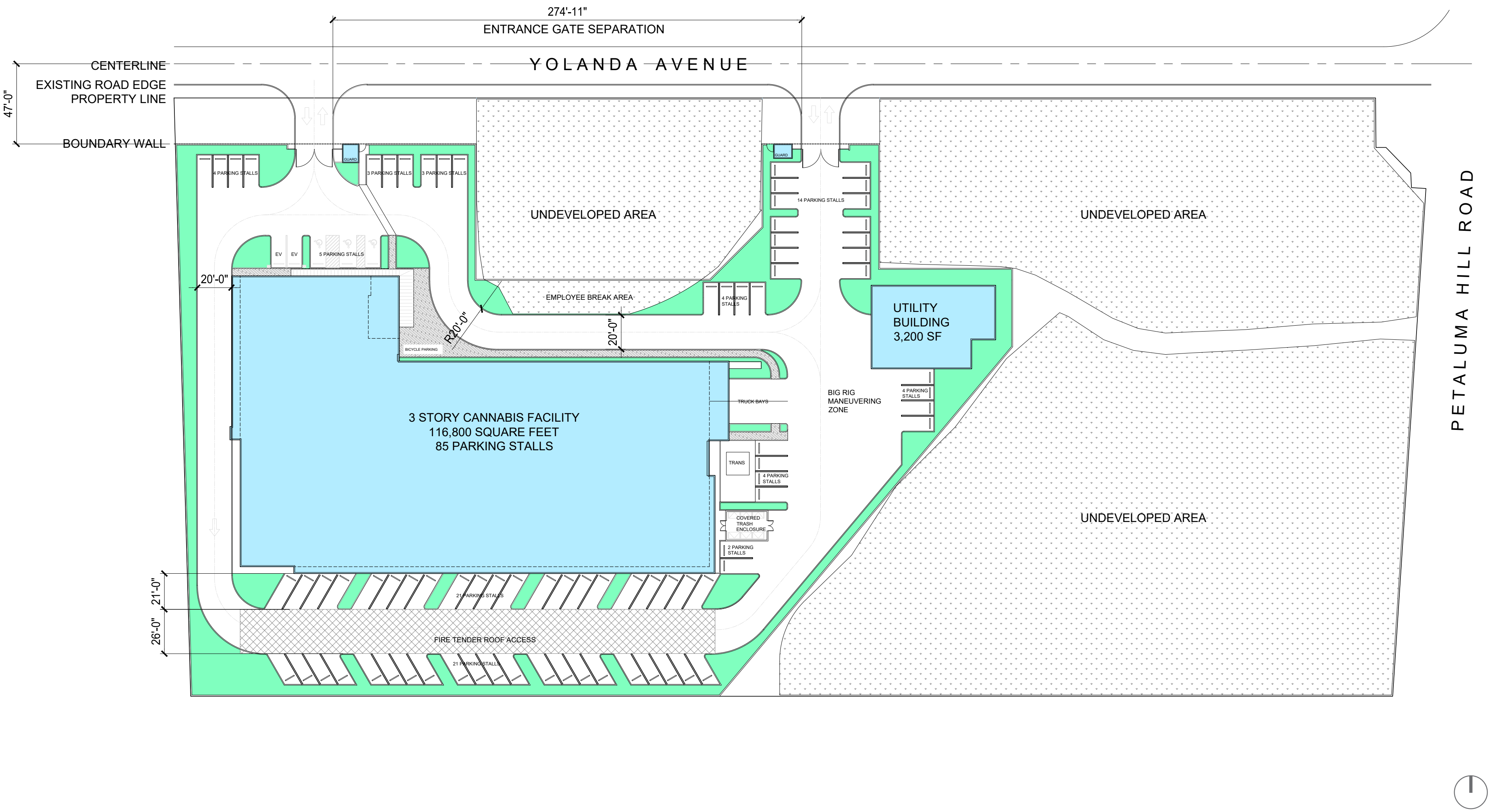
2.2 PROJECT DESCRIPTION

The proposed project includes the construction of approximately 120,000 square feet of indoor cannabis cultivation uses (including manufacturing, distribution, and laboratory testing operations) on a parcel of land bound by Yolanda Avenue in the north, Petaluma Hill Road in the east, agricultural and residential uses to the south, and industrial/commercial uses on the east. The project site is currently occupied by one residence and open space. No retail activity is proposed as part of the project. The project site plan is presented on **Figure 1**.

The proposed project will be operated on a shift schedule, with the following employee breakdown:

- Primary Day Shift (9:30 AM to 6:30 PM): 45 employees
- Early Night Shift (6:30 PM to 3:30 AM): 25 employees
- Night Shift (7:00 PM to 4:00 AM): 10 employees
- Early Morning Shift (4:00 AM to 10:00 AM): 25 employees

This shift schedule results in unique project vehicle trip generation characteristics, which are discussed further in **Chapter 4**.



Site Plan Source: SAG Architecture, April 2019

Figure 1

Project Site Plan

WC18-3529_1_SitePlan

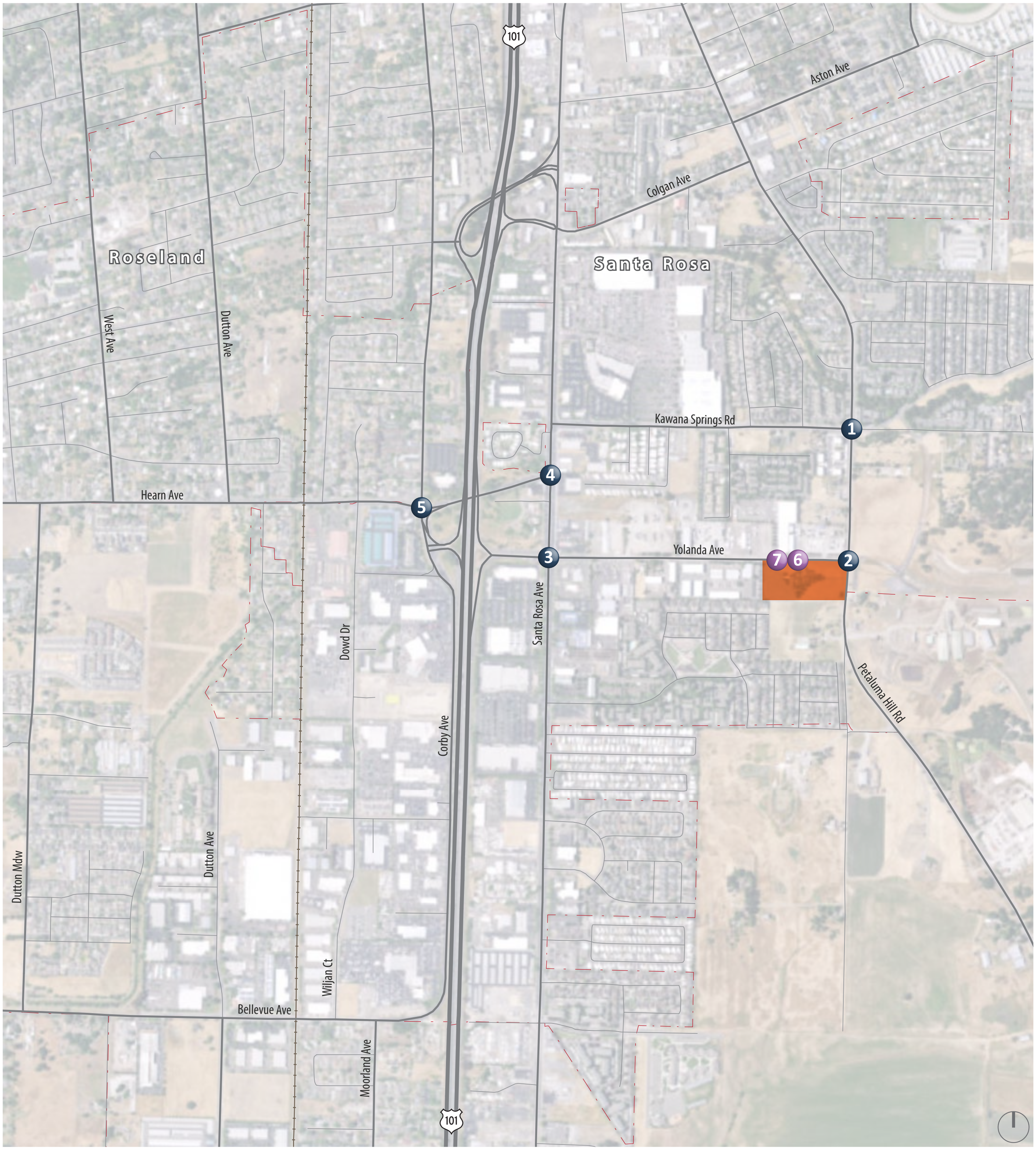
2.3 PROJECT STUDY AREA

The study area is generally located along the Yolanda Avenue, Petaluma Hill Road, Santa Rosa Avenue, and Hearn Avenue corridors, as shown on **Figure 2**. The study intersections, listed in **Table 1** and shown on **Figure 2**, were selected in consultation with City of Santa Rosa staff based on community concerns regarding traffic congestion, the expected number of trips generated by the proposed project, and travel routes to complementary land uses. As noted in the *Standard Guidance for the Preparation of Traffic Impact Analysis*, the study area generally includes major intersections within a 0.5 mile radius of the project site.

TABLE 1: STUDY INTERSECTIONS

Intersection ID	Intersection Name	Jurisdiction(s)	Traffic Control
1	Kawana Springs Road/Petaluma Hill Road	City of Santa Rosa	Signalized
2	Yolanda Avenue/Petaluma Hill Road	City of Santa Rosa	Signalized
3	Yolanda Avenue-US 101 Northbound Ramps/ Santa Rosa Avenue	City of Santa Rosa/ Caltrans	Signalized
4	Hearn Avenue/Santa Rosa Avenue	City of Santa Rosa	Signalized
5	Hearn Avenue/Corby Avenue	City of Santa Rosa	Signalized
6	Project Driveway East/Yolanda Avenue	City of Santa Rosa	Side-Street Stop-Controlled[1]
7	Project Driveway West/Yolanda Avenue	City of Santa Rosa	Side-Street Stop-Controlled[1]

Notes:
1. Proposed control after completion of project. Intersection does not exist under Existing Conditions.
Source: Fehr & Peers, February 2019.



Project Site | # Study Intersection | # Project Scenario Only Intersection

Figure 2

Project Study Area

WC18-3529_2_StudyArea

2.4 ANALYSIS SCENARIOS

Roadway system operations are evaluated during the weekday morning (AM) and evening (PM) peak hours when traffic volumes on the surrounding roadway network are expected to be the highest, and the project would generate the most vehicle traffic. The analysis scenarios are shown in **Table 2**.

TABLE 2: ANALYSIS SCENARIOS

SCENARIO	DESCRIPTION
Existing	The analysis of Existing Conditions was based on traffic counts provided collected in 2018, as well as existing lane geometries and signal timings. The existing conditions assessment also includes a description of key study area roadways and an assessment of bicycle, pedestrian, public transit facilities and services near the site.
Existing plus Approved Projects (EPAP)	Existing volumes and transportation system plus traffic generated by approved, proposed, and built but not yet occupied projects. Trip generation, distribution and assignment for these projects based on previously completed/approved studies or manually completed based on data from the ITE *Trip Generation Manual, 10th Edition* and locations of complementary land uses.
Existing plus Approved Projects with Project	This traffic scenario provides an assessment of operating conditions under EPAP with the addition of project-generated traffic and transportation network infrastructure proposed by the project. The impacts of the proposed project on EPAP baseline operating conditions were identified.
Cumulative without Project	Year 2040 traffic forecasts without the proposed project were developed for Cumulative Conditions by applying traffic volume growth data derived from the Sonoma County Transportation Authority travel demand model and other data sources. The growth data were applied to Existing Conditions volumes to arrive at Year 2040 traffic volumes.
Cumulative with Project	This traffic scenario provides an assessment of operating conditions under Cumulative Conditions with the addition of project-generated traffic and transportation network infrastructure proposed by the project. The impacts of the proposed project on Year 2040 baseline traffic operating conditions were then identified.

Source: Fehr & Peers, February 2019.

2.5 ANALYSIS METHODS

The operations of roadway facilities are described with the term "level of service" (LOS). LOS is a qualitative description of traffic flow from a vehicle driver's perspective based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined ranging from LOS A (free-flow conditions) to LOS F (over capacity conditions). LOS E corresponds to operations "at capacity." When volumes exceed capacity, stop-and-go conditions result and operations are designated LOS F.

2.5.1 SIGNALIZED INTERSECTIONS

The method described in Chapter 18 of the Transportation Research Board's *2010 Highway Capacity Manual* (2010 HCM) was used to conduct the level of service calculations for the signalized study intersections. This method is used to estimate the control delay experienced by motorists at an intersection. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections was calculated using the Synchro traffic analysis software and correlated to a LOS designation as shown in **Table 3**.

TABLE 3: SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service	Description	Average Control Delay per Vehicle (seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	55.1 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0

Source: *Highway Capacity Manual*, Transportation Research Board, 2010.

2.5.2 UNSIGNALIZED INTERSECTIONS

The method described in Chapter 19 of the 2010 HCM was used to conduct the level of service calculations for the side-street stop-controlled intersections. The average control delay for unsignalized intersections was also calculated using the Synchro traffic analysis software. For side-street stop-controlled intersections, the worst movement (for multi-lane approaches) or worst approach (for single-lane approaches) delay was used to determine the LOS for the intersection, using the LOS designations shown in **Table 4**.

TABLE 4: UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Little or no delay.	≤ 10.0
B	Short traffic delays.	10.1 to 15.0
C	Average traffic delays.	15.1 to 25.0
D	Long traffic delays.	25.1 to 35.0
E	Very long traffic delays.	35.1 to 50.0
F	Extreme traffic delays with intersection capacity exceeded.	> 50.0

Source: *Highway Capacity Manual*, Transportation Research Board, 2010.

2.6 CEQA TRANSPORTATION IMPACT CRITERIA

The section describes the LOS standards and impact criteria applied to the roadway facility types analyzed for CEQA purposes. Overall, the determination of significance for project impacts is based on applicable guidelines defined by the City of Santa Rosa. The detailed standards and impact criteria presented below focuses on elements pertaining to transportation system operations.

2.6.1 INTERSECTIONS

The City of Santa Rosa General Plan and the City's *Standard Guidance for the Preparation of Traffic Impact Analysis* note the following adopted LOS goals and policies:

- *Policy T-D-1* - Maintain a Level of Service (LOS) D or better along all major corridors. Exceptions to meeting the standard include:
    - Within downtown;
    - Where attainment would result in significant environmental degradation;
    - Where topography or environmental impacts makes the improvement impossible; or
    - Where attainment would ensure loss of an area's unique character

  - The LOS is to be calculated using the average traffic demand over the highest 60-minute period

- *Policy T-D-2* – Monitor level of service at intersection to assure that improvements or alternatives to improve corridor level of service do not cause severe impacts at any signal intersection

This study does not assume that any of the study intersections are included in the exceptions noted in Policy T-D-1. While Policy T-D-1 relates to corridor LOS, Policy T-D-2 and general interrupted traffic facility flow theory for arterial roadways suggests that the LOS D policy is also applicable to intersections along study corridors. Based on the above standards and additional guidance form the *Guidelines for Transportation Impact Reports*, the following CEQA impact criteria were developed to evaluate transportation impacts of the proposed project.

2.6.1.1 Signalized Intersections

The proposed project would have significant impacts to signalized intersection operations if:

- For intersections operating acceptably (LOS A, B, C or D) prior to the implementation of the project: the project would create a significant impact if it would cause intersection operations to degrade to LOS E or LOS F
- For intersections operating unacceptably (LOS E or LOS F) prior to the implementation of the project: the project would create a significant impact if it would result in an increase of greater than 5.0 seconds in the average delay at the intersection *and* the number of project trips added to the intersection results in an increase in volume-to-capacity ratio of more than 0.020.

2.6.1.2 Unsignalized Intersections

The City of Santa Rosa does not maintain specific CEQA standards of significance for use in the evaluation of unsignalized intersection operations, nor would the City's LOS D policy directly apply because, typically, the stop-controlled movements at side-street stop-controlled intersections are not major corridors.

The decision by the California Court of Appeal in *East Sacramento Partnership for a Livable City v. City of Sacramento, et al. (2016)* notes that "compliance with a general plan policy does not conclusively establish there is not a significant environmental impact." Therefore, while the relationship between unsignalized study intersections operations and the City's LOS D policy may be somewhat unclear, this exemption does not relieve the need for the determination of potential impacts to intersection operations at the unsignalized study intersections. Given this context, the following CEQA transportation impact criteria were developed based on local state of the practice and applicable goals and policies in the City's General Plan.

The proposed project would have significant impacts to unsignalized intersection operations if:

- For intersections operating acceptably (LOS A, B, C or D) prior to the implementation of the project: the project would create a significant impact if both the following criteria are met:
    - It would cause intersection operations to degrade to LOS E or LOS F
    - The intersection meets California MUTCD Signal Warrant 3A or Warrant 3B (commonly known as the "Peak Hour Signal Warrant")
- For intersections operating unacceptably (LOS E or LOS F) prior to the implementation of the project: the project would create a significant impact if both the following criteria are met:
    - The project would result in an increase of greater than 5.0 seconds in the worst approach or worst movement delay at the intersection
    - The intersection meets California MUTCD Signal Warrant 3A or Warrant 3B (commonly known as the "Peak Hour Signal Warrant")

2.6.2 PEDESTRIAN SYSTEM

The project would create a significant impact related to the pedestrian system if any of the following criteria are met (based on General Plan Policy T-J):

- The project generates 20 or more pedestrians in any single hour at an unsignalized intersection, mid-block crossing, or where no crossing has been established;
- The project disrupts existing pedestrian facilities, including existing paths of travel and direct access;
- The project interferes with or precludes planned pedestrian facilities; or
- The project creates inconsistencies with adopted pedestrian system plans, guidelines, policies, or standards.

2.6.3 BICYCLE SYSTEM

The project would create a significant impact related to the bicycle system if any of the following criteria are met (based on General Plan Policy T-J):

- The project disrupts existing bicycle facilities, including existing paths of travel and direct access;
- The project interferes with or precludes planned bicycle facilities; or
- The project creates inconsistencies with adopted bicycle system plans, guidelines, policies, or standards.

2.6.4 PUBLIC TRANSIT SYSTEM

The project would create a significant impact related to public transit service if any of the following criteria are met (based on General Plan Policy T-H-3):

- The project generates a substantial increase in public transit riders that cannot be adequately served by existing public transit services;
- The project establishes transit facilities or equipment that results in a sigh distance deficiency or vehicle conflict point; or,
- The project disrupts or conflicts with existing or planned public transit facilities.

Policy T-H-3 requires that new development provided transit improvements, where a rough proportionality to demand from the project is established.

2.6.5 EMERGENCY ACCESS

Ease of access and travel time are critical for first responders traveling in emergency access vehicles. Obstructions in the roadway, detours, and congestion delay are among the factors that can affect emergency response time. Using the *General Plan* as a guide, significant impacts would occur if a project or an element of a project:

- Conflicts with an existing or planned emergency response facility or route; or
- Provides inadequate access to accommodate emergency vehicles

2.6.6 COMMUNITY CHARACTER (CUT-THROUGH TRAFFIC)

The project would create a significant impact related to community character if any of the following criteria are met (based on General Plan Policy T-C-3):

- The project would substantially increase cut-through traffic in residential neighborhoods; or
- The project would result in additional commercial vehicle trips in a residential area

2.7 REPORT ORGANIZATION

The remainder of the report is divided into the following chapters:

- ***Chapter 3: Existing Conditions*** describes the existing transportation system in the project vicinity, including the surrounding roadway network, peak period intersection turning movement volumes, existing bicycle, pedestrian, and transit facilities, and intersection operations.
- ***Chapter 4: Project Traffic Estimates*** presents the project trip generation, distribution, and assignment.
- ***Chapter 5: Existing plus Approved Projects (EPAP) Conditions*** addresses the Existing plus Approved Project condition, both without and with the project, and discusses vehicular impacts.
- ***Chapter 6: Cumulative (Year 2045) Conditions*** addresses the long-term future conditions, both without and with the project, and discusses vehicular impacts.
- ***Chapter 7: Site Plan Evaluation and Recommendations*** discusses site access and circulation based on the current site plan for all modes of travel. Recommendations are provided.

3.0 EXISTING CONDITIONS

A comprehensive multi-modal data collection effort was undertaken to identify existing transportation conditions in the vicinity of the proposed project. The assessment of Existing Conditions relevant to this study includes an inventory of the street system, traffic volumes on these facilities, and operating conditions at key intersections. Existing public transit service, and bicycle and pedestrian facilities in the study area are also described.

3.1 EXISTING TRANSPORTATION FACILITIES

3.1.1 EXISTING STREET SYSTEM

Direct vehicular access to the project site is provided by Yolanda Avenue. Local access to the site is provided via Petaluma Hill Road, Santa Rosa Avenue, Hearn Avenue, and Corby Avenue. Regional access to the project site is provided via the US 101 freeway. These facilities are described below and are illustrated on **Figure 2** (presented earlier in **Section 2.3**).

Yolanda Avenue is a two-lane regional/arterial street located north of the project; the facility runs in an east-west direction from Santa Rosa Avenue in the west, to Petaluma Hill Road in the east. Further to the west of Santa Rosa Avenue, Yolanda Avenue transitions to/from the ramps at the US 101/Yolanda Avenue-Hearn Avenue interchange. The speed limit on the facility near the project site is 35 miles per hour; bicycle and pedestrian facilities are generally not provided in the vicinity of the project site. The Yolanda Avenue corridor is also proposed to connect to the future Farmers Lane Extension, a portion of which is currently under construction as part of a nearby development project.

Petaluma Hill Road is a north-south two-lane regional/arterial street that extends from Santa Rosa Avenue (near SR 12) in the north to Adobe Road in Penngrove. In addition to the roadway being designated as a regional/arterial street in the City of Santa Rosa General Plan, Petaluma Hill Road is a major regional roadway paralleling US 101, and provides connections between southeastern Santa Rosa, eastern Rohnert Park, Penngrove and Petaluma (via subsequent connections to Old Redwood Highway and Adobe Road). The posted speed limit is 45 miles per hour in the vicinity of the project site, and on-street parking is prohibited along the roadway.

Santa Rosa Avenue is a north-south four-to-six lane regional/arterial street that extends from Downtown Santa Rosa (at Third Street) in the north to US 101 and Roberts Lake Road in the south. The facility serves a mix of residential, retail, and industrial uses along the corridor. The posted speed limit is 35 miles per hour between Colgan Avenue and Burt Street and 40 miles per hour between Burt Street and the city limits south of the study area; on-street parking is (generally) not permitted.

Hearn Avenue is a two-to-four lane east-west regional/arterial street that connects residential areas west of Stony Point Road (in the west) to Santa Rosa Avenue in the east. The roadway serves as one of the three local US 101 overcrossings between SR 12 and Rohnert Park. The US 101/Hearn Avenue interchange is proposed to be improved as part of the *US 101/Hearn Avenue Interchange Project*. The posted speed limit in the vicinity of the interchange is 30 miles per hour.

Kawana Springs Road is an east-west two-lane regional/arterial street that connects Santa Rosa Avenue in the west to residential neighborhoods in the east. The roadway is proposed to connect to the future Farmers Lane Extension. The current posted speed limit is 30 miles per hour to the east of Petaluma Hill Road and 35 miles per hour to the west of Petaluma Hill Road.

US 101 is a six-lane north-south freeway that connects the project site to destinations throughout central Sonoma, Marin, and Mendocino Counties, with further connections to San Francisco, Los Angeles, and California's North Coast region. In the vicinity of the project site, US 101 includes high-occupancy vehicle lanes, which require a vehicle occupancy of two or more persons. The on-ramps at the US 101/Hearn Avenue-Yolanda Avenue are subject to ramp metering during the morning and afternoon commute periods; the northbound US 101 on-ramp includes a high-occupancy vehicle bypass lane, subject to a vehicle occupancy restriction of two or more persons per vehicle.

3.1.2 EXISTING PUBLIC TRANSIT SERVICES AND CONNECTIVITY

This section summarizes local and regional public transit connectivity in the study area. Public transit systems that serve the study area and surrounding areas are introduced below and described in more detail in **Table 5**.

- **Santa Rosa CityBus (CityBus):** Santa Rosa CityBus provides local bus service throughout the City of Santa Rosa. One CityBus route (Route 5) directly serves the project site, every 30 minutes during peak and midday periods on weekdays, with a stop along Yolanda Avenue. A second CityBus route (Route 3) indirectly serves the project site with stops along Santa Rosa Avenue south of Yolanda Avenue. Both of these routes serve the Second Street/Downtown Transit Mall, which provides connections to other CityBus and regional transit services, as well as a connection to the Downtown Santa Rosa SMART Station.
- **Sonoma County Transit (SCT)**: Sonoma County Transit provides regional bus service in the City of Santa Rosa, with connections to other communities throughout Sonoma County. Four Sonoma County Transit routes indirectly serve the project site with stops along Santa Rosa Avenue south

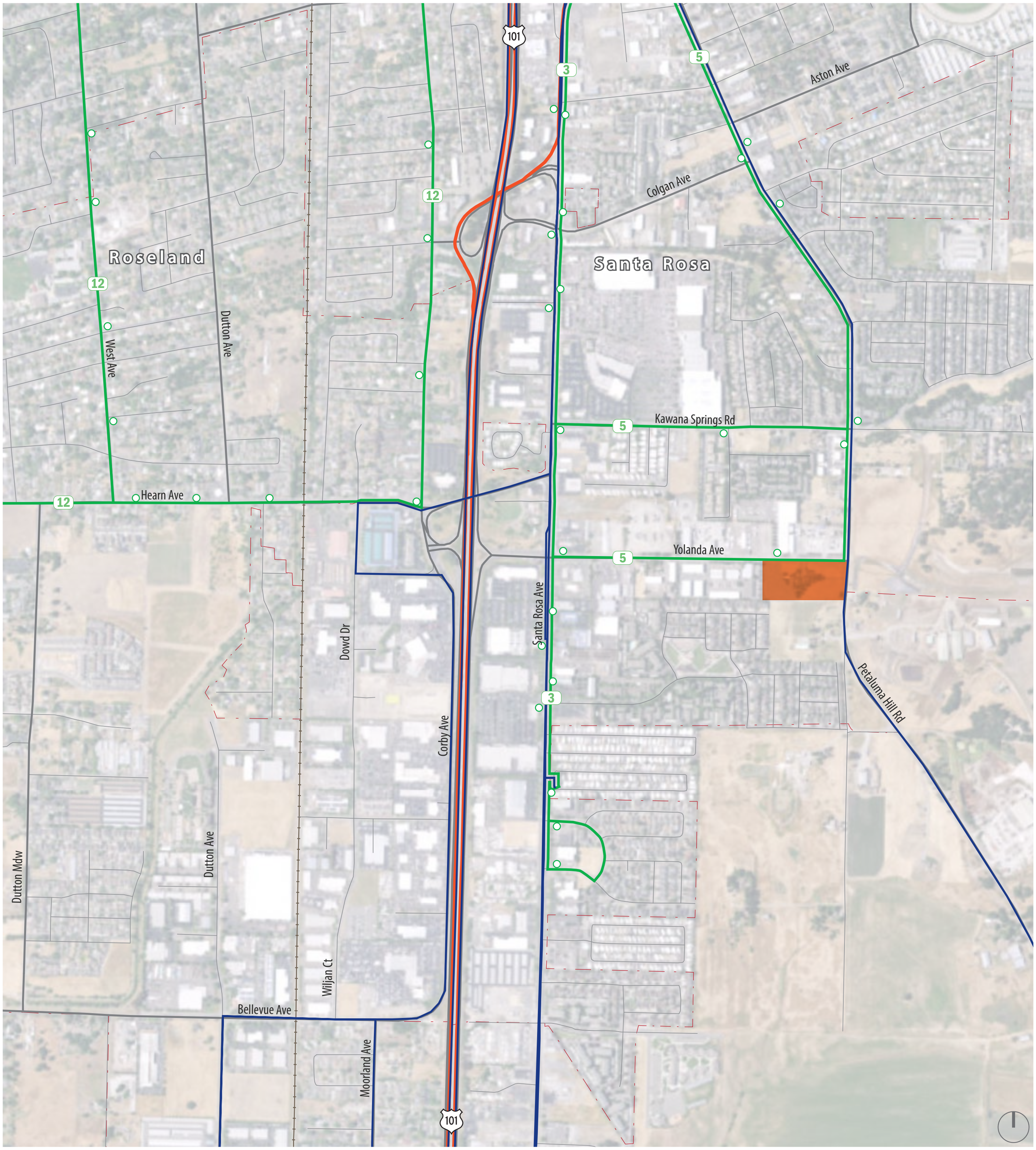
of Yolanda Avenue and along Petaluma Hill Road at Kawana Springs Road. These routes also connect to the Second Street/Downtown Transit Mall; one route (Route 54) also provides a connection to the Rohnert Park SMART Station.

Public transit services within the project study area and that traverse through study intersections are detailed in **Table 5** and displayed on **Figure 3**.

TABLE 5: EXISTING PUBLIC TRANSIT SERVICES

Route	From	To	Weekdays			Weekends	
			Operating Hours[1]	Headway (Minutes)[2]		Operating Hours[1]	Headway (Minutes)[2]
				Peak	Midday		
Santa Rosa CityBus (CityBus) – Local Bus Service							
CityBus 3	Downtown Santa Rosa Transit Mall	Elsa Drive/ Santa Rosa Avenue	6:00 AM to 8:00 PM	30	30	6:00 AM to 7:30 PM[3]	60
CityBus 5	Downtown Santa Rosa Transit Mall	Yolanda Avenue/ Santa Rosa Avenue	6:15 AM to 8:10 PM	30	30	6:30 AM to 8:00 PM[4]	60
Sonoma County Transit (SCT) – Regional Bus Service							
SCT 44/48/54[5]	Santa Rosa Coddingtown	Downtown Petaluma	5:20 AM to 10:30 PM	10-30	60	7:00 AM to 10:10 PM	60-90
SCT 46	Downtown Santa Rosa Transit Mall	Cotati SMART Station	6:50 AM to 5:50 PM	2 AM Runs 3 PM Runs		No Weekend Service	

Notes:
1. Operating hours rounded to the nearest 10 minutes
2. Headways are defined as the time between transit vehicles on the same route in the same direction.
3. Sunday service operates between 10:00 AM and 4:30 PM
4. Sunday Service operations between 10:30 AM and 5:00 PM
5. SCT routes 44, 48, 54 generally provide regional service between Santa Rosa and Petaluma, with similar termini. In the vicinity of the project site, these three SCT routes operate similar to a combined service.
Sources: Santa Rosa CityBus and Sonoma County Transit, accessed February 2019.



Project Site

Golden Gate Transit

Sonoma County Transit

Santa Rosa City Bus and Route Number

Santa Rosa City Bus Stop

Figure 3

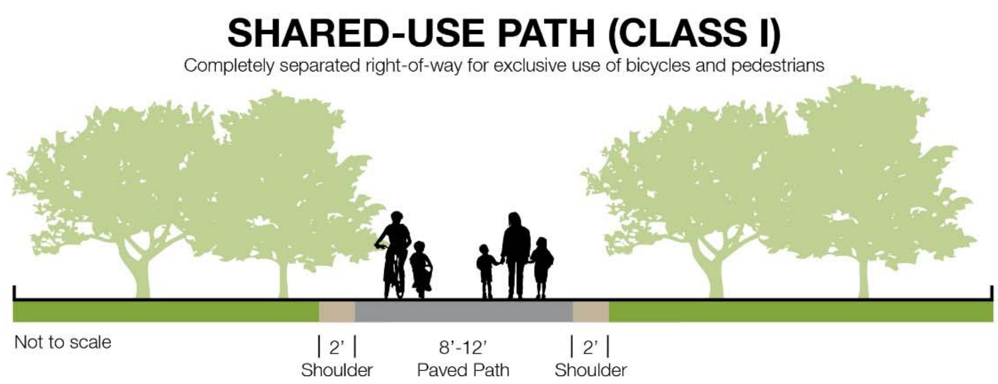
Existing Public Transit Routes

WC18-3529_3_Transit

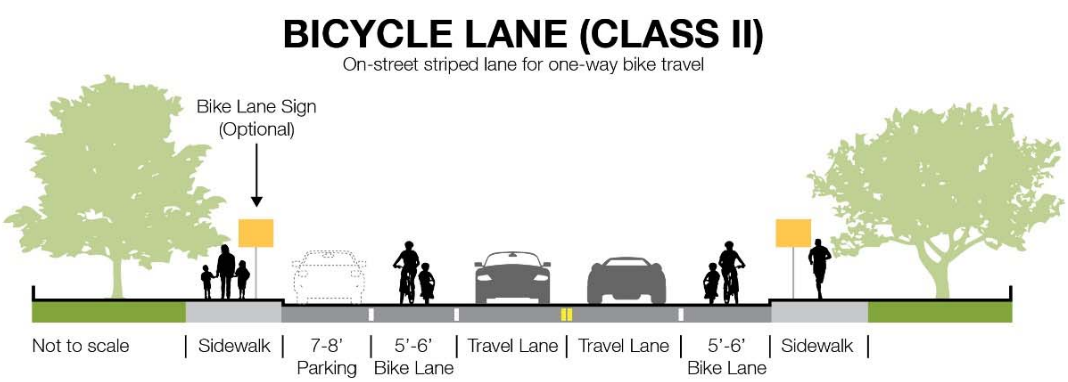
3.1.3 EXISTING BICYCLE FACILITIES

Bikeway planning and design in California typically relies on guidelines and design standards established by California Department of Transportation (Caltrans) in the Highway Design Manual (Chapter 1000: Bikeway Planning and Design). Caltrans provides for four distinct types of bikeway facilities, as described below and shown in the accompanying figures.

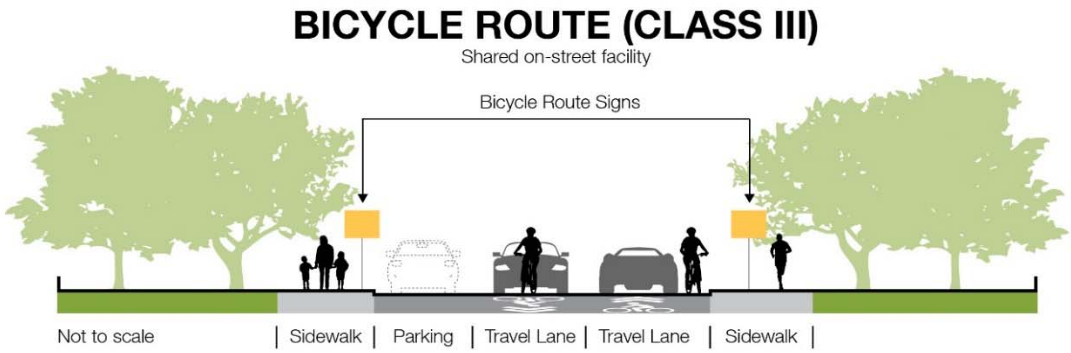
- *Class I Bikeways (Shared-Use Path)* provide a completely separate right-of-way and are designated for the exclusive use of bicycles and pedestrians, with vehicle and pedestrian cross-flow minimized. In general, bike paths serve corridors where on-street facilities are not feasible or where sufficient right-of-way exists to allow them to be constructed.



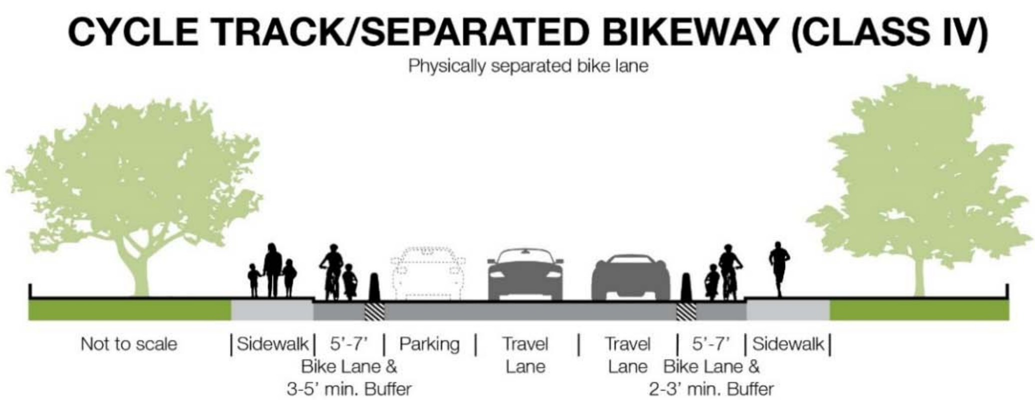
- *Class II Bikeways (Bicycle Lanes)* are dedicated lanes for bicyclists generally adjacent to the outer vehicle travel lanes. These lanes have special lane markings, pavement legends, and signage. Bicycle lanes are typically five (5) feet wide. Adjacent vehicle parking and vehicle/pedestrian cross-flow are permitted.



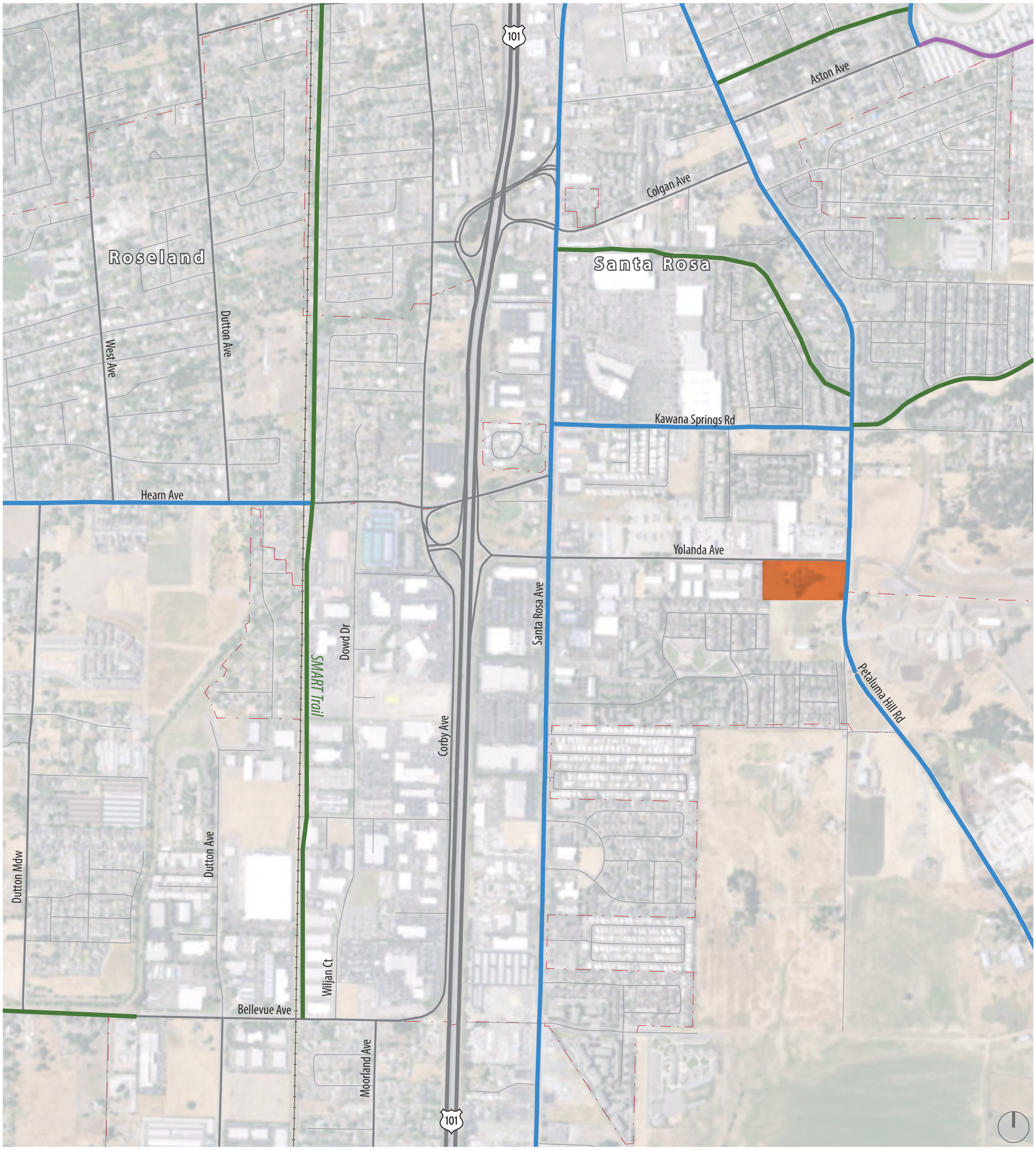
- *Class III Bikeways (Bicycle Route)* are designated by signs or pavement markings for shared use with pedestrians or motor vehicles, but have no separated bike right-of-way or lane striping. Bike routes serve either to: a) provide a connection to other bicycle facilities where dedicated facilities are infeasible, or b) designate preferred routes through high-demand corridors.



- *Class IV Bikeways (cycle tracks or "separated" bikeways)* provide a right-of-way designated exclusively for bicycle travel within a roadway and are protected from other vehicle traffic by physical barriers, including, but not limited to, grade separation, flexible posts, inflexible vertical barriers such as raised curbs, or parked cars.



Existing bicycle facilities in the study area are displayed on **Figure 4**. An existing Class I shared-use path, the SMART Trail, is located approximately 1.0 miles west of the project site. Class II bicycle lanes are provided along Santa Rosa Avenue, Kawana Springs Road, and Petaluma Hill Road. The Final Draft of the City of Santa Rosa *Bicycle & Pedestrian Master Plan Update 2018* includes proposals for new Class II bicycle lanes along Yolanda Avenue between Santa Rosa Avenue and Petaluma Hill Road, as well as Class II bicycle lanes and a Class I shared-use path (the Taylor Mountain Regional Park Trail) along the proposed Farmers Lane Extension.



Project Site

Class I Bike/Multi-use Path

Class II Bike Lane

Class III Bike Route

Figure 4

Existing Bicycle Facilities

WC18-3529_4_BikeFac

3.1.4 EXISTING PEDESTRIAN FACILITIES

Pedestrian facilities consist of sidewalks, crosswalks, and pedestrian signals at signalized intersections. The pedestrian environment was evaluated along the connecting roadways that directly serve the project site and adjacent roadways that connect to transit stops and/or nearby destinations in the greater study area.

Pedestrian connectivity in the vicinity of the project site is poor as sidewalks are currently not provided along Yolanda Avenue or Petaluma Hill Road. Nearby sidewalk facilities are located along Yolanda Avenue near Santa Rosa Avenue and Petaluma Hill Road near Kawana Springs Road. The project proposes to construct a sidewalk along the developed portion of the Yolanda Avenue project frontage.

3.2 EXISTING INTERSECTION VOLUMES AND LANE CONFIGURATIONS

The operations of the study intersections are evaluated for the highest one-hour volume during the weekday morning (7:00 to 9:00 AM) and weekday afternoon (4:00 to 6:00 PM) periods. Existing peak period intersection counts were conducted at the study intersections in 2018 on clear days with area schools in-session. The highest 60-minute volume at each individual intersection was used in the analysis, with intersection volumes balanced based on the higher volume (where appropriate). These counts formed the basis of the Existing Conditions intersection operations analysis (discussed further in **Section 3.3**). A summary of count data for this study can be found in **Appendix A**.

Existing lane configurations and types of intersection control devices were confirmed through field observations. **Figure 5** presents the existing weekday AM and PM peak hour turning movement volumes, lane configurations, and traffic control devices used in the Existing Conditions analysis. **Figure 6** presents existing weekday AM and PM peak hour bicycle and pedestrian volumes at the study intersections.

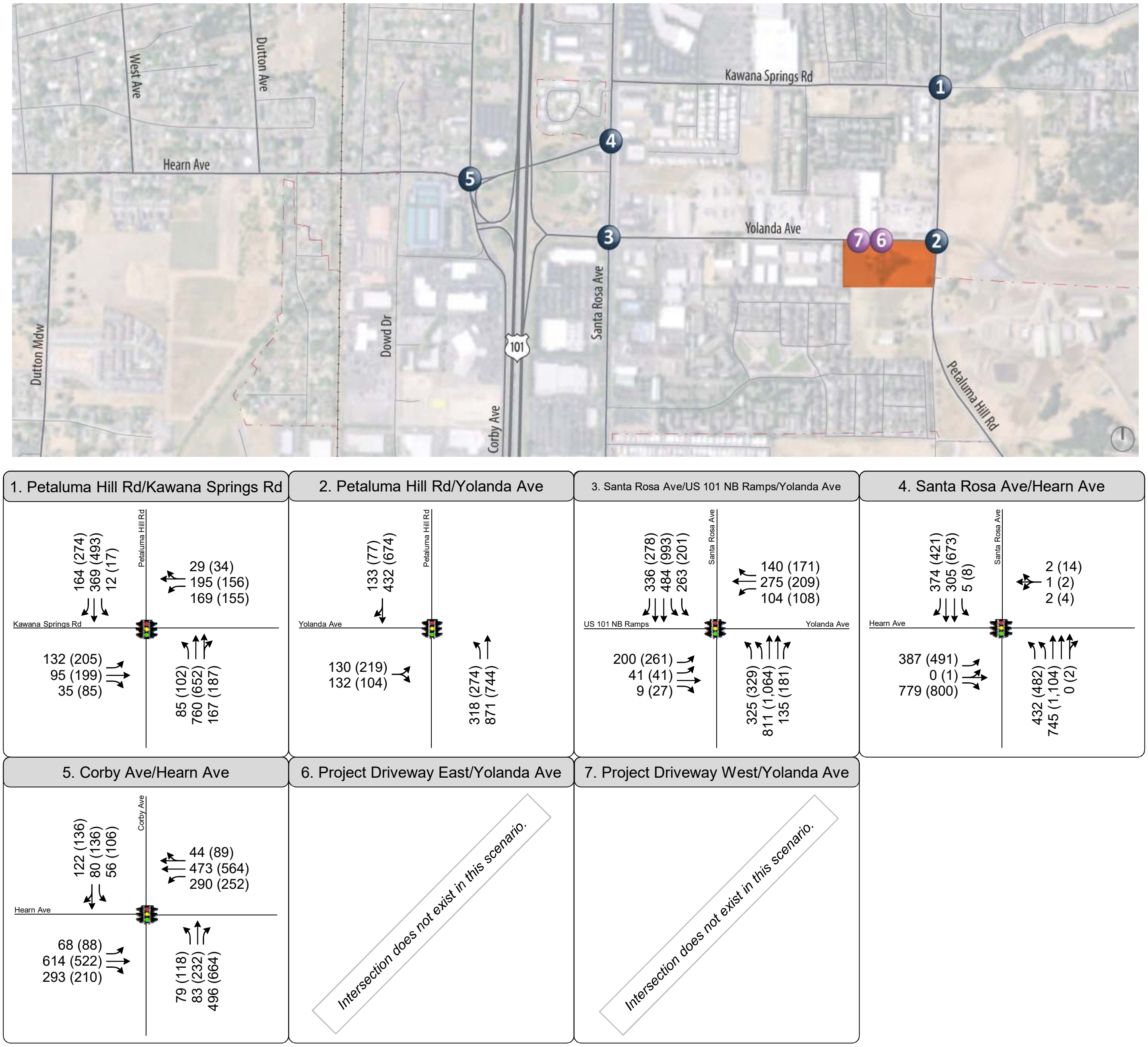
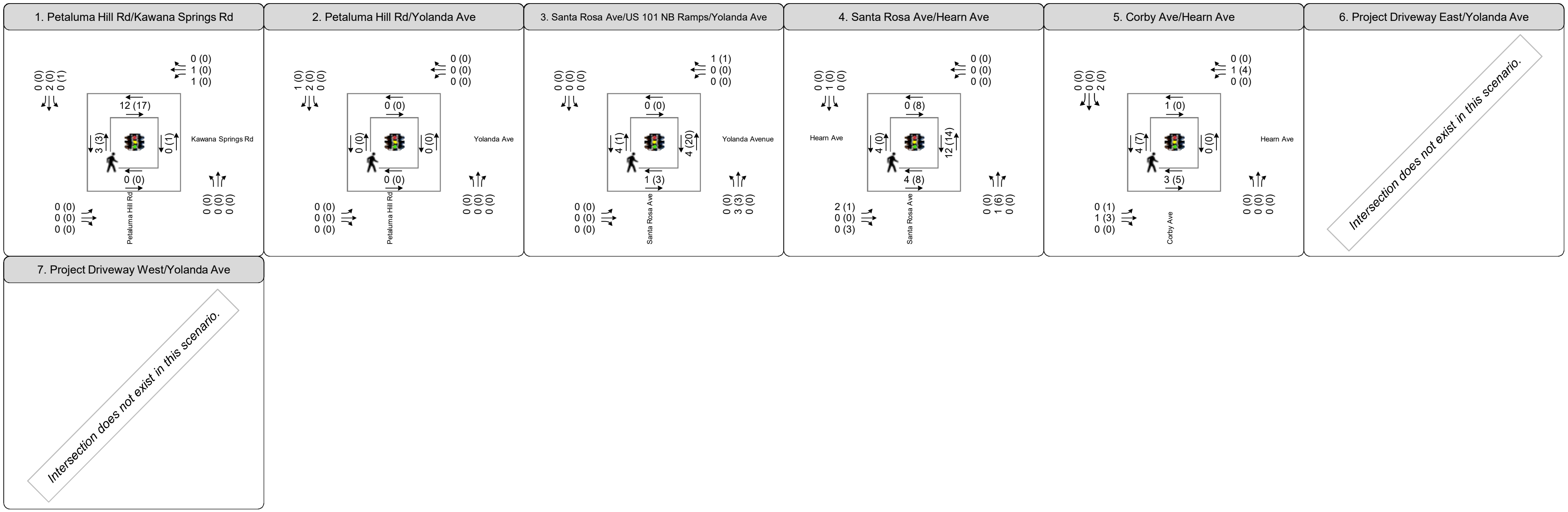


Figure 5

Existing Conditions
Peak Hour Traffic Volumes, Lane Configurations and Intersection Control



Movement Direction

Traffic Signal

AM (PM) Peak Hour Volume

Stop Sign

Figure 5

Existing Conditions
Peak Hour Bicycle and Pedestrian Volumes

3.3 EXISTING INTERSECTION LEVELS OF SERVICE

Existing intersection lane configurations and peak hour turning movement volumes were used to calculate the levels of service for the study intersections during the weekday AM and PM peak hours for Existing Conditions. The results of the LOS analysis using the Synchro software program for the study intersections under Existing Conditions are presented in **Table 6**, and the corresponding LOS calculation sheets are included in **Appendix B**.

The results of the LOS calculations indicate that the majority of the study intersections operate acceptably with respect to their LOS standard. The following intersection does not meet its respective LOS standard:

- Intersection 5: Corby Avenue/Hearn Avenue (LOS E in the AM peak hour and PM peak hour)

TABLE 6: EXISTING INTERSECTION LEVELS OF SERVICE

	Intersection	Control Type[1]	Count Date	Peak Hour[2]	Delay[3]	LOS[4]	LOS Standard
1	Kawana Springs Road/ Petaluma Hill Road	Signalized	11/2018	AM PM	23.5 23.7	C C	D
2	Yolanda Avenue/ Petaluma Hill Road	Signalized	11/2018	AM PM	20.0 29.8	B C	D
3	Yolanda Avenue-US 101 Northbound Ramps/ Santa Rosa Avenue	Signalized	11/2018	AM PM	35.3 37.8	D D	D
4	Hearn Avenue/ Santa Rosa Avenue	Signalized	11/2018	AM PM	25.0 29.5	C C	D
5	Hearn Avenue/ Corby Avenue	Signalized	2/2018	AM PM	**57.8** **62.3**	**E** **E**	D
6	Project Driveway East/ Yolanda Avenue	*Intersection does not exist in this scenario.*					D
7	Project Driveway West/ Yolanda Avenue	*Intersection does not exist in this scenario.*					D

Notes:
1. Signalized = Traffic Signal Control, SSSC = Side-Street Stop-Controlled
2. AM = Weekday morning peak hour, PM = Weekday evening peak hour
3. Whole intersection average delay reported for signalized intersections and all-way stop-controlled intersections. Side-street stop-controlled delay presented as Whole Intersection Average Delay (Worst Movement Delay). Delay calculated per *HCM 2010* methodologies.
4. LOS designation per *HCM 2010*.
Bold indicates unacceptable operations.
Source: Fehr & Peers, February 2019.

3.4 EXISTING INTERSECTION COLLISION DATA

Intersection collision data for the signalized study intersections was previously analyzed as part of a previous traffic analysis effort by Transpedia Consulting Engineers. This analysis is based on collision data from the 2013-2017 time period. Transpedia computed intersection collision rates and compared them to published statewide averages for similar facilities. **Table 7** presents the results of Transpedia's analysis.

TABLE 7: EXISTING INTERSECTION LEVELS OF SERVICE

Intersection		Control Type	Total Collisions (2013-2017)	Calculated Collision Rate (c/mve)[1]	Statewide Collision Rate (c/mve)[1]
1	Kawana Springs Road/ Petaluma Hill Road	Signalized 4-Legged	28	0.54	0.27
2	Yolanda Avenue/ Petaluma Hill Road	Signalized 3-Legged	17	0.38	0.21
3	Yolanda Avenue-US 101 Northbound Ramps/Santa Rosa Avenue	Signalized 4-Legged	54	0.67	0.27
4	Hearn Avenue/ Santa Rosa Avenue	Signalized 4-Legged	41	0.53	0.27
5	Hearn Avenue/ Corby Avenue	Signalized 4-Legged	66	1.01	0.27
6	Project Driveway East/ Yolanda Avenue	*Intersection does not exist in this scenario.*			
7	Project Driveway West/ Yolanda Avenue	*Intersection does not exist in this scenario.*			

Notes:
1. c/mve = collisions per million vehicles entering intersection
Source: Transpedia Consulting Engineers, 2018

As noted in the Transpedia report, the calculated existing collision rates at all five existing study intersections were above the statewide average. Transpedia's review of the collision reports note that "driving at unsafe speed" was the main reason for the collisions. Fehr & Peers generally concurs with Transpedia's conclusion that, because the proposed project does not currently exist, the project would not be responsible for the intersections currently exhibiting collision rates above the statewide average.

4.0 PROJECT TRAFFIC ESTIMATES

The amount of traffic expected to be generated on the study roadway system by the proposed project is estimated using a three-step process: (1) project trip generation, (2) trip distribution, and (3) trip assignment. The first step estimates the amount of project-generated traffic that would be added to the roadway network. The second step estimates the direction of travel to and from the project site. During the third step, the new trips are assigned to specific street segments and intersection turning movements. This process is described in more detail in the following sections. The assumptions and data provided in these sections was submitted to City staff for review and comment by means of a technical memorandum prepared by Fehr & Peers dated August 29, 2017.

4.1 PROJECT TRIP GENERATION

Trip generation estimates represent the number of vehicles that would likely access the project on an average weekday. Typically, data from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 10th Edition* is used to estimate vehicle trip generation. However, owing to the unique land use of the proposed project, site-specific trip making data provided to Fehr & Peers by the project applicant was used as the basis for the trip generation estimate. A summary of this site-specific trip making data is provided below.

- Employee Shifts: The proposed project would be a 24-hour operation, and be staffed by a total of 105 employees spread over four shifts.
  - Primary Day Shift: 45 employees arriving during the AM peak hour and departing during the PM peak hour
  - Early Night Shift: 25 employees arriving during the PM peak hour and departing during the off-peak early morning period
  - Night Shift: 10 employees arriving after the PM peak hour and departing during the off-peak early morning period
  - Early Morning Shift: 25 employees arriving before the AM peak hour and departing in the period between the AM peak hour and PM peak hour; a limited number of AM peak hour lunch break trips are assumed for this employee shift.
- Deliveries: The proposed project would provide delivery service of products, by appointment, during primary day shift hours. One round-trip per hour is expected to be generated by the project, with up to 10 trips per day.

- Other trip making activities: The proposed project would also generate a limited number of additional trips, such as material deliveries (fertilizer, irrigation supplies, etc.), visitors, vendors, and service/maintenance staff.

The above assumptions are intended to provide a conservative basis for the calculation of net new project trips to the transportation system. For the purposes of this study, it was assumed that trips for the Primary Day Shift, Early Night Shift and Early Morning Shift affect the AM and/or PM peak commute hours, even though they are unlikely to do so in practice. Based on the above assumptions, the weekday daily, AM peak hour and PM peak hour trip generation for the site was estimated. **Table 8** presents the estimates of the trip generation for the proposed project.

TABLE 8: PROJECT TRIP GENERATION ESTIMATES

Trip Generator	Quantity	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Primary Day Shift	45 employees	100	45	0	45	0	45	45
Early Night Shift	25 employees	60	0	0	0	25	0	25
Night Shift	10 employees	25	0	0	0	0	0	0
Early Morning Shift	25 employees	60	5	5	10	0	0	0
Product Deliveries	1 round trip per hour	20	1	1	2	1	1	2
Other Activities		20	3	3	6	3	3	6
Grand Total		***285***	***54***	***9***	***63***	***29***	***49***	***78***

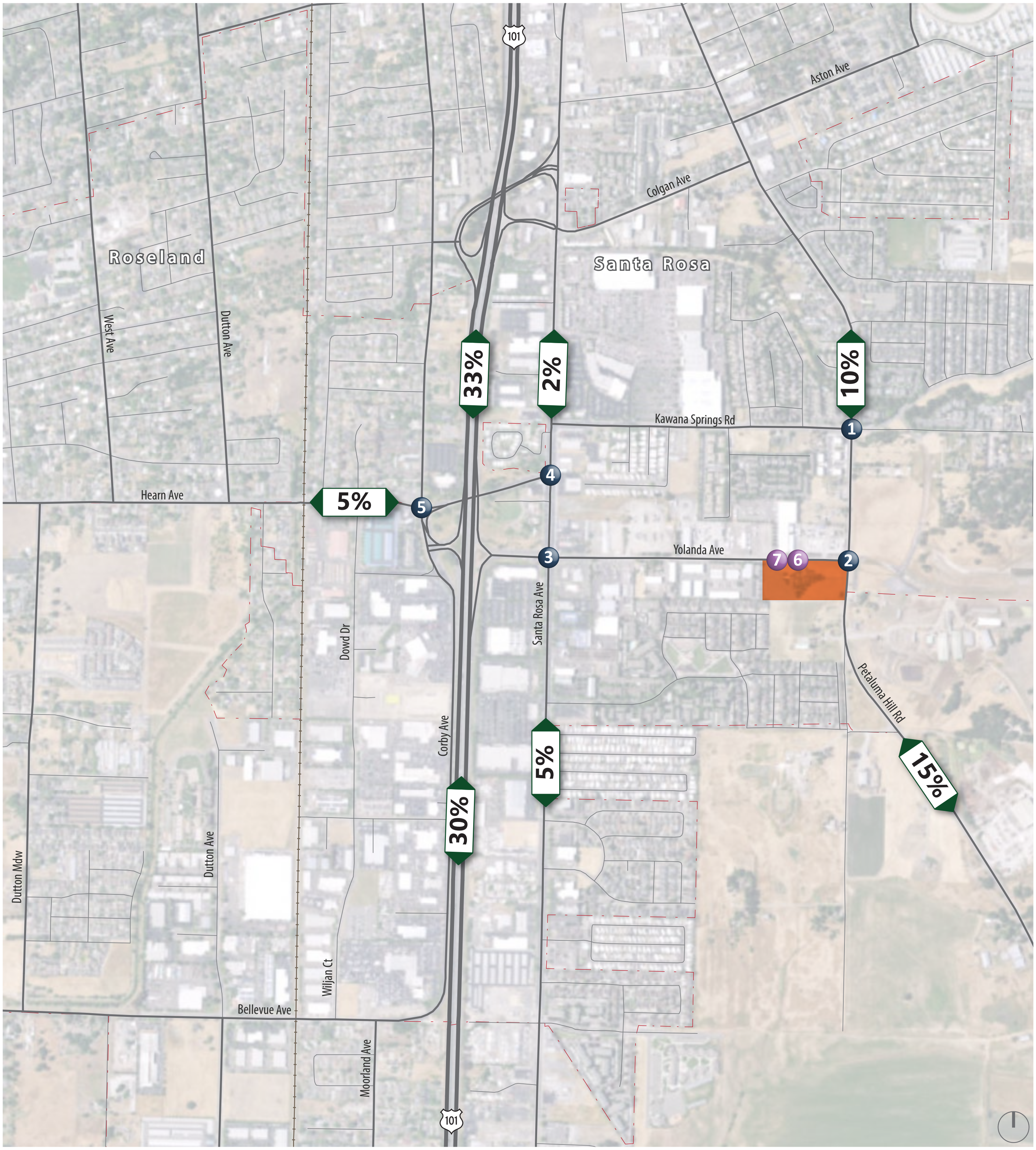
Source: Fehr & Peers, August 2017.

As summarized in **Table 8**, the proposed development would generate 285 daily, 63 AM peak hour, and 78 PM peak hour trips.

4.2 PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

The trip distribution and assignment process is used to estimate how the trips generated by a project would be distributed across the roadway network. The geographical distribution of trips generated by the project is based on the locations of complementary land uses, the street system serving the project, and existing travel patterns in the area. **Figure 7** presents the resulting trip distribution. Based on the configuration of the roadway network, the project trips were assigned (at a link-level) to the roadway system, which is presented on **Figure 8**.

The trip distribution and assignment analysis suggests that most trips would use Yolanda Avenue, the US 101 freeway, and Petaluma Hill Road to reach destinations in Santa Rosa and other communities in Sonoma County.



Project Site
Study Intersection
Project Scenario Only Intersection

XX% Project Trip Distribution

Figure 7

Project Trip Distribution

WC18-3529_7_TripDistro

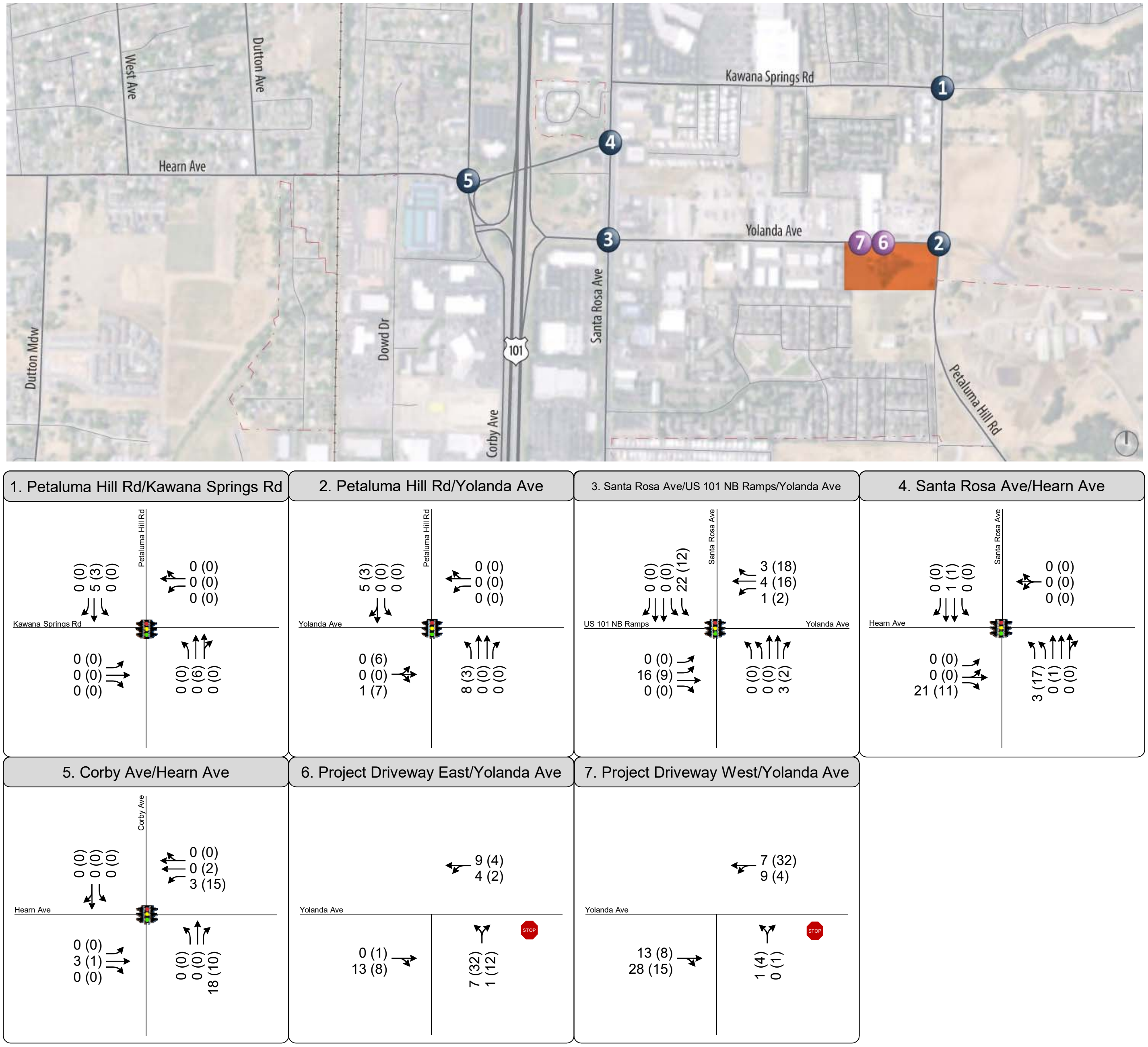


Figure 8

Project Trip Assignment

5.0 EXISTING PLUS APPROVED PROJECTS (EPAP) CONDITIONS

This chapter presents the results of the intersection operations impact analysis and multimodal transportation impact analysis under Existing plus Approved Projects (EPAP) conditions and EPAP with Project conditions. EPAP conditions, also sometimes known as "Near Term," "Baseline," or "Background" Conditions, are defined as existing traffic volumes plus traffic generated by projects that are approved but not yet built, and built but not yet occupied. For the analysis of the proposed project, other nearby projects that are in the project development or approvals process have also been considered in this scenario. The EPAP scenario is intended to reflect conditions at the "opening day" of the proposed project. EPAP with Project conditions are defined as EPAP conditions plus traffic generated by the proposed project.

5.1 EPAP CONDITIONS ROADWAY IMPROVEMENTS

As noted in **Section 3.1.1**, several pending local and regional transportation improvements may influence near-term traffic volume patterns along study area roadways. City of Santa Rosa staff confirmed that a portion of the Farmers Lane Extension (the portion nearest Yolanda Avenue) is currently under construction. The following improvements were included in the analysis based on recently competed traffic analyses for nearby projects:

- Changes to Yolanda Avenue/Petaluma Hill Road intersection associated with partial construction of Farmers Lane Extension per Residences at Taylor Mountain and Taylor Mountain Estates project Initial Study/Mitigated Negative Declaration (City of Santa Rosa and M-Group, August 2017):
  - Lane geometries:
    - Southbound approach: 1 left turn lane, 1 through-right turn shared lane
    - Northbound approach: 1 left turn lane, 2 through lanes, 1 right turn lane
    - Eastbound approach: 1 left turn-through-right turn shared lane
    - Westbound approach: 1 left turn lane, 1 through-right turn shared lane
  - Signal control:
    - Northbound/Southbound approaches: protected, leading left turn phases
    - Eastbound/Westbound approaches: split phases
  - Signal timings re-optimized for EPAP Conditions at Petaluma Hill Road/Yolanda Avenue

Intersection geometries and signal timings at all other study intersections were held at Existing Conditions values.

5.2 EPAP CONDITIONS TRAFFIC VOLUME ESTIMATES

This section outlines the EPAP Conditions volume development process. Included in this section is a list of specific projects considered in the analysis, as well as other assumptions used in the development of EPAP conditions volumes.

5.2.1 PROJECTS CONSIDERED UNDER EPAP CONDITIONS

City of Santa Rosa staff and Fehr & Peers coordinated to develop a list of projects to include in the EPAP scenario. The project list was based on the November 2018 City of Santa Rosa Pending Development Report. Based on this coordination, a total of nine projects were included in the analysis, as presented in **Table 9**.

TABLE 9: EPAP CONDITIONS PROJECT LIST

Project	Project Size[1]	Project Type
Kawana Springs Apartments	120 dwelling units	Multifamily housing
Modified Kawana Meadows Project	62 dwelling units	Single-family housing
Residences at Taylor Mountain	93 dwelling units	Multifamily housing
Taylor Mountain Estate	7 dwelling units	Single-family housing
Holly Hock Subdivision Plan 2	16 dwelling units	Single-family housing
The Vistas at Kawana Springs	101 dwelling units	Single-family housing
Penstemon Place	59 dwelling units	Single-family housing
The Farmstead	20 dwelling units	Multifamily housing
Green Trove Wellness	24,000 square feet	Light Manufacturing

Notes:
1. Estimated number of units or square feet of development proposed, approved, under construction, or not yet occupied at time of traffic counts.
Source: Fehr & Peers, February 2019.

To apportion trips generated by the projects in **Table 9** to the study network, two data sources were considered. Where available, data from the approved TIA for a given project was used to assign trips through the study area. In cases where the study area for a given project and the study area for this project do not overlap, a manual assignment of the project trips through the study intersections was performed, taking special care to consider the locations of compatible land uses (for example, the locations of schools for residential trips). Where an approved TIA for a project was not available, trip generation for the project was estimated using data from the ITE *Trip Generation Manual, 10th Edition*. Trips were distributed and assigned to the study area based on the locations of complementary land uses and published TIA trip distribution and assignment data for similar nearby projects. **Appendix C** summarizes the trip generation assumptions for each of the projects included EPAP analysis.

5.2.2 OTHER EPAP CONDITIONS TRAFFIC VOLUME ASSUMPTIONS

As the economy in Sonoma County and the rest of the San Francisco Bay Area continues to expand, it is likely that regional traffic volumes will continue to increase over time. Therefore, to account for near-term regional growth in traffic volumes, as well as to account for traffic generated by other approved, pending or built but not yet occupied projects in the City of Santa Rosa and the surrounding region, the baseline Existing Conditions traffic volumes were increased by 5.0 percent.

5.2.3 EPAP CONDITIONS TRAFFIC VOLUMES

EPAP conditions traffic volumes were calculated by adding the growth in traffic volumes resulting from the projects in **Table 9** to the factored Existing Conditions traffic volumes (described in **Section 5.2.2**). The EPAP Conditions traffic volume forecasts are presented on **Figure 9**.

5.3 EPAP WITH PROJECT CONDITIONS TRAFFIC VOLUMES

Net new trips from the proposed project were added to the EPAP Conditions traffic projections to develop traffic volumes for EPAP with Project Conditions. The resulting volumes are shown on **Figure 10**.

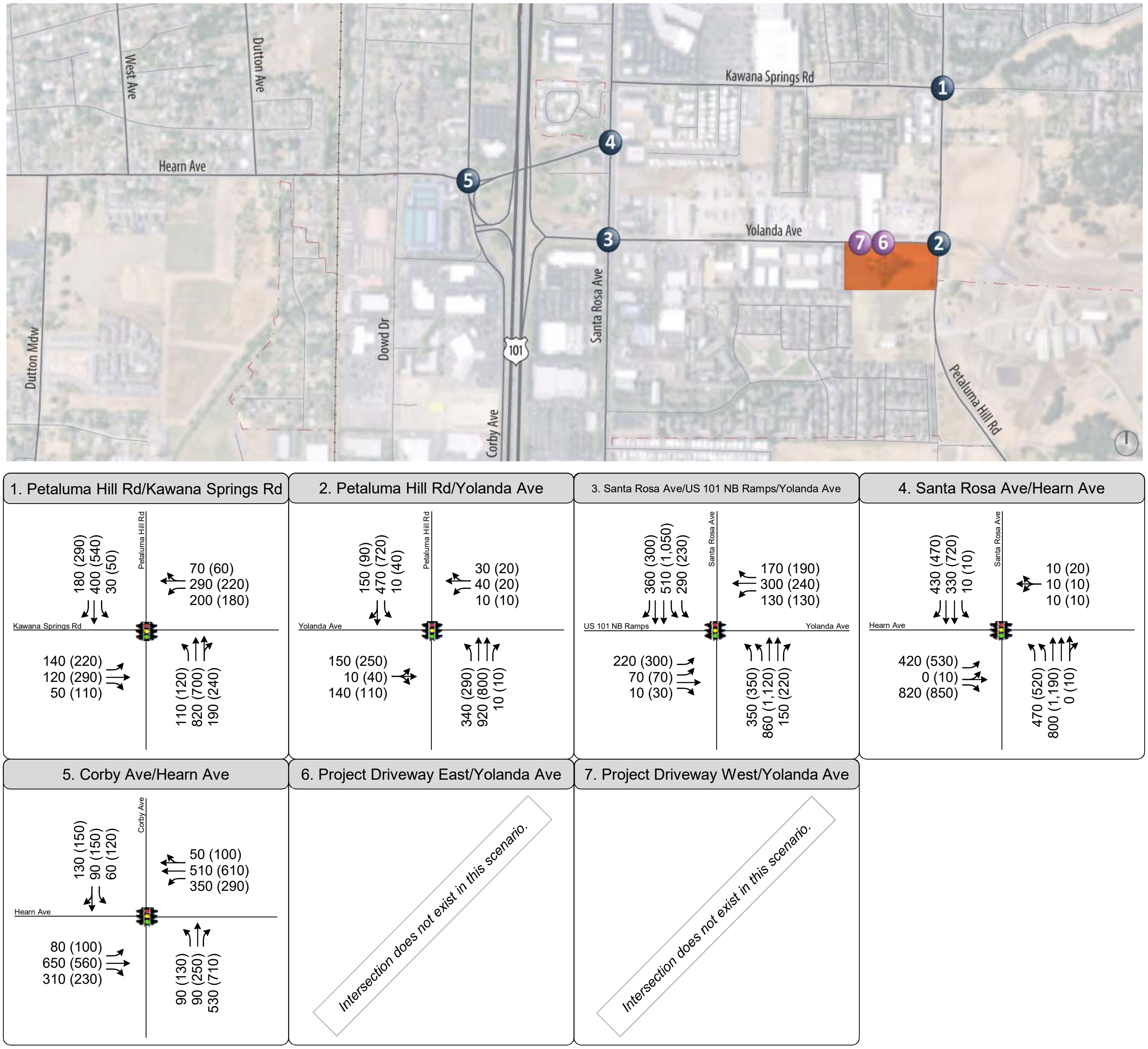


Figure 9

EPAP (without Project) Conditions
Peak Hour Traffic Volumes, Lane Configurations
and Intersection Control

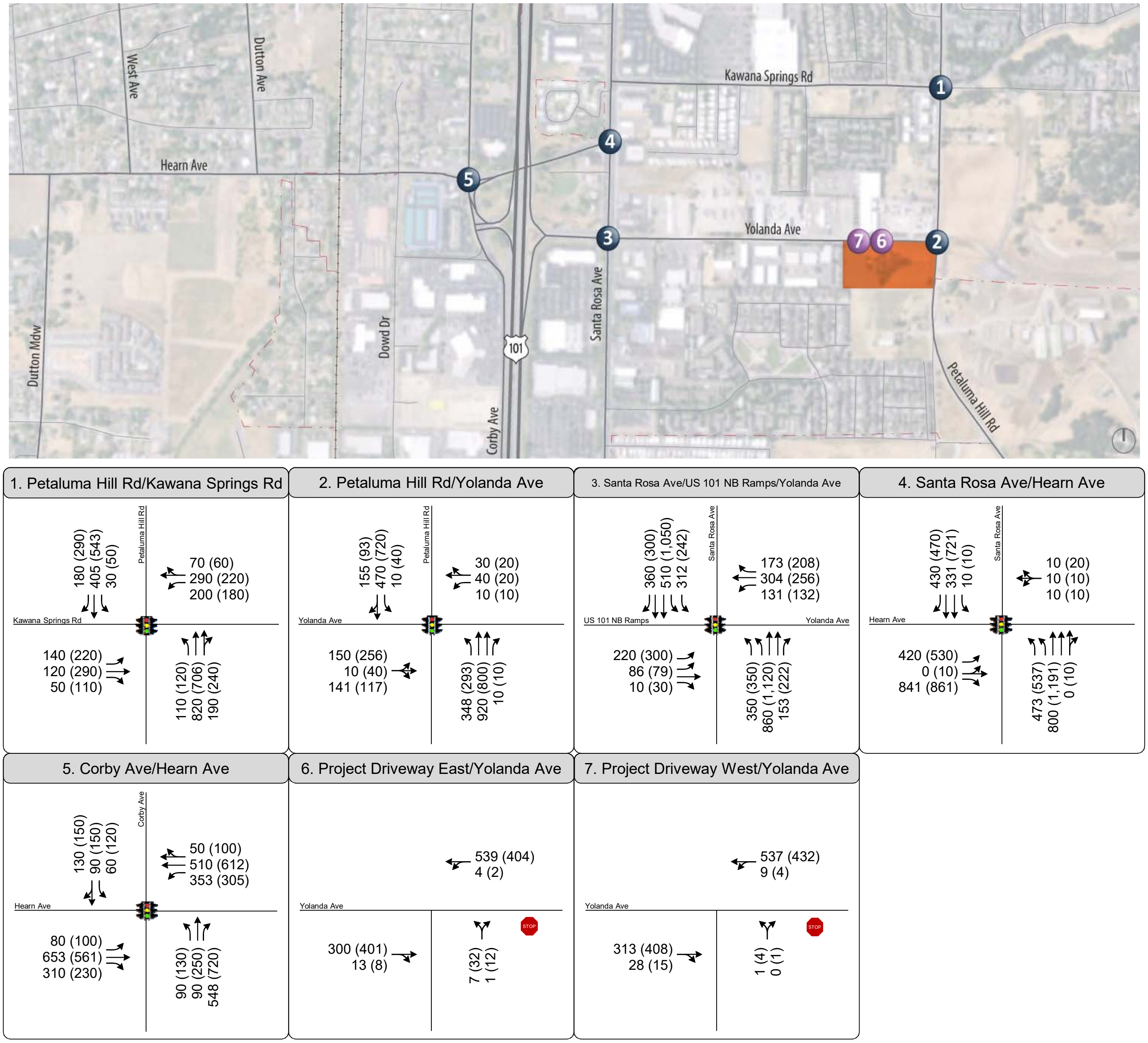


Figure 10

EPAP with Project Conditions
Peak Hour Traffic Volumes, Lane Configurations
and Intersection Control

5.4 EPAP CONDITIONS INTERSECTION LEVELS OF SERVICE

Intersection LOS was calculated for EPAP Conditions and EPAP with Project Conditions to identify potential project impacts to the roadway system.

Table 10 provides the results of the intersection LOS calculations for EPAP Conditions and EPAP with Project Conditions, while **Appendix B** contains the corresponding calculation sheets. The changes in delay and LOS between EPAP without Project and EPAP with Project Conditions are used to identify significant impacts. Impact significance is discussed in **Section 5.5**.

The results of the LOS calculations indicate that the majority of the study intersections are projected to continue operating acceptably with respect to their LOS standard, with one additional intersection degrading (between Existing Conditions and EPAP Conditions) to unacceptable operations during at least one peak hour. The following intersections are projected to not meet their respective LOS standards under EPAP (without Project) Conditions:

- Intersection 2: Yolanda Avenue-Farmers Lane Extension/Petaluma Hill Road (LOS E in the PM peak hour)
- Intersection 5: Hearn Avenue/Corby Avenue (LOS E in the AM peak hour and PM peak hour)

TABLE 10: EPAP CONDITIONS INTERSECTION LEVELS OF SERVICE

Intersection		Control Type[1]	Peak Hour[2]	EPAP Conditions		EPAP with Project Conditions	
				Delay[3]	LOS[4]	Delay[3]	LOS[4]
1	Kawana Springs Road/ Petaluma Hill Road	Signalized	AM PM	31.9 28.7	C C	31.9 28.8	C C
2	Yolanda Avenue-Farmers Lane Extension/Petaluma Hill Road	Signalized	AM PM	40.7 **63.7**	D **E**	42.4 **67.0**	D **E**
3	Yolanda Avenue-US 101 Northbound Ramps/ Santa Rosa Avenue	Signalized	AM PM	41.6 40.4	D D	42.3 41.0	D D
4	Hearn Avenue/ Santa Rosa Avenue	Signalized	AM PM	18.6 25.3	B C	19.0 25.8	B C
5	Hearn Avenue/ Corby Avenue	Signalized	AM PM	**77.9** **72.6**	**E** **E**	**79.2** **75.4**	**E** **E**
6	Project Driveway East/ Yolanda Avenue	SSSC	AM PM	*Intersection does not existing in this scenario.*		0.2 (16.6) 0.8 (16.4)	A (C) A (C)
7	Project Driveway West/ Yolanda Avenue	SSSC	AM PM	*Intersection does not existing in this scenario.*		0.1 (17.8) 0.1 (16.1)	A (C) A (C)

Notes:
1. Signalized = Traffic Signal Control, SSSC = Side-Street Stop-Controlled
2. AM = Weekday morning peak hour, PM = Weekday evening peak hour
3. Whole intersection average delay reported for signalized intersections and all-way stop-controlled intersections. Side-street stop-controlled delay presented as Whole Intersection Average Delay (Worst Movement Delay). Delay calculated per *HCM 2010* methodologies.
4. LOS designation per *HCM 2010*.
Bold indicates unacceptable operations.
Source: Fehr & Peers, February 2019.
.

5.5 EPAP WITH PROJECT INTERSECTION IMPACTS

This section of the report evaluates the EPAP with Project Conditions intersection LOS results presented in **Table 10** against the City of Santa Rosa criteria for significant intersection impacts. The proposed project could result in a significant impact to intersection operations at the following intersections:

- Intersection 2: Yolanda Avenue-Farmers Lane Extension/Petaluma Hill Road (PM peak hour)
- Intersection 5: Hearn Avenue/Corby Avenue (AM and PM peak hours)

Intersection 2: Yolanda Avenue-Farmers Lane Extension/Petaluma Hill Road – This intersection is projected to operate at a deficient LOS E during the PM peak hour under EPAP (without Project) Conditions. The addition of project traffic would increase average peak hour delay, but by less than the 5.0 seconds required to result in a significant impact. Therefore, based on the significance criteria in **Section 2.6.1.1**, this impact is considered ***less-than-significant*** and no mitigation is required.

Intersection 5: Hearn Avenue/Corby Avenue – This intersection is projected to operate at a deficient LOS E during both the AM and PM peak hours under EPAP (without Project) Conditions. The addition of project traffic would increase average peak hour delay, but by less than the 5.0 seconds required to result in a significant impact. Therefore, based on the significance criteria in **Section 2.6.1.1**, this impact is considered ***less-than-significant*** and no mitigation is required.

The results of the intersection operations analysis indicate that other study intersections would continue to operate at LOS D or better after the addition of project trips. Based on the impact criteria presented in **Section 2.6.1**, the project's impacts to these other study intersections under EPAP with Project Conditions are ***less-than-significant*** and no mitigation is required.

5.6 MULTIMODAL TRANSPORTATION IMPACTS

This section of the report details the project's impacts to the multimodal transportation system, including impacts to pedestrians, bicyclists and the public transit system. The level of impact is similar between project alternatives, and thus the impacts and findings have been presented in a combined format.

5.6.1 PEDESTRIAN AND BICYCLE IMPACTS

The project site plans (presented earlier as **Figure 1** in **Section 2.1**) notes that the project proposes to construct a sidewalk along the Yolanda Avenue frontage of the site. The proposed sidewalk would not connect to the existing sidewalk along Yolanda Avenue (which terminates about 1,500 feet to the west of the project site), but would ensure that a continuous pedestrian facility could be built in the Yolanda Avenue corridor as part of the proposed widening of the corridor (as envisioned in the General Plan). The proposed project would not disrupt existing pedestrian or bicycle facilities, nor would it preclude the construction of proposed or planned bicycle facilities. Also, the proposed project is not anticipated to generate more than 20 pedestrian trips per hour. Therefore, the project's impacts to pedestrians and bicyclists are ***less-than-significant***.

5.6.2 PUBLIC TRANSIT IMPACTS

The project site is directly served by one CityBus route (as described in **Section 3.1.2**), and the nearest transit stop is located directly across Yolanda Avenue from the project site. The stop includes amenities such as a bus stop shelter, bench and public trash can. While the project may result in an increase in public transit demand, the increase in public transit demand is not expected to result in over-capacity conditions on transit. The proposed project would not disrupt existing public transit services or preclude planned public transit facilities or services. The proposed sidewalk on the Yolanda Avenue project frontage may be beneficial for transit riders that would need to cross the street to access the transit stop. Therefore, the project's impacts to the public transit system are ***less-than-significant***.

The City of Santa Rosa may, as part of the project entitlement process (outside of CEQA mitigation measures) require that the project fund transit improvements. As further discussed in **Chapter 7**, providing signage and/or striping to better connect the project site (and proposed sidewalk) to the existing transit stop may be beneficial if further engineering study shows that the connection can be safely made.

5.6.3 EMERGENCY ACCESS IMPACTS

The proposed project includes two access points along Yolanda Avenue and the site plan notes a fire tender access area. A circulator roadway rings the main cannabis facility building. The proposed project is not anticipated to degrade roadway operations to the point where emergency vehicles are impacted. Therefore, the project does not conflict with existing or planned emergency response routes, nor does it provide inadequate access to accommodate emergency vehicles. Accordingly, the project's impacts to external and internal emergency access are ***less-than-significant***.

5.6.4 COMMUNITY CHARACTER (CUT-THROUGH TRAFFIC) IMPACTS

The proposed project is anticipated to add trips to the arterial roadway system as part of normal operations. The majority of these trips are destined to other areas in Santa Rosa and Sonoma County. Based on the trip distribution in **Figure 7**, these trips would remain on the arterial roadways in the area surrounding the project site. Cut through routes such as those using Burt Street or Winterhaven Avenue have low speed limits, are longer in length, and include traffic calming features, making these routes unattractive for potential cut-through trips. Therefore, the project's Community Character impacts are ***less-than-significant***.

6.0 CUMULATIVE (YEAR 2040) CONDITIONS

The Cumulative condition represents conditions at the buildout of the City's General Plan and other regional planning documents such as Plan Bay Area. Based on a review of previously-completed transportation analyses for projects in the City of Santa Rosa, City staff indicated that 2040 is the Cumulative horizon year, which would incorporate the City's 2035 General Plan and Plan Bay Area 2040. The 2040 horizon year is also consistent with the horizon year for the Sonoma County Transportation Authority (SCTA) countywide travel demand model.

To evaluate the potential impact of traffic generated by the proposed project on the surrounding street system, volume estimates representing Cumulative without Project Conditions were prepared. Traffic conditions without the project under this future scenario reflect traffic increases due to nearby and regional development along with background roadway network changes and street improvements. The forecasted Cumulative without Project Conditions traffic volumes were then used as the baseline to identify impacts on the roadway system. This chapter presents the results of the level of service calculations under Cumulative Conditions with and without the Project.

6.1 CUMULATIVE BASELINE ROADWAY IMPROVEMENTS

This section outlines the changes to the study area roadway system proposed as part of the Farmers Lane Extension project and US 101/Hearn Avenue interchange project. These projects were confirmed by City staff to be reasonably foreseeable for the Cumulative Conditions horizon year of 2040. The following baseline roadway improvements were assumed in the Cumulative (Year 2040) Conditions analysis:

- Full buildout of Farmers Lane Extension, including modification of Petaluma Hill Road/Yolanda Avenue to:
  - Southbound approach: 1 left turn lane, 2 through lanes, 1 right turn lane
  - Northbound approach: 1 left turn lane, 2 through lanes, 1 right turn lane
  - Eastbound approach: 1 left turn lane, 1 through lane, 1 through-right turn shared lane
  - Westbound approach: 1 left turn lane, 1 through lane, 1 through-right turn shared lane
  - Protected, leading left turn phases on all approaches
- Yolanda Avenue widened to four lanes between Santa Rosa Avenue and Petaluma Hill Road (associated with Farmers Lane Extension)
- Buildout of US 101/Hearn Avenue interchange project, including:
  - Four-lane Hearn Avenue overcrossing
  - Modifications to Hearn Avenue/Corby Avenue intersection:

- o Southbound approach: 1 left turn lane, 1 through-right turn shared lane (no change versus Existing Conditions)
- o Northbound approach: 1 left turn lane, 1 through lanes, 2 right turn lanes
- o Eastbound approach: 1 left turn lane, 1 through lane, 1 through-right turn shared lane
- o Westbound approach: 1 left turn lane, 1 through lane, 1 through-right turn shared lane (includes substantial increase in left turn lane storage distance)

All other intersection geometric configurations were held constant to the assumptions under EPAP Conditions. Signal timings at all signalized study intersections were optimized under Cumulative without Project Conditions to reflect periodic signal timing adjustments that the City of Santa Road performs as part of their routine traffic signal update program. Signal timings for the Cumulative with Project Conditions analysis were held constant at Cumulative without Project Conditions values to be conservative.

6.2 CUMULATIVE CONDITIONS TRAFFIC VOLUMES

Traffic volumes for Cumulative Conditions are comprised of Existing Conditions volumes plus traffic generated by anticipated local and regional land use growth. The SCTA travel demand model incorporates most arterial and collector roadways throughout the City of Santa Rosa and is generally a reasonable tool for use in the analysis of City arterials (such as Yolanda Avenue, Petaluma Hill Road, Santa Rosa Avenue, Hearn Avenue, etc.) and other major collector roadways.

After reviewing the structure of the model traffic analysis zone (TAZ) system and roadway network detail in and around the project site and study intersections, it was determined that the SCTA travel demand model would be a suitable tool for the estimation of future year demand volumes. The Year 2040 model used in the development of the traffic volume forecasts presented in this chapter incorporated the Farmers Lane Extension project and the US 101/Hearn Avenue interchange project. These projects may result in substantial traffic volume redistribution effects in the study area. Therefore, the SCTA model should be used in lieu of other forecasting methods that do not reflect potential changes in traffic assignment (i.e. a volume forecast factor method, etc.).

The following presents the specific steps used to develop Year 2040 forecasts from the model:

- **Step 1** – Run the validated base year (2010) model to estimate AM and PM peak hour traffic volumes.
- **Step 2** – Run the Year 2040 model to estimate AM and PM peak hour traffic volumes.
- **Step 3** – Develop Year 2040 No Project (Cumulative) forecasts using the following formula:

Cumulative Forecasts = Existing Peak Hour Volume + (Year 2040 Model Peak Hour Volume – Base Year Model Peak Hour Volume)

- **Step 4** – Check for reasonableness (e.g., ensure that volumes do not drop below Existing or EPAP levels, or grow exponentially unless there is a specific reason).

The above process relies on the Base Year 2010 model for the estimation of traffic volume growth. It was reasoned that the Base Year 2010 model would be suitable for forecasting as the extra eight years of traffic volume growth assumed in the forecasts (i.e. Base Year 2010 versus counts performed in 2018) would yield forecasts that are conservatively high for the purposes of evaluating and disclosing CEQA impacts.

The Cumulative Conditions intersection turning movement forecasts are presented in **Figure 11**. A large growth in vehicles in the area is expected as the area surrounding the project site is built out with residential and commercial/industrial uses, combined with additional travel demand passing through the study area associated with the Farmers Lane Extension.

6.3 CUMULATIVE WITH PROJECT TRAFFIC VOLUMES

Net new trips from the proposed project were added to the Cumulative without Project Conditions traffic projections to develop traffic volumes for Cumulative with Project Conditions. The resulting volumes are shown on **Figure 12**.

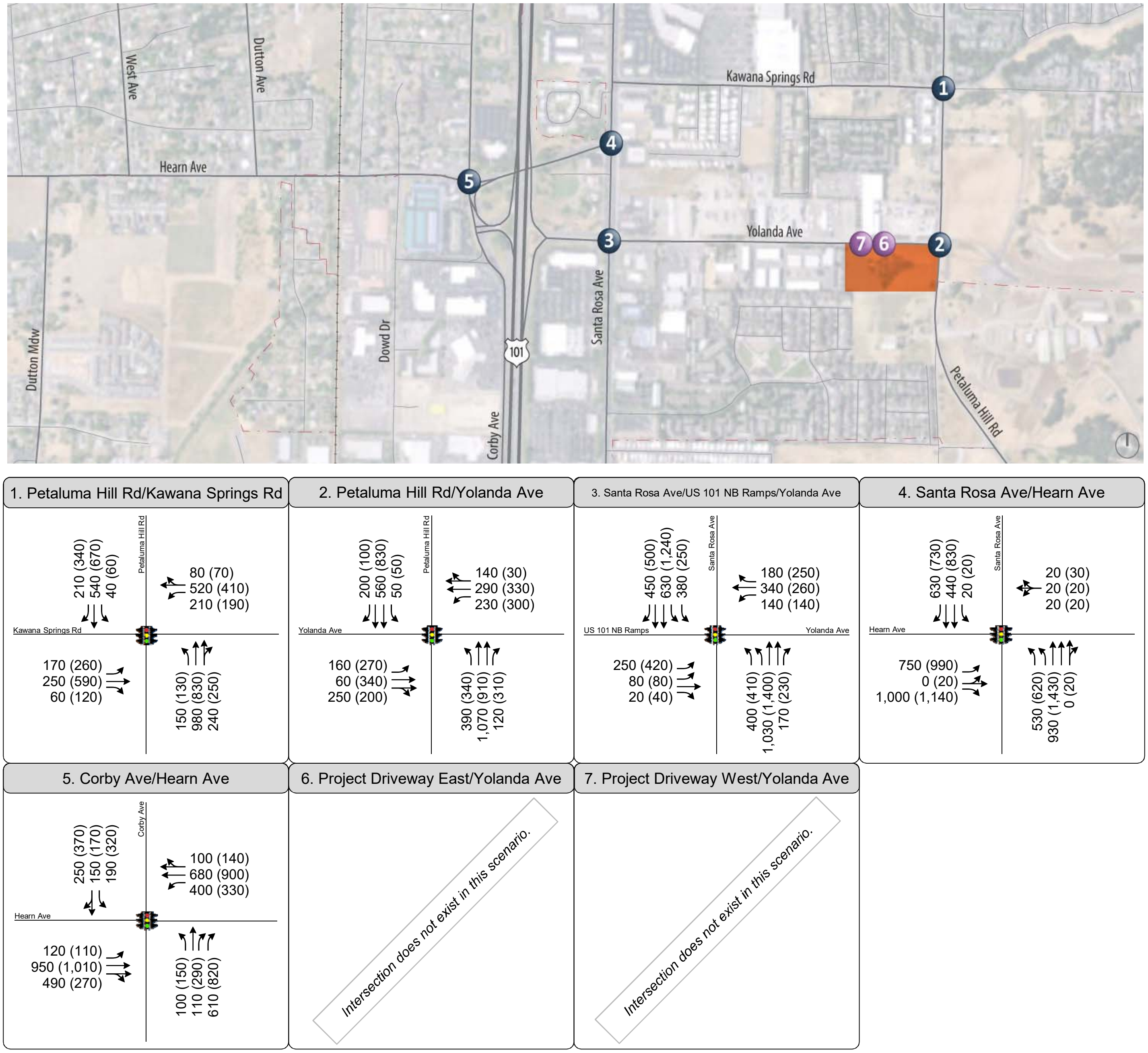


Figure 11

Cumulative without Project Conditions
Peak Hour Traffic Volumes, Lane Configurations and Intersection Control

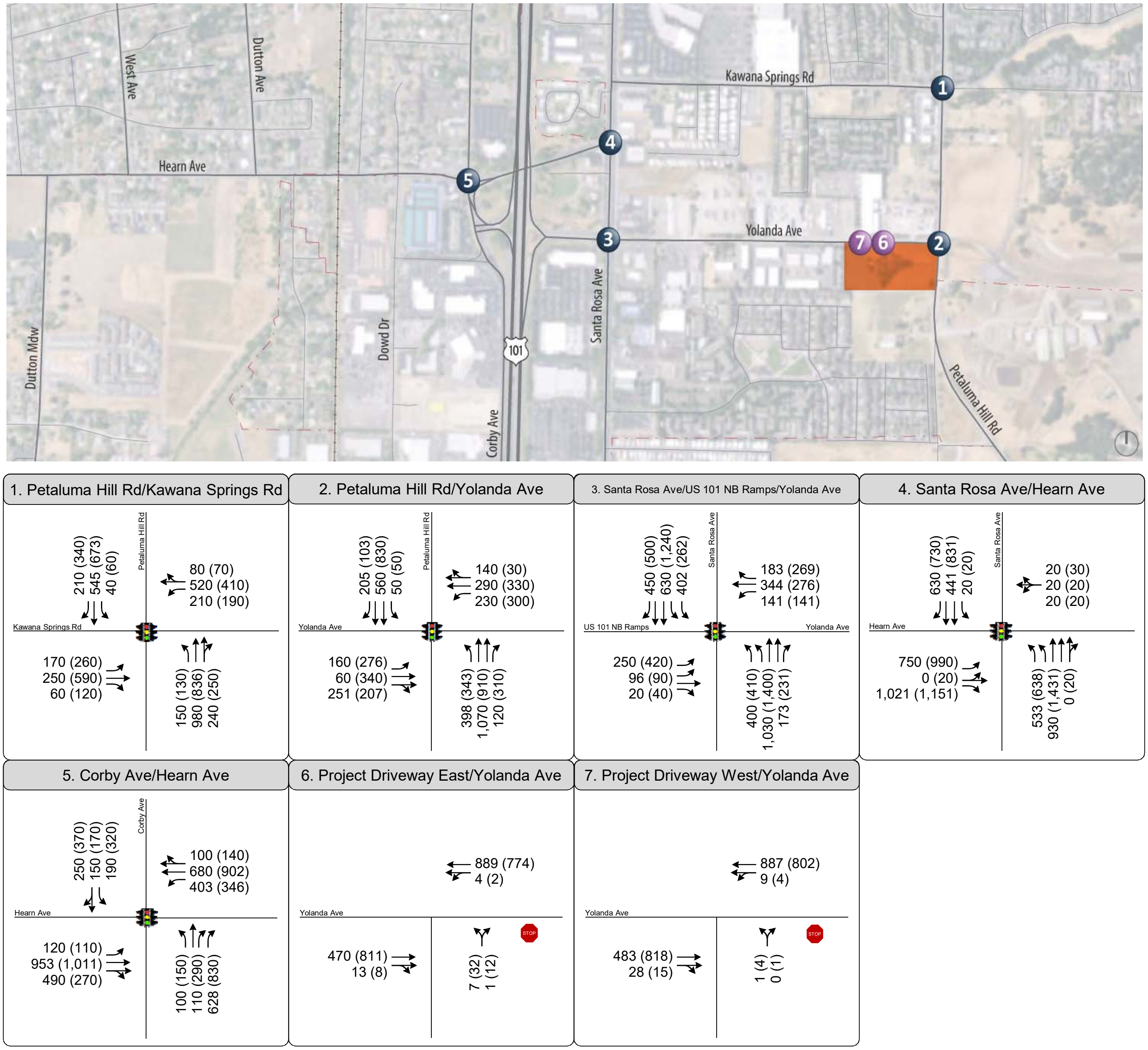


Figure 12

Cumulative (Year 2040) with Project Conditions
Peak Hour Traffic Volumes, Lane Configurations
and Intersection Control

6.4 CUMULATIVE WITH PROJECT INTERSECTION LEVELS OF SERVICE

Intersection LOS was calculated for Cumulative without Project Conditions and Cumulative with Project Conditions. The results of the analyses are used to identify potential project impacts to the roadway system.

Table 11 provides the results of the intersection LOS calculations, while **Appendix B** contains the corresponding calculation sheets. The changes in delay and LOS between Cumulative and Cumulative with Project conditions are used to identify significant impacts. Impact significance is discussed in **Section 6.5**.

The following intersections are projected to not meet their respective LOS standards under Cumulative without Project Conditions:

- Intersection 1: Kawana Springs Road/Petaluma Hill Road (LOS E in the AM peak hour and PM peak hour)
- Intersection 5: Hearn Avenue/Corby Avenue (LOS F in the AM peak hour and PM peak hour)

TABLE 11: CUMUALTIVE CONDITIONS INTERSECTION LEVELS OF SERVICE

Intersection		Control Type[1]	Peak Hour[2]	Cumulative without Project Conditions		Cumulative with Project Conditions	
				Delay[3]	LOS[4]	Delay[3]	LOS[4]
1	Kawana Springs Road/ Petaluma Hill Road	Signalized	AM PM	**66.1** **62.2**	**E** **E**	**66.1** **62.2**	**E** **E**
2	Yolanda Avenue-Farmers Lane Extension/Petaluma Hill Road	Signalized	AM PM	28.6 50.1	C D	28.9 50.7	C D
3	Yolanda Avenue-US 101 Northbound Ramps/ Santa Rosa Avenue	Signalized	AM PM	52.9 41.6	D D	53.2 42.0	D D
4	Hearn Avenue/ Santa Rosa Avenue	Signalized	AM PM	42.4 47.9	D D	44.8 49.1	D D
5	Hearn Avenue/ Corby Avenue	Signalized	AM PM	**95.1** **135.9**	**F** **F**	**95.7** **139.9**	**F** **F**
6	Project Driveway East/ Yolanda Avenue	SSSC	AM PM	*Intersection does not existing in this scenario.*		0.1 (19.5) 0.8 (30.9)	A (C) A (D)
7	Project Driveway West/ Yolanda Avenue	SSSC	AM PM	*Intersection does not existing in this scenario.*		0.1 (21.4) 0.1 (27.1)	A (C) A (D)

Notes:
1. Signalized = Traffic Signal Control, SSSC = Side-Street Stop-Controlled
2. AM = Weekday morning peak hour, PM = Weekday evening peak hour
3. Whole intersection average delay reported for signalized intersections and all-way stop-controlled intersections. Side-street stop-controlled delay presented as Whole Intersection Average Delay (Worst Movement Delay). Delay calculated per *HCM 2010* methodologies.
4. LOS designation per *HCM 2010*.
Bold indicates unacceptable operations.
Source: Fehr & Peers, February 2019.

6.5 CUMULATIVE WITH PROJECT INTERSECTION IMPACTS

This section of the report evaluates the EPAP with Project Conditions intersection LOS results presented in **Table 11** against the City of Santa Rosa criteria for significant intersection impacts. The proposed project could result in a significant impact to intersection operations at the following intersections:

- Intersection 1: Kawana Springs Road/Petaluma Hill Road (AM and PM peak hours)
- Intersection 5: Hearn Avenue/Corby Avenue (AM and PM peak hours)

Intersection 1: Kawana Springs Road/Petaluma Hill Road – This intersection is projected to operate at a deficient LOS E during both the AM and PM peak hours under Cumulative without Project Conditions. The addition of project traffic would increase average peak hour delay, but by less than the 5.0 seconds required to result in a significant impact. Therefore, based on the significance criteria in **Section 2.6.1.1**, this impact is considered ***less-than-significant*** and no mitigation is required.

Intersection 5: Hearn Avenue/Corby Avenue – This intersection is projected to operate at a deficient LOS F during both the AM and PM peak hours under Cumulative without Project Conditions. The addition of project traffic would increase average peak hour delay, but by less than the 5.0 seconds required to result in a significant impact. Therefore, based on the significance criteria in **Section 2.6.1.1**, this impact is considered ***less-than-significant*** and no mitigation is required.

The results of the intersection operations analysis indicate that other study intersections would continue to operate at LOS D or better after the addition of project trips. Based on the impact criteria presented in **Section 2.6.1**, the project's impacts to these other study intersections under Cumulative with Project Conditions are ***less-than-significant*** and no mitigation is required.

6.6 MULTIMODAL TRANSPORTATION IMPACTS

Cumulative without Project and Cumulative with Project conditions for pedestrian facilities, bicycle facilities, public transit facilities, emergency vehicle access, and community character would generally be equivalent to EPAP Conditions and EPAP with Project conditions. Discussion regarding project impacts to these modes of transportation under Existing with Project Conditions is provided in **Chapter 5**. Similar to EPAP with Project conditions, the impacts to pedestrians, bicyclists, public transit, emergency vehicle access, and community character are expected to be ***less-than-significant***.

7.0 SITE PLAN EVALUATION AND RECOMMENDATIONS

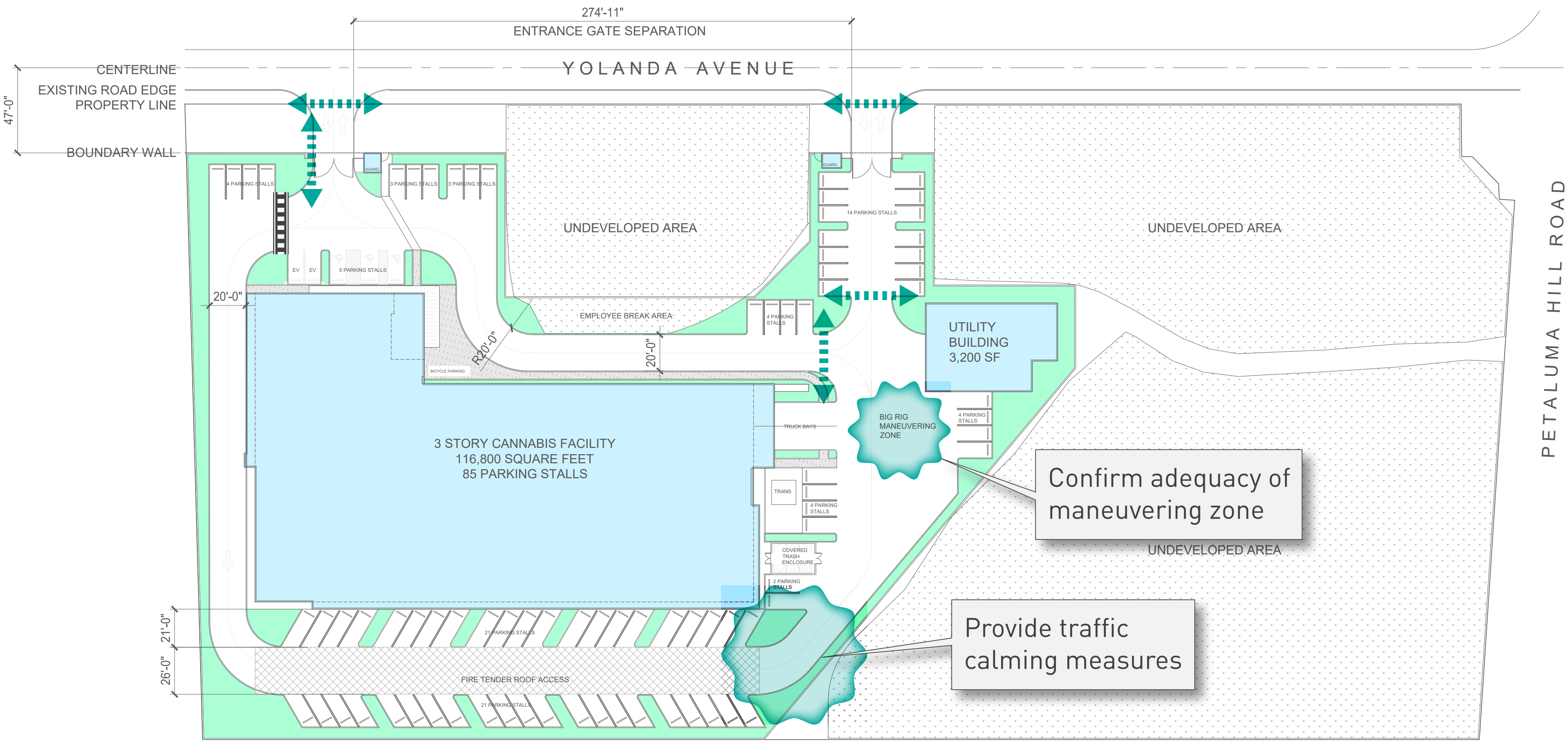
This chapter analyzes site access and internal circulation for vehicles, pedestrians, bicycles, and transit vehicles. Recommendations are provided to address on-site vehicle circulation issues to improve wayfinding and reduce driver confusion. Active and transit mode recommendations include the provision of pedestrian and bicycle facilities and direct connections, and efficient linkages with existing transit stops external to the site. When available, the final site improvement plans should also be reviewed by City staff to identify and address any transportation issues that cannot be identified based on a review of the conceptual site plan, before the project is built. The recommendations provided in this chapter are summarized on **Figure 13**.

7.1.1 MOTOR VEHICLE SITE ACCESS AND CIRCULATION

The project, as currently proposed, provides access to the public circulation system through the use of two driveways along Yolanda Avenue. The West Driveway is anticipated to be the primary employee entry point as it directly serves the entrance to the one-way circulator roadway that provides access to most of the parking stalls proposed on-site. The East Driveway is anticipated to be the primary employee exit point as the one-way circulator roadway directly feeds the driveway. The two driveway intersections are anticipated to be side-street stop-controlled; therefore, sight distance along Yolanda Avenue is critical for vehicles exiting the project site.

The posted speed limit along Yolanda Avenue is 35 miles per hour. According to Table 201.1 of the Caltrans Highway Design Manual, the stopping sight distance at 35 miles per hour is 250 feet. The observed sight distance along the project frontage appears to be in excess of 250 feet, indicating that the sight distance should be adequate. It is strongly recommended that the final site improvement plan be reviewed for potential sight distance impediments including any new signs, above ground utility boxes, or landscaping proposed in the sight triangle.

The following checks and considerations are recommended for the final site improvement plan review to enhance vehicular access and circulation throughout the project site:



Provide Pedestrian Connection

Stripe Crosswalk

Site Plan Source: SAG Architecture, April 2019

Figure 13

Site Plan Recommendations

- Confirm the adequacy of the large truck maneuvering zone on the east side of the main building though an AutoTurn analysis of the final site plan
- Confirm the adequacy of the circulator roadway system to accommodate emergency vehicles
- Provide traffic calming measures for the circulator roadway at the southeast corner of the main building to slow down vehicles as they enter the downstream conflict area with parking stalls, the trash enclosure and the truck bays.
- Prepare an internal plan to reverse the direction of the one-way circulator roadway in case of emergency situations or a large truck breakdown in the maneuvering zone.

7.1.2 PEDESTRIAN, BICYCLE, AND TRANSIT ACCESS AND CIRCULATION

This section of the report addresses on-site facilities that provide pedestrian and bicycle access and circulation for the project.

7.1.2.1 On-Site Pedestrian and Bicycle Evaluation

Pedestrian and bicycle facilities on-site include a network of pathways and sidewalks around the buildings. The site plan does not readily note how parking stalls around the building connect to the entrance to the main building. Recommendations for improving on-site bicycle and pedestrian access and circulation include:

- Provide a direct connection between the proposed public sidewalk and on-site pedestrian circulation system (connection may pass immediately next to the western guard house)
- Provide pedestrian pathways between parking areas not immediately adjacent to the main building
- Stripe crosswalks along the site circulator roadway at pedestrian crossing/vehicle conflict points
- Ensure adequate sight distance at project driveway interface with Yolanda Avenue to facilitate pedestrian crossings of the driveways
- Update the site plan to show the location and number of short-term and long-term bicycle parking spaces proposed to be provided.

7.1.2.2 Transit Access

The project is located adjacent to existing bus routes and stops operating along Yolanda Avenue. Although the expected increase in passenger demand is not projected to exceed available transit capacity, enhancements to existing service are recommended to encourage transit use. Recommendations for improving transit access include:

- Coordinate with the City to improve the pedestrian connection between the south side of Yolanda Avenue and the transit stop on the north side of Yolanda Avenue
- Coordinate with the City to fund additional enhancements at the existing transit stop in a manner proportional to the project's additional transit passenger demand

Improvements to transit service may be accomplished and funded through a coordinated effort between the project applicant, the City and transit agencies.

APPENDIX A: TRAFFIC COUNT DATA

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 1AM FINAL
Site Code : 00000001
Start Date : 11/15/2018
Page No : 1

Groups Printed- Lights - Buses - Trucks

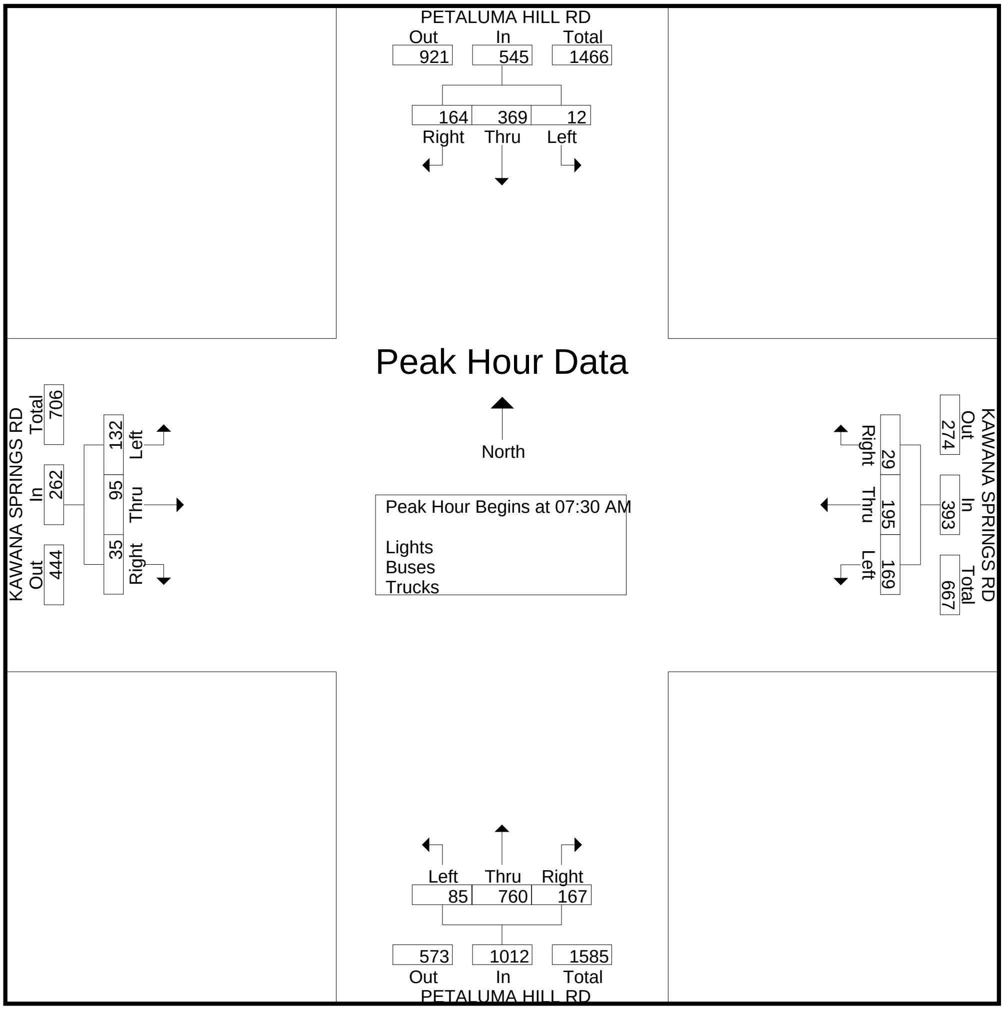
	PETALUMA HILL RD Southbound					KAWANA SPRINGS RD Westbound					PETALUMA HILL RD Northbound					KAWANA SPRINGS RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	14	44	3	2	63	3	17	22	0	42	15	71	9	0	95	2	10	11	0	23	223
07:15 AM	31	68	1	3	103	7	29	35	0	71	22	101	26	0	149	11	13	19	3	46	369
07:30 AM	44	84	3	1	132	5	57	38	0	100	56	165	20	0	241	8	29	34	0	71	544
07:45 AM	47	99	4	1	151	9	68	47	0	124	51	186	24	0	261	10	36	44	1	91	627
Total	136	295	11	7	449	24	171	142	0	337	144	523	79	0	746	31	88	108	4	231	1763
08:00 AM	43	89	3	0	135	11	43	40	0	94	25	200	25	0	250	7	12	23	1	43	522
08:15 AM	30	97	2	2	131	4	27	44	0	75	35	209	16	0	260	10	18	31	1	60	526
08:30 AM	38	105	1	1	145	5	37	20	0	62	29	185	18	0	232	10	16	20	0	46	485
08:45 AM	39	73	3	3	118	4	32	23	0	59	20	136	24	0	180	10	16	21	1	48	405
Total	150	364	9	6	529	24	139	127	0	290	109	730	83	0	922	37	62	95	3	197	1938
Grand Total	286	659	20	13	978	48	310	269	0	627	253	1253	162	0	1668	68	150	203	7	428	3701
Apprch %	29.2	67.4	2	1.3		7.7	49.4	42.9	0		15.2	75.1	9.7	0		15.9	35	47.4	1.6		
Total %	7.7	17.8	0.5	0.4	26.4	1.3	8.4	7.3	0	16.9	6.8	33.9	4.4	0	45.1	1.8	4.1	5.5	0.2	11.6	
Lights	277	640	19	13	949	47	305	268	0	620	246	1225	160	0	1631	64	147	184	7	402	3602
% Lights	96.9	97.1	95	100	97	97.9	98.4	99.6	0	98.9	97.2	97.8	98.8	0	97.8	94.1	98	90.6	100	93.9	97.3
Buses	4	9	1	0	14	1	3	1	0	5	2	8	1	0	11	1	1	13	0	15	45
% Buses	1.4	1.4	5	0	1.4	2.1	1	0.4	0	0.8	0.8	0.6	0.6	0	0.7	1.5	0.7	6.4	0	3.5	1.2
Trucks	5	10	0	0	15	0	2	0	0	2	5	20	1	0	26	3	2	6	0	11	54
% Trucks	1.7	1.5	0	0	1.5	0	0.6	0	0	0.3	2	1.6	0.6	0	1.6	4.4	1.3	3	0	2.6	1.5

	PETALUMA HILL RD Southbound				KAWANA SPRINGS RD Westbound				PETALUMA HILL RD Northbound				KAWANA SPRINGS RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	44	84	3	131	5	57	38	100	**56**	165	20	241	8	29	34	71	543
07:45 AM	**47**	**99**	**4**	**150**	9	**68**	**47**	**124**	51	186	24	**261**	**10**	**36**	**44**	**90**	**625**
08:00 AM	43	89	3	135	**11**	43	40	94	25	200	**25**	250	7	12	23	42	521
08:15 AM	30	97	2	129	4	27	44	75	35	**209**	16	260	10	18	31	59	523
Total Volume	164	369	12	545	29	195	169	393	167	760	85	1012	35	95	132	262	2212
% App. Total	30.1	67.7	2.2		7.4	49.6	43		16.5	75.1	8.4		13.4	36.3	50.4		
PHF	.872	.932	.750	.908	.659	.717	.899	.792	.746	.909	.850	.969	.875	.660	.750	.728	.885

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 1AM FINAL
Site Code : 00000001
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 1AM FINAL
Site Code : 00000001
Start Date : 11/15/2018
Page No : 1

Groups Printed- Bikes

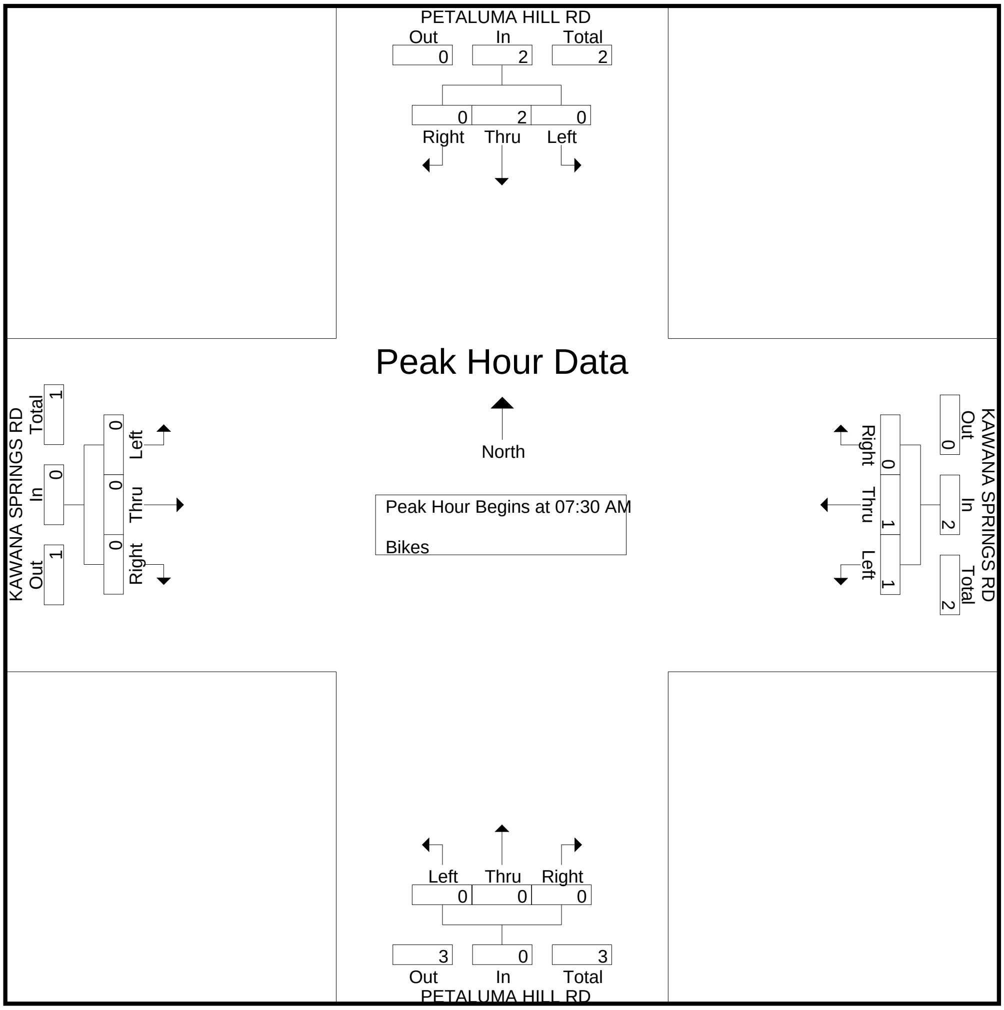
	PETALUMA HILL RD Southbound					KAWANA SPRINGS RD Westbound					PETALUMA HILL RD Northbound					KAWANA SPRINGS RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	3
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
08:30 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	3
Grand Total	0	2	0	0	2	0	3	1	0	4	0	0	0	0	0	0	0	0	0	0	6
Apprch %	0	100	0	0		0	75	25	0		0	0	0	0		0	0	0	0		
Total %	0	33.3	0	0	33.3	0	50	16.7	0	66.7	0	0	0	0	0	0	0	0	0	0	

	PETALUMA HILL RD Southbound				KAWANA SPRINGS RD Westbound				PETALUMA HILL RD Northbound				KAWANA SPRINGS RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	1
07:45 AM	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	1	0	1	0	0	**1**	1	0	0	0	0	0	0	0	0	**2**
Total Volume	0	2	0	2	0	1	1	2	0	0	0	0	0	0	0	0	4
% App. Total	0	100	0		0	50	50		0	0	0		0	0	0		
PHF	.000	.500	.000	.500	.000	.250	.250	.500	.000	.000	.000	.000	.000	.000	.000	.000	.500

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 1AM FINAL
Site Code : 00000001
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA

(408) 622-4787

tdsbay@cs.com

File Name : 1PM FINAL
Site Code : 00000001
Start Date : 11/15/2018
Page No : 1

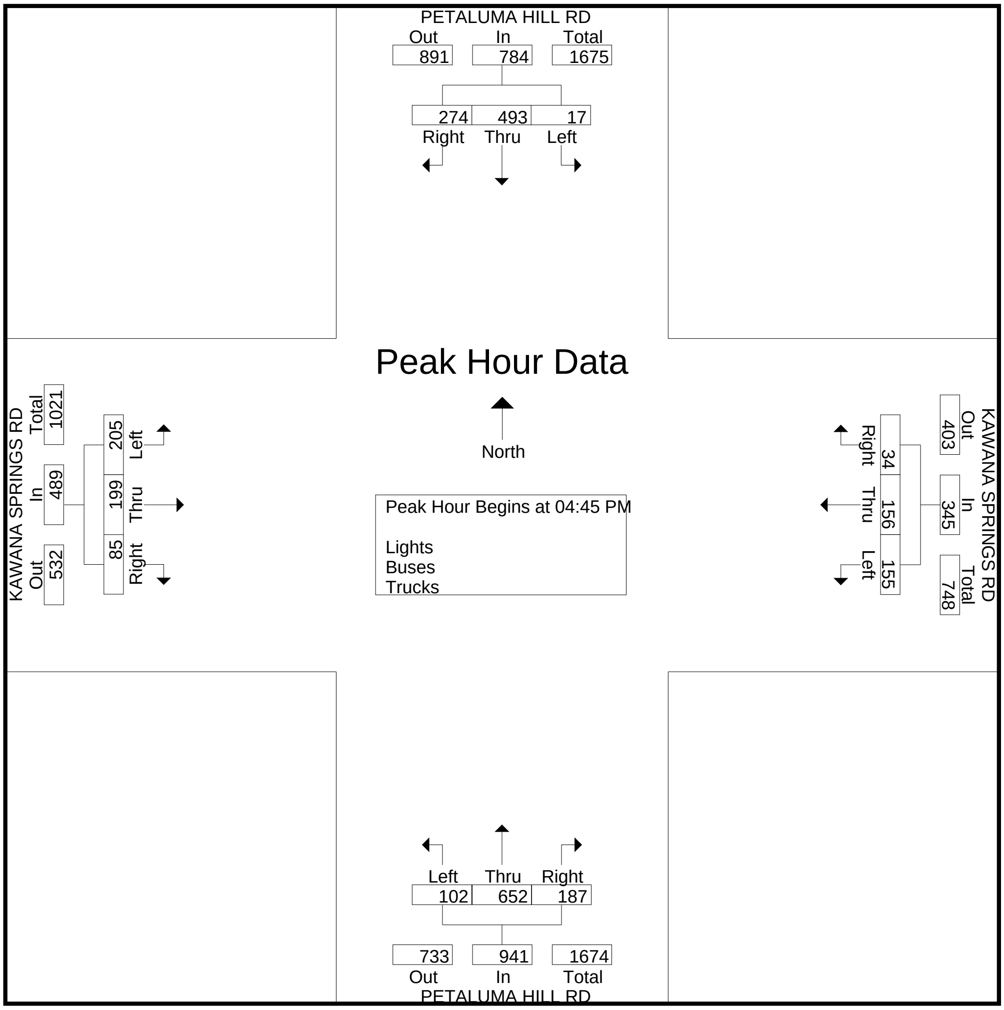
Groups Printed- Lights - Buses - Trucks

	PETALUMA HILL RD Southbound					KAWANA SPRINGS RD Westbound					PETALUMA HILL RD Northbound					KAWANA SPRINGS RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	61	116	3	2	182	4	41	34	0	79	43	142	21	0	206	24	48	45	1	118	585
04:15 PM	52	111	4	1	168	1	37	46	0	84	33	140	19	0	192	31	42	46	0	119	563
04:30 PM	60	125	0	0	185	10	43	40	0	93	43	149	27	0	219	25	34	53	2	114	611
04:45 PM	63	123	3	0	189	8	46	46	0	100	40	151	21	0	212	15	64	34	1	114	615
Total	236	475	10	3	724	23	167	166	0	356	159	582	88	0	829	95	188	178	4	465	2374
05:00 PM	62	139	6	5	212	6	37	31	0	74	44	161	22	0	227	22	50	57	0	129	642
05:15 PM	76	121	3	1	201	4	35	35	0	74	57	183	29	0	269	27	43	53	0	123	667
05:30 PM	73	110	5	7	195	16	38	43	1	98	46	157	30	0	233	21	42	61	2	126	652
05:45 PM	54	91	3	4	152	3	32	34	0	69	47	170	25	0	242	11	46	33	0	90	553
Total	265	461	17	17	760	29	142	143	1	315	194	671	106	0	971	81	181	204	2	468	2514
Grand Total	501	936	27	20	1484	52	309	309	1	671	353	1253	194	0	1800	176	369	382	6	933	4888
Apprch %	33.8	63.1	1.8	1.3		7.7	46.1	46.1	0.1		19.6	69.6	10.8	0		18.9	39.5	40.9	0.6		
Total %	10.2	19.1	0.6	0.4	30.4	1.1	6.3	6.3	0	13.7	7.2	25.6	4	0	36.8	3.6	7.5	7.8	0.1	19.1	
Lights	495	925	27	20	1467	52	306	308	1	667	353	1244	194	0	1791	175	366	375	6	922	4847
% Lights	98.8	98.8	100	100	98.9	100	99	99.7	100	99.4	100	99.3	100	0	99.5	99.4	99.2	98.2	100	98.8	99.2
Buses	1	7	0	0	8	0	2	0	0	2	0	6	0	0	6	0	2	5	0	7	23
% Buses	0.2	0.7	0	0	0.5	0	0.6	0	0	0.3	0	0.5	0	0	0.3	0	0.5	1.3	0	0.8	0.5
Trucks	5	4	0	0	9	0	1	1	0	2	0	3	0	0	3	1	1	2	0	4	18
% Trucks	1	0.4	0	0	0.6	0	0.3	0.3	0	0.3	0	0.2	0	0	0.2	0.6	0.3	0.5	0	0.4	0.4

	PETALUMA HILL RD Southbound				KAWANA SPRINGS RD Westbound				PETALUMA HILL RD Northbound				KAWANA SPRINGS RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	63	123	3	189	8	**46**	**46**	**100**	40	151	21	212	15	**64**	34	113	614
05:00 PM	62	**139**	**6**	**207**	6	37	31	74	44	161	22	227	22	50	57	**129**	637
05:15 PM	**76**	121	3	200	4	35	35	74	**57**	**183**	29	**269**	**27**	43	53	123	**666**
05:30 PM	73	110	5	188	**16**	38	43	97	46	157	**30**	233	21	42	**61**	124	642
Total Volume	274	493	17	784	34	156	155	345	187	652	102	941	85	199	205	489	2559
% App. Total	34.9	62.9	2.2		9.9	45.2	44.9		19.9	69.3	10.8		17.4	40.7	41.9		
PHF	.901	.887	.708	.947	.531	.848	.842	.863	.820	.891	.850	.875	.787	.777	.840	.948	.961

Traffic Data Service
San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 1PM FINAL
Site Code : 00000001
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 1PM FINAL
Site Code : 00000001
Start Date : 11/15/2018
Page No : 1

Groups Printed- Bikes

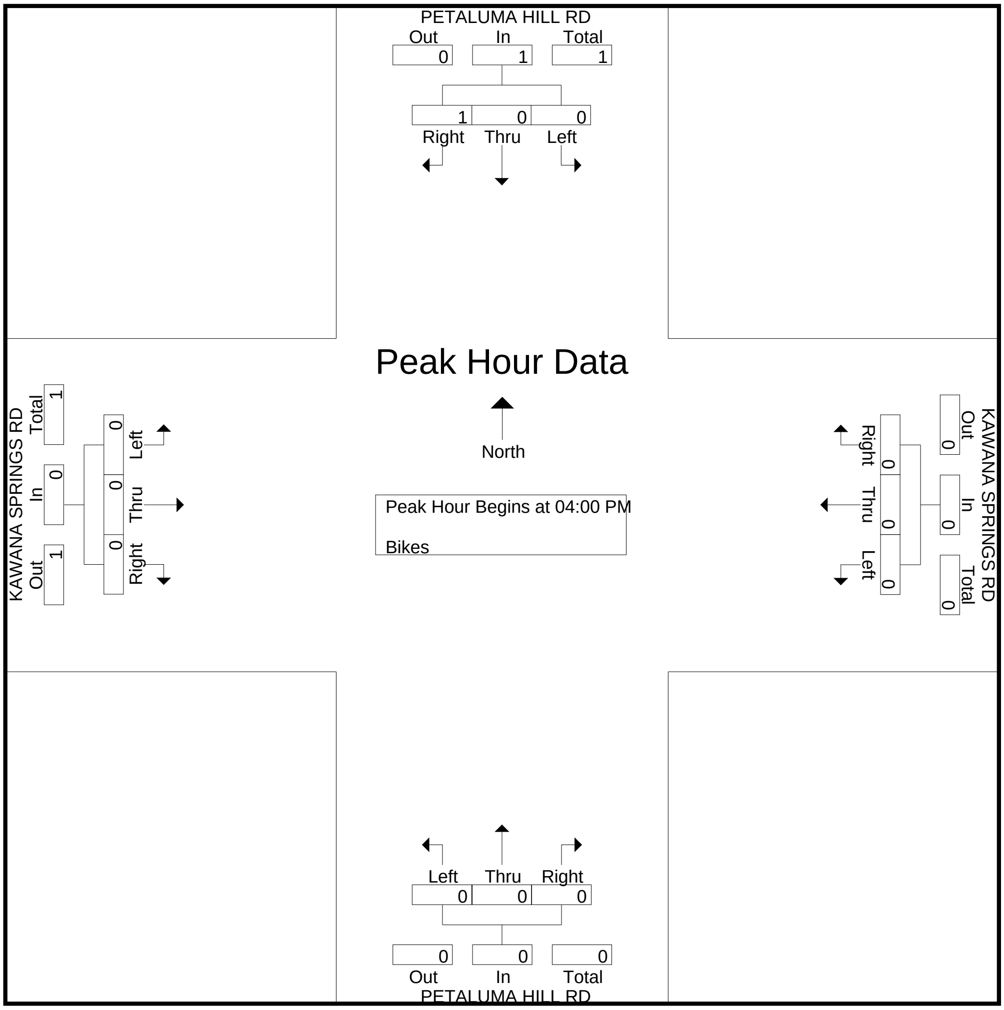
	PETALUMA HILL RD Southbound					KAWANA SPRINGS RD Westbound					PETALUMA HILL RD Northbound					KAWANA SPRINGS RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Apprch %	100	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %	100	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

	PETALUMA HILL RD Southbound				KAWANA SPRINGS RD Westbound				PETALUMA HILL RD Northbound				KAWANA SPRINGS RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Total Volume	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
% App. Total	100	0	0		0	0	0		0	0	0		0	0	0		
PHF	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 1PM FINAL
Site Code : 00000001
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 2AM FINAL
Site Code : 00000002
Start Date : 11/15/2018
Page No : 1

Groups Printed- Lights - Buses - Trucks

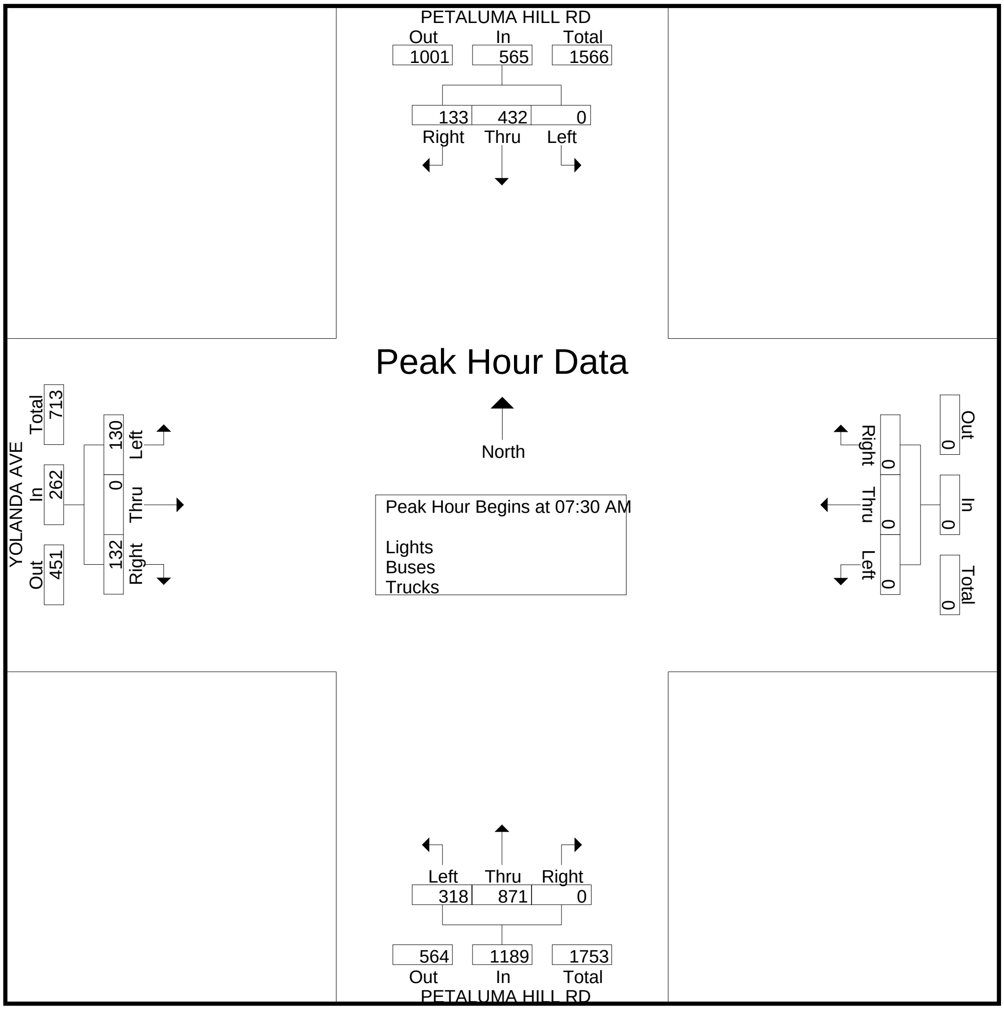
	PETALUMA HILL RD Southbound					Westbound					PETALUMA HILL RD Northbound					YOLANDA AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	20	47	0	0	67	0	0	0	0	0	0	69	53	0	122	31	0	7	0	38	227
07:15 AM	19	85	0	0	104	0	0	0	0	0	0	137	67	0	204	31	0	12	0	43	351
07:30 AM	22	115	0	0	137	0	0	0	0	0	0	207	68	0	275	50	0	28	0	78	490
07:45 AM	39	90	0	0	129	0	0	0	0	0	0	236	82	0	318	29	0	47	0	76	523
Total	100	337	0	0	437	0	0	0	0	0	0	649	270	0	919	141	0	94	0	235	1591
08:00 AM	36	124	0	0	160	0	0	0	0	0	0	183	75	0	258	23	0	32	0	55	473
08:15 AM	36	103	0	0	139	0	0	0	0	0	0	245	93	0	338	30	0	23	0	53	530
08:30 AM	30	108	0	0	138	0	0	0	0	0	0	208	76	0	284	25	0	24	0	49	471
08:45 AM	27	82	0	0	109	0	0	0	0	0	0	158	83	0	241	35	0	33	0	68	418
Total	129	417	0	0	546	0	0	0	0	0	0	794	327	0	1121	113	0	112	0	225	1892
Grand Total	229	754	0	0	983	0	0	0	0	0	0	1443	597	0	2040	254	0	206	0	460	3483
Apprch %	23.3	76.7	0	0		0	0	0	0		0	70.7	29.3	0		55.2	0	44.8	0		
Total %	6.6	21.6	0	0	28.2	0	0	0	0	0	0	41.4	17.1	0	58.6	7.3	0	5.9	0	13.2	
Lights	220	742	0	0	962	0	0	0	0	0	0	1421	566	0	1987	244	0	200	0	444	3393
% Lights	96.1	98.4	0	0	97.9	0	0	0	0	0	0	98.5	94.8	0	97.4	96.1	0	97.1	0	96.5	97.4
Buses	7	5	0	0	12	0	0	0	0	0	0	9	2	0	11	0	0	1	0	1	24
% Buses	3.1	0.7	0	0	1.2	0	0	0	0	0	0	0.6	0.3	0	0.5	0	0	0.5	0	0.2	0.7
Trucks	2	7	0	0	9	0	0	0	0	0	0	13	29	0	42	10	0	5	0	15	66
% Trucks	0.9	0.9	0	0	0.9	0	0	0	0	0	0	0.9	4.9	0	2.1	3.9	0	2.4	0	3.3	1.9

	PETALUMA HILL RD Southbound				Westbound				PETALUMA HILL RD Northbound				YOLANDA AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	22	115	0	137	0	0	0	0	0	207	68	275	**50**	0	28	**78**	490
07:45 AM	**39**	90	0	129	0	0	0	0	0	236	82	318	29	0	**47**	76	523
08:00 AM	36	**124**	0	**160**	0	0	0	0	0	183	75	258	23	0	32	55	473
08:15 AM	36	103	0	139	0	0	0	0	0	**245**	**93**	**338**	30	0	23	53	**530**
Total Volume	133	432	0	565	0	0	0	0	0	871	318	1189	132	0	130	262	2016
% App. Total	23.5	76.5	0		0	0	0		0	73.3	26.7		50.4	0	49.6		
PHF	.853	.871	.000	.883	.000	.000	.000	.000	.000	.889	.855	.879	.660	.000	.691	.840	.951

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 2AM FINAL
Site Code : 00000002
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 2AM FINAL
Site Code : 00000002
Start Date : 11/15/2018

Groups Printed- Bikes

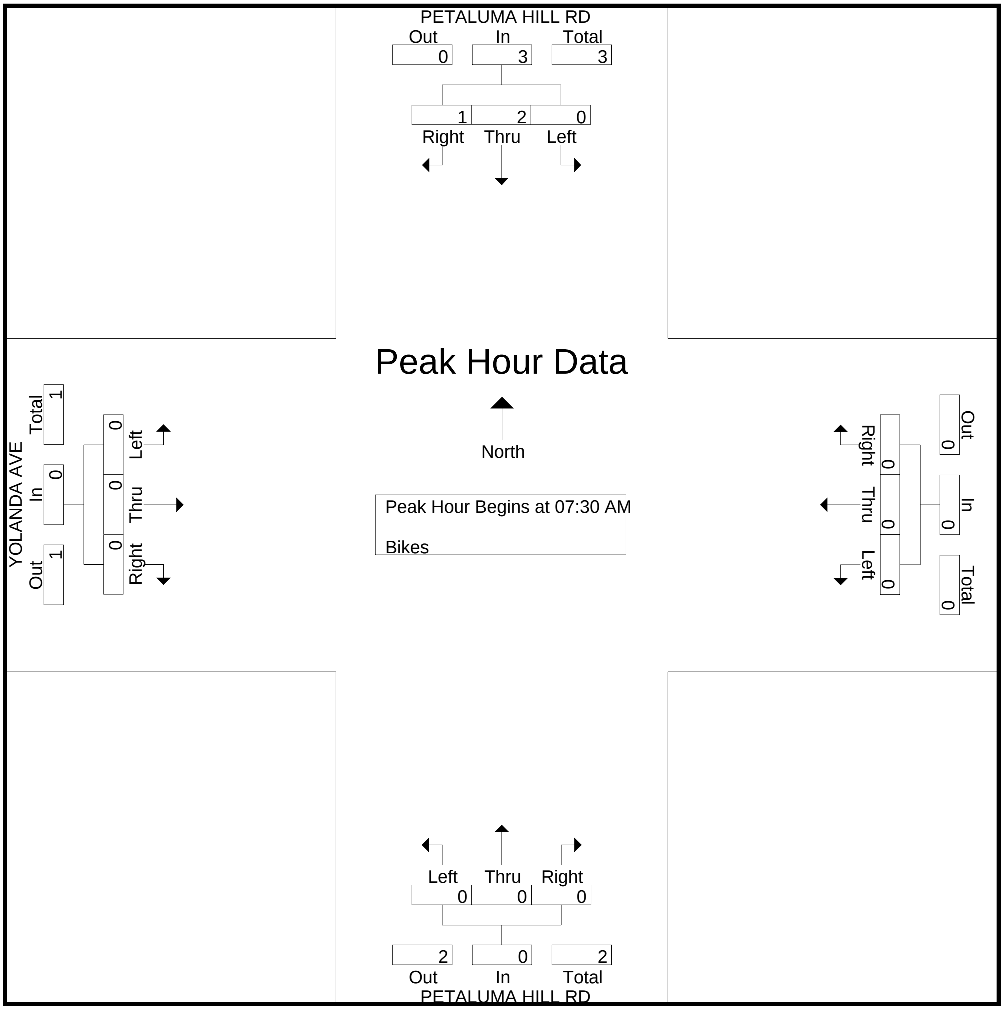
	PETALUMA HILL RD Southbound					Westbound					PETALUMA HILL RD Northbound					YOLANDA AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Grand Total	1	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Apprch %	33.3	66.7	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %	33.3	66.7	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

	PETALUMA HILL RD Southbound				Westbound				PETALUMA HILL RD Northbound				YOLANDA AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	**1**	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	**1**	1	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	**2**
Total Volume	1	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
% App. Total	33.3	66.7	0		0	0	0		0	0	0		0	0	0		
PHF	.250	.500	.000	.375	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.375

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 2AM FINAL
Site Code : 00000002
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 2PM FINAL
Site Code : 00000002
Start Date : 11/15/2018
Page No : 1

Groups Printed- Lights - Buses - Trucks

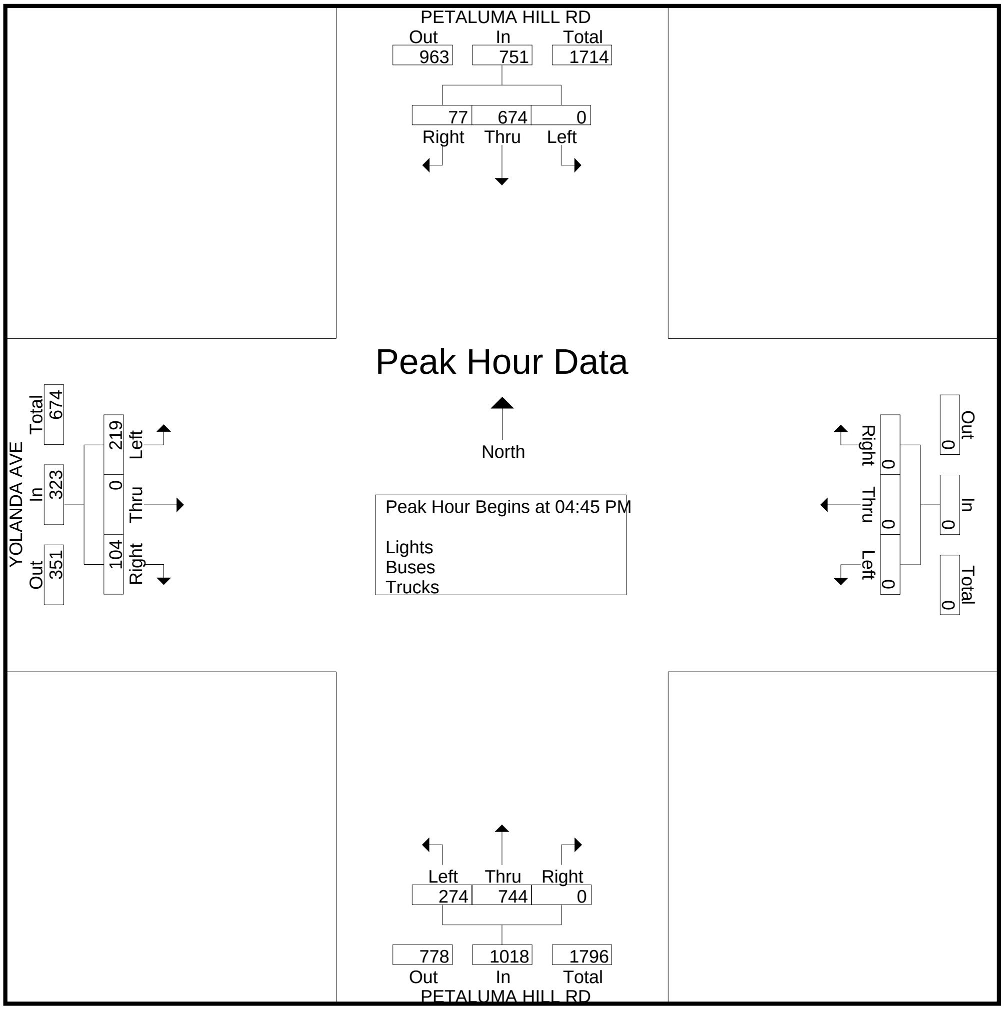
	PETALUMA HILL RD Southbound					Westbound					PETALUMA HILL RD Northbound					YOLANDA AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	30	161	0	0	191	0	0	0	0	0	0	152	66	0	218	15	0	52	0	67	476
04:15 PM	31	150	0	0	181	0	0	0	0	0	0	154	69	0	223	26	0	51	0	77	481
04:30 PM	22	187	0	0	209	0	0	0	0	0	0	152	43	0	195	22	0	53	0	75	479
04:45 PM	17	166	0	0	183	0	0	0	0	0	0	172	81	0	253	30	0	49	0	79	515
Total	100	664	0	0	764	0	0	0	0	0	0	630	259	0	889	93	0	205	0	298	1951
05:00 PM	23	170	0	0	193	0	0	0	0	0	0	181	67	0	248	29	0	53	0	82	523
05:15 PM	15	163	0	0	178	0	0	0	0	0	0	201	72	0	273	30	0	63	0	93	544
05:30 PM	22	175	0	0	197	0	0	0	0	0	0	190	54	0	244	15	0	54	0	69	510
05:45 PM	13	147	0	0	160	0	0	0	0	0	0	196	56	0	252	18	0	52	0	70	482
Total	73	655	0	0	728	0	0	0	0	0	0	768	249	0	1017	92	0	222	0	314	2059
Grand Total	173	1319	0	0	1492	0	0	0	0	0	0	1398	508	0	1906	185	0	427	0	612	4010
Apprch %	11.6	88.4	0	0		0	0	0	0		0	73.3	26.7	0		30.2	0	69.8	0		
Total %	4.3	32.9	0	0	37.2	0	0	0	0	0	0	34.9	12.7	0	47.5	4.6	0	10.6	0	15.3	
Lights	164	1310	0	0	1474	0	0	0	0	0	0	1390	495	0	1885	178	0	427	0	605	3964
% Lights	94.8	99.3	0	0	98.8	0	0	0	0	0	0	99.4	97.4	0	98.9	96.2	0	100	0	98.9	98.9
Buses	5	2	0	0	7	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	12
% Buses	2.9	0.2	0	0	0.5	0	0	0	0	0	0	0.4	0	0	0.3	0	0	0	0	0	0.3
Trucks	4	7	0	0	11	0	0	0	0	0	0	3	13	0	16	7	0	0	0	7	34
% Trucks	2.3	0.5	0	0	0.7	0	0	0	0	0	0	0.2	2.6	0	0.8	3.8	0	0	0	1.1	0.8

	PETALUMA HILL RD Southbound				Westbound				PETALUMA HILL RD Northbound				YOLANDA AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	17	166	0	183	0	0	0	0	0	172	**81**	253	**30**	0	49	79	515
05:00 PM	**23**	170	0	193	0	0	0	0	0	181	67	248	29	0	53	82	523
05:15 PM	15	163	0	178	0	0	0	0	0	**201**	72	**273**	30	0	**63**	**93**	**544**
05:30 PM	22	**175**	0	**197**	0	0	0	0	0	190	54	244	15	0	54	69	510
Total Volume	77	674	0	751	0	0	0	0	0	744	274	1018	104	0	219	323	2092
% App. Total	10.3	89.7	0		0	0	0		0	73.1	26.9		32.2	0	67.8		
PHF	.837	.963	.000	.953	.000	.000	.000	.000	.000	.925	.846	.932	.867	.000	.869	.868	.961

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 2PM FINAL
Site Code : 00000002
Start Date : 11/15/2018
Page No : 2



Traffic Data Service
San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 2PM FINAL
Site Code : 00000002
Start Date : 11/15/2018
Page No : 1

Groups Printed- Bikes

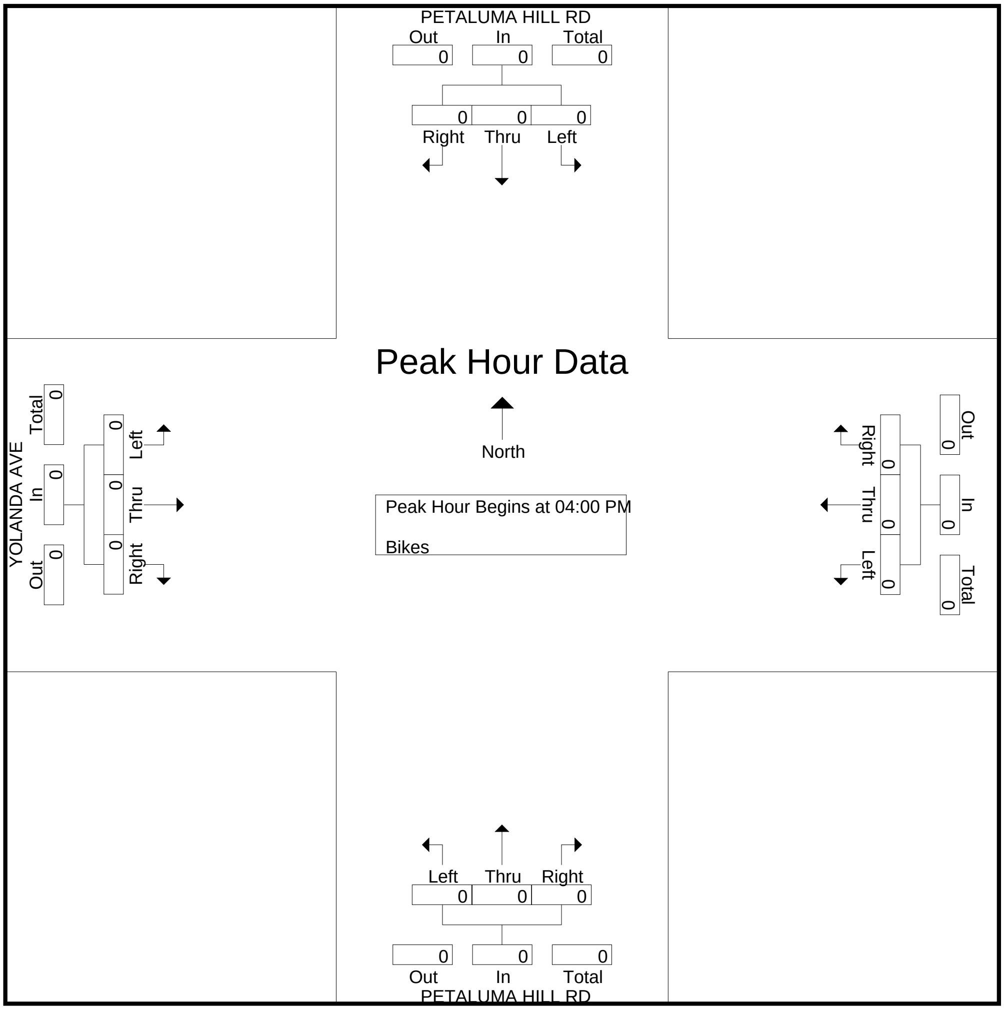
	PETALUMA HILL RD Southbound					Westbound					PETALUMA HILL RD Northbound					YOLANDA AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

	PETALUMA HILL RD Southbound				Westbound				PETALUMA HILL RD Northbound				YOLANDA AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 2PM FINAL
Site Code : 00000002
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 3AM FINAL
Site Code : 00000003
Start Date : 11/15/2018
Page No : 1

Groups Printed- Lights - Buses - Trucks

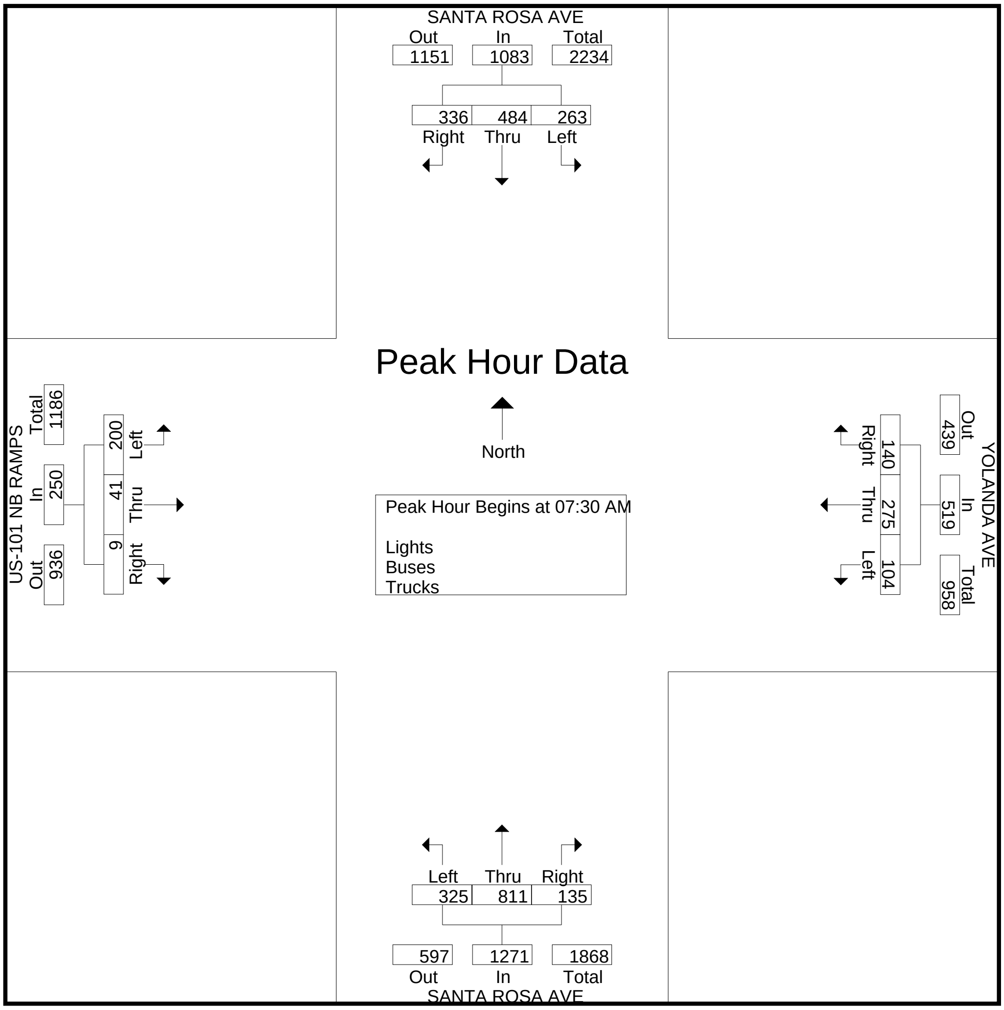
	SANTA ROSA AVE Southbound					YOLANDA AVE Westbound					SANTA ROSA AVE Northbound					US-101 NB RAMPS Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	55	74	40	0	169	18	58	22	4	102	7	74	61	0	142	3	7	42	0	52	465
07:15 AM	101	74	59	0	234	23	52	19	2	96	12	77	64	2	155	2	6	43	0	51	536
07:30 AM	101	107	77	0	285	22	65	24	0	111	39	206	98	0	343	0	13	54	2	69	808
07:45 AM	97	141	55	0	293	36	72	29	0	137	40	234	85	0	359	3	15	60	0	78	867
Total	354	396	231	0	981	99	247	94	6	446	98	591	308	2	999	8	41	199	2	250	2676
08:00 AM	87	110	66	0	263	40	67	24	2	133	30	188	71	1	290	3	9	33	2	47	733
08:15 AM	51	126	65	0	242	42	71	27	2	142	26	183	71	0	280	3	4	53	0	60	724
08:30 AM	66	137	67	0	270	27	72	27	4	130	26	154	62	0	242	3	7	30	1	41	683
08:45 AM	68	128	63	0	259	29	57	26	2	114	26	145	64	1	236	4	12	51	2	69	678
Total	272	501	261	0	1034	138	267	104	10	519	108	670	268	2	1048	13	32	167	5	217	2818
Grand Total	626	897	492	0	2015	237	514	198	16	965	206	1261	576	4	2047	21	73	366	7	467	5494
Apprch %	31.1	44.5	24.4	0		24.6	53.3	20.5	1.7		10.1	61.6	28.1	0.2		4.5	15.6	78.4	1.5		
Total %	11.4	16.3	9	0	36.7	4.3	9.4	3.6	0.3	17.6	3.7	23	10.5	0.1	37.3	0.4	1.3	6.7	0.1	8.5	
Lights	591	856	474	0	1921	221	481	177	16	895	195	1214	553	4	1966	17	67	349	7	440	5222
% Lights	94.4	95.4	96.3	0	95.3	93.2	93.6	89.4	100	92.7	94.7	96.3	96	100	96	81	91.8	95.4	100	94.2	95
Buses	3	21	1	0	25	5	2	2	0	9	2	20	1	0	23	0	0	2	0	2	59
% Buses	0.5	2.3	0.2	0	1.2	2.1	0.4	1	0	0.9	1	1.6	0.2	0	1.1	0	0	0.5	0	0.4	1.1
Trucks	32	20	17	0	69	11	31	19	0	61	9	27	22	0	58	4	6	15	0	25	213
% Trucks	5.1	2.2	3.5	0	3.4	4.6	6	9.6	0	6.3	4.4	2.1	3.8	0	2.8	19	8.2	4.1	0	5.4	3.9

	SANTA ROSA AVE Southbound				YOLANDA AVE Westbound				SANTA ROSA AVE Northbound				US-101 NB RAMPS Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**101**	107	**77**	285	22	65	24	111	39	206	**98**	343	0	13	54	67	806
07:45 AM	97	**141**	55	**293**	36	**72**	**29**	137	**40**	**234**	85	**359**	**3**	**15**	**60**	**78**	**867**
08:00 AM	87	110	66	263	40	67	24	131	30	188	71	289	3	9	33	45	728
08:15 AM	51	126	65	242	**42**	71	27	**140**	26	183	71	280	3	4	53	60	722
Total Volume	336	484	263	1083	140	275	104	519	135	811	325	1271	9	41	200	250	3123
% App. Total	31	44.7	24.3		27	53	20		10.6	63.8	25.6		3.6	16.4	80		
PHF	.832	.858	.854	.924	.833	.955	.897	.927	.844	.866	.829	.885	.750	.683	.833	.801	.901

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 3AM FINAL
Site Code : 00000003
Start Date : 11/15/2018
Page No : 2



Traffic Data Service
San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 3AM FINAL
Site Code : 00000003
Start Date : 11/15/2018
Page No : 1

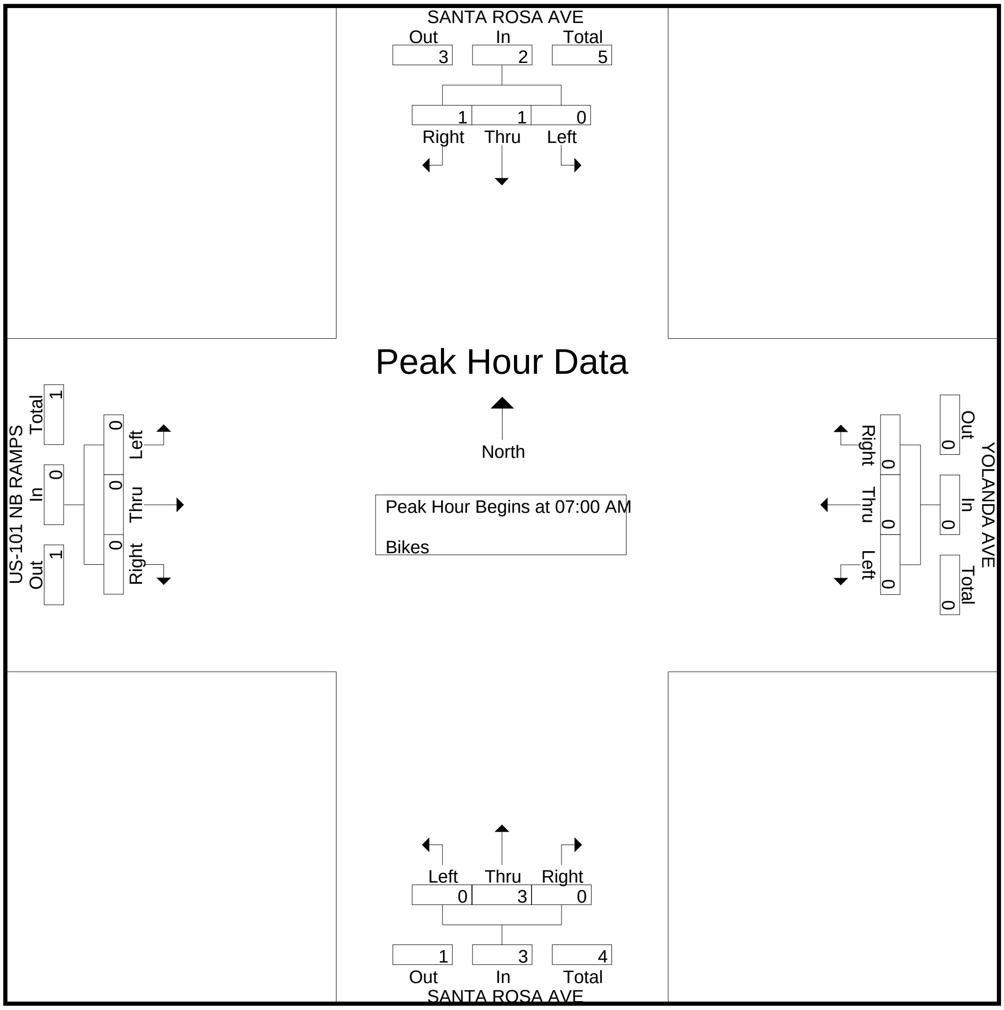
Groups Printed- Bikes

	SANTA ROSA AVE Southbound					YOLANDA AVE Westbound					SANTA ROSA AVE Northbound					US-101 NB RAMPS Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Total	1	1	0	0	2	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	5
08:00 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Total	0	0	0	0	0	1	0	0	0	1	0	2	0	0	2	0	0	0	0	0	3
Grand Total	1	1	0	0	2	1	0	0	0	1	0	5	0	0	5	0	0	0	0	0	8
Apprch %	50	50	0	0		100	0	0	0		0	100	0	0		0	0	0	0		
Total %	12.5	12.5	0	0	25	12.5	0	0	0	12.5	0	62.5	0	0	62.5	0	0	0	0	0	

	SANTA ROSA AVE Southbound				YOLANDA AVE Westbound				SANTA ROSA AVE Northbound				US-101 NB RAMPS Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**1**	**1**	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	**2**
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	**2**	0	**2**	0	0	0	0	2
07:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total Volume	1	1	0	2	0	0	0	0	0	3	0	3	0	0	0	0	5
% App. Total	50	50	0		0	0	0		0	100	0		0	0	0		
PHF	.250	.250	.000	.250	.000	.000	.000	.000	.000	.375	.000	.375	.000	.000	.000	.000	.625

Traffic Data Service
San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 3AM FINAL
Site Code : 00000003
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 3PM FINAL
Site Code : 00000003
Start Date : 11/15/2018
Page No : 1

Groups Printed- Lights - Buses - Trucks

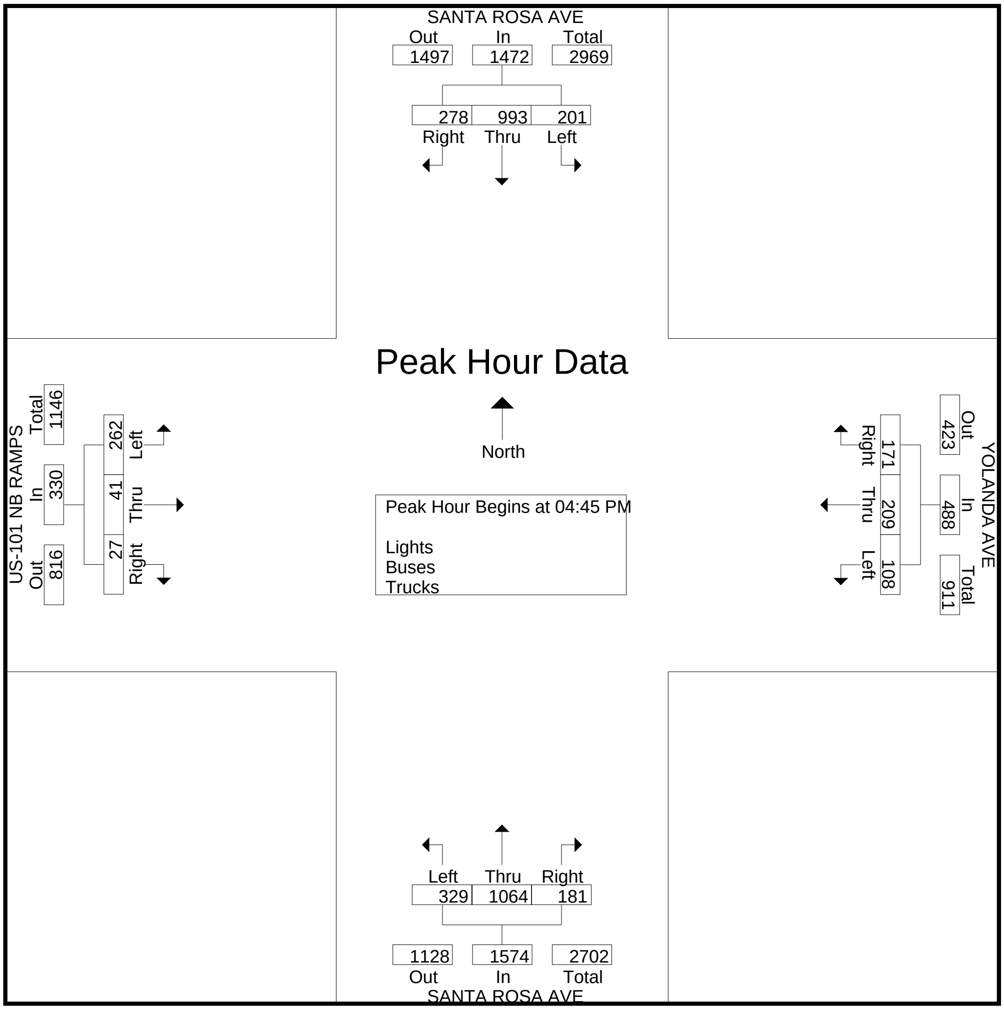
	SANTA ROSA AVE Southbound					YOLANDA AVE Westbound					SANTA ROSA AVE Northbound					US-101 NB RAMPS Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	75	238	43	0	356	52	54	30	6	142	42	232	93	2	369	14	14	81	2	111	978
04:15 PM	71	243	67	0	381	44	49	32	2	127	46	204	71	1	322	6	12	91	0	109	939
04:30 PM	90	232	32	0	354	28	52	34	8	122	40	216	88	1	345	11	17	94	1	123	944
04:45 PM	66	290	61	0	417	43	55	19	4	121	50	207	74	0	331	9	15	73	0	97	966
Total	302	1003	203	0	1508	167	210	115	20	512	178	859	326	4	1367	40	58	339	3	440	3827
05:00 PM	77	235	51	0	363	55	48	29	6	138	46	275	84	0	405	8	11	71	0	90	996
05:15 PM	75	241	47	0	363	41	52	34	5	132	50	278	94	0	422	4	4	57	1	66	983
05:30 PM	60	227	42	0	329	32	54	26	5	117	35	304	77	3	419	6	11	61	0	78	943
05:45 PM	67	244	42	0	353	31	48	22	3	104	45	279	78	0	402	10	12	63	0	85	944
Total	279	947	182	0	1408	159	202	111	19	491	176	1136	333	3	1648	28	38	252	1	319	3866
Grand Total	581	1950	385	0	2916	326	412	226	39	1003	354	1995	659	7	3015	68	96	591	4	759	7693
Apprch %	19.9	66.9	13.2	0		32.5	41.1	22.5	3.9		11.7	66.2	21.9	0.2		9	12.6	77.9	0.5		
Total %	7.6	25.3	5	0	37.9	4.2	5.4	2.9	0.5	13	4.6	25.9	8.6	0.1	39.2	0.9	1.2	7.7	0.1	9.9	
Lights	575	1921	373	0	2869	313	404	221	39	977	348	1972	651	7	2978	67	89	583	4	743	7567
% Lights	99	98.5	96.9	0	98.4	96	98.1	97.8	100	97.4	98.3	98.8	98.8	100	98.8	98.5	92.7	98.6	100	97.9	98.4
Buses	0	9	0	0	9	6	0	0	0	6	0	13	0	0	13	0	0	2	0	2	30
% Buses	0	0.5	0	0	0.3	1.8	0	0	0	0.6	0	0.7	0	0	0.4	0	0	0.3	0	0.3	0.4
Trucks	6	20	12	0	38	7	8	5	0	20	6	10	8	0	24	1	7	6	0	14	96
% Trucks	1	1	3.1	0	1.3	2.1	1.9	2.2	0	2	1.7	0.5	1.2	0	0.8	1.5	7.3	1	0	1.8	1.2

	SANTA ROSA AVE Southbound				YOLANDA AVE Westbound				SANTA ROSA AVE Northbound				US-101 NB RAMPS Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	66	**290**	**61**	**417**	43	**55**	19	117	**50**	207	74	331	**9**	**15**	**73**	**97**	962
05:00 PM	**77**	235	51	363	**55**	48	29	**132**	46	275	84	405	8	11	71	90	**990**
05:15 PM	75	241	47	363	41	52	**34**	127	50	278	**94**	**422**	4	4	57	65	977
05:30 PM	60	227	42	329	32	54	26	112	35	**304**	77	416	6	11	61	78	935
Total Volume	278	993	201	1472	171	209	108	488	181	1064	329	1574	27	41	262	330	3864
% App. Total	18.9	67.5	13.7		35	42.8	22.1		11.5	67.6	20.9		8.2	12.4	79.4		
PHF	.903	.856	.824	.882	.777	.950	.794	.924	.905	.875	.875	.932	.750	.683	.897	.851	.976

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 3PM FINAL
Site Code : 00000003
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 3PM FINAL
Site Code : 00000003
Start Date : 11/15/2018
Page No : 1

Groups Printed- Bikes

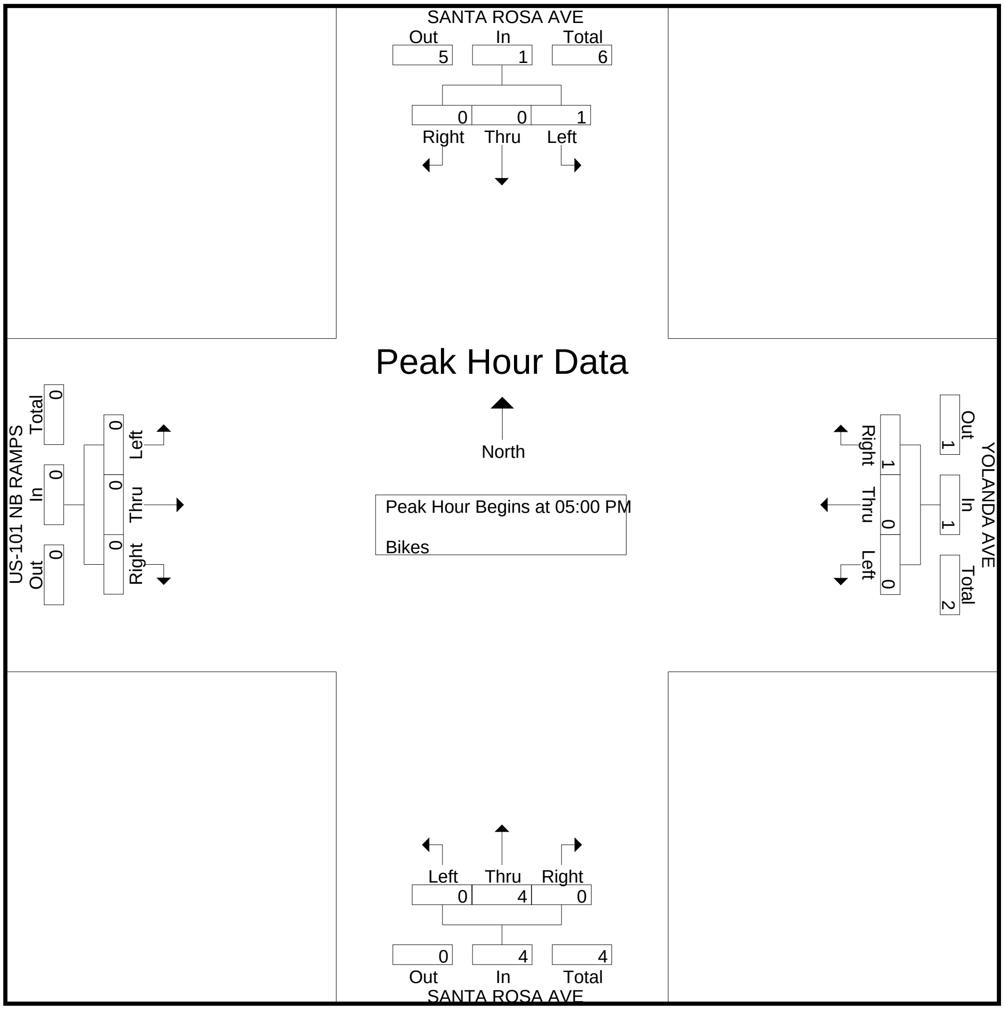
	SANTA ROSA AVE Southbound					YOLANDA AVE Westbound					SANTA ROSA AVE Northbound					US-101 NB RAMPS Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	3
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	2
05:45 PM	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
Total	0	0	1	0	1	1	0	0	0	1	0	4	0	0	4	0	0	0	0	0	6
Grand Total	0	0	1	0	1	1	0	0	0	1	0	7	0	0	7	0	0	0	0	0	9
Apprch %	0	0	100	0		100	0	0	0		0	100	0	0		0	0	0	0		
Total %	0	0	11.1	0	11.1	11.1	0	0	0	11.1	0	77.8	0	0	77.8	0	0	0	0	0	

	SANTA ROSA AVE Southbound				YOLANDA AVE Westbound				SANTA ROSA AVE Northbound				US-101 NB RAMPS Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
05:30 PM	0	0	0	0	**1**	0	0	**1**	0	1	0	1	0	0	0	0	**2**
05:45 PM	0	0	**1**	**1**	0	0	0	0	0	1	0	1	0	0	0	0	2
Total Volume	0	0	1	1	1	0	0	1	0	4	0	4	0	0	0	0	6
% App. Total	0	0	100		100	0	0		0	100	0		0	0	0		
PHF	.000	.000	.250	.250	.250	.000	.000	.250	.000	1.00	.000	1.00	.000	.000	.000	.000	.750

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 3PM FINAL
Site Code : 00000003
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 4AM FINAL
Site Code : 00000004
Start Date : 11/15/2018
Page No : 1

Groups Printed- Lights - Buses - Trucks

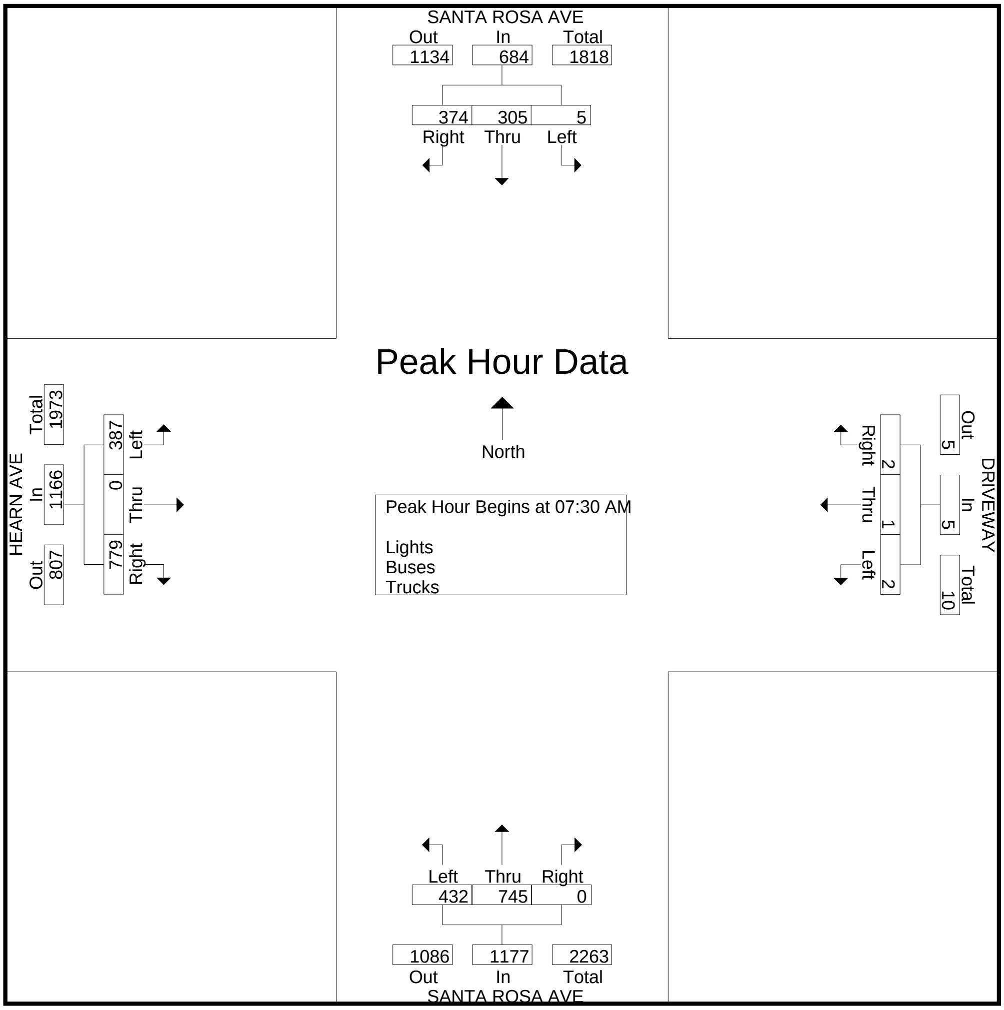
	SANTA ROSA AVE Southbound					DRIVEWAY Westbound					SANTA ROSA AVE Northbound					HEARN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	46	28	0	0	74	0	0	0	1	1	0	59	84	0	143	135	0	34	0	169	387
07:15 AM	74	47	0	0	121	0	0	0	3	3	0	75	82	0	157	193	0	46	0	239	520
07:30 AM	100	70	0	0	170	0	0	0	2	2	0	180	106	0	286	220	0	75	2	297	755
07:45 AM	97	84	1	0	182	0	0	2	3	5	0	204	131	0	335	192	0	106	0	298	820
Total	317	229	1	0	547	0	0	2	9	11	0	518	403	0	921	740	0	261	2	1003	2482
08:00 AM	103	69	4	0	176	2	0	0	3	5	0	170	96	2	268	191	0	104	1	296	745
08:15 AM	74	82	0	0	156	0	1	0	4	5	0	191	99	2	292	176	0	102	1	279	732
08:30 AM	80	83	2	0	165	2	0	0	2	4	0	153	85	1	239	189	0	84	1	274	682
08:45 AM	73	59	0	0	132	0	2	1	3	6	1	153	86	3	243	203	0	109	0	312	693
Total	330	293	6	0	629	4	3	1	12	20	1	667	366	8	1042	759	0	399	3	1161	2852
Grand Total	647	522	7	0	1176	4	3	3	21	31	1	1185	769	8	1963	1499	0	660	5	2164	5334
Apprch %	55	44.4	0.6	0		12.9	9.7	9.7	67.7		0.1	60.4	39.2	0.4		69.3	0	30.5	0.2		
Total %	12.1	9.8	0.1	0	22	0.1	0.1	0.1	0.4	0.6	0	22.2	14.4	0.1	36.8	28.1	0	12.4	0.1	40.6	
Lights	628	494	6	0	1128	3	3	3	21	30	1	1136	734	8	1879	1422	0	638	5	2065	5102
% Lights	97.1	94.6	85.7	0	95.9	75	100	100	100	96.8	100	95.9	95.4	100	95.7	94.9	0	96.7	100	95.4	95.7
Buses	5	14	0	0	19	0	0	0	0	0	0	22	5	0	27	9	0	10	0	19	65
% Buses	0.8	2.7	0	0	1.6	0	0	0	0	0	0	1.9	0.7	0	1.4	0.6	0	1.5	0	0.9	1.2
Trucks	14	14	1	0	29	1	0	0	0	1	0	27	30	0	57	68	0	12	0	80	167
% Trucks	2.2	2.7	14.3	0	2.5	25	0	0	0	3.2	0	2.3	3.9	0	2.9	4.5	0	1.8	0	3.7	3.1

	SANTA ROSA AVE Southbound				DRIVEWAY Westbound				SANTA ROSA AVE Northbound				HEARN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	100	70	0	170	0	0	0	0	0	180	106	286	**220**	0	75	295	751
07:45 AM	97	**84**	1	**182**	0	0	**2**	**2**	0	**204**	**131**	**335**	192	0	**106**	**298**	**817**
08:00 AM	**103**	69	**4**	176	**2**	0	0	2	0	170	96	266	191	0	104	295	739
08:15 AM	74	82	0	156	0	**1**	0	1	0	191	99	290	176	0	102	278	725
Total Volume	374	305	5	684	2	1	2	5	0	745	432	1177	779	0	387	1166	3032
% App. Total	54.7	44.6	0.7		40	20	40		0	63.3	36.7		66.8	0	33.2		
PHF	.908	.908	.313	.940	.250	.250	.250	.625	.000	.913	.824	.878	.885	.000	.913	.978	.928

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 4AM FINAL
Site Code : 00000004
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA

(408) 622-4787

tdsbay@cs.com

File Name : 4AM FINAL
Site Code : 00000004
Start Date : 11/15/2018
Page No : 1

Groups Printed- Bikes

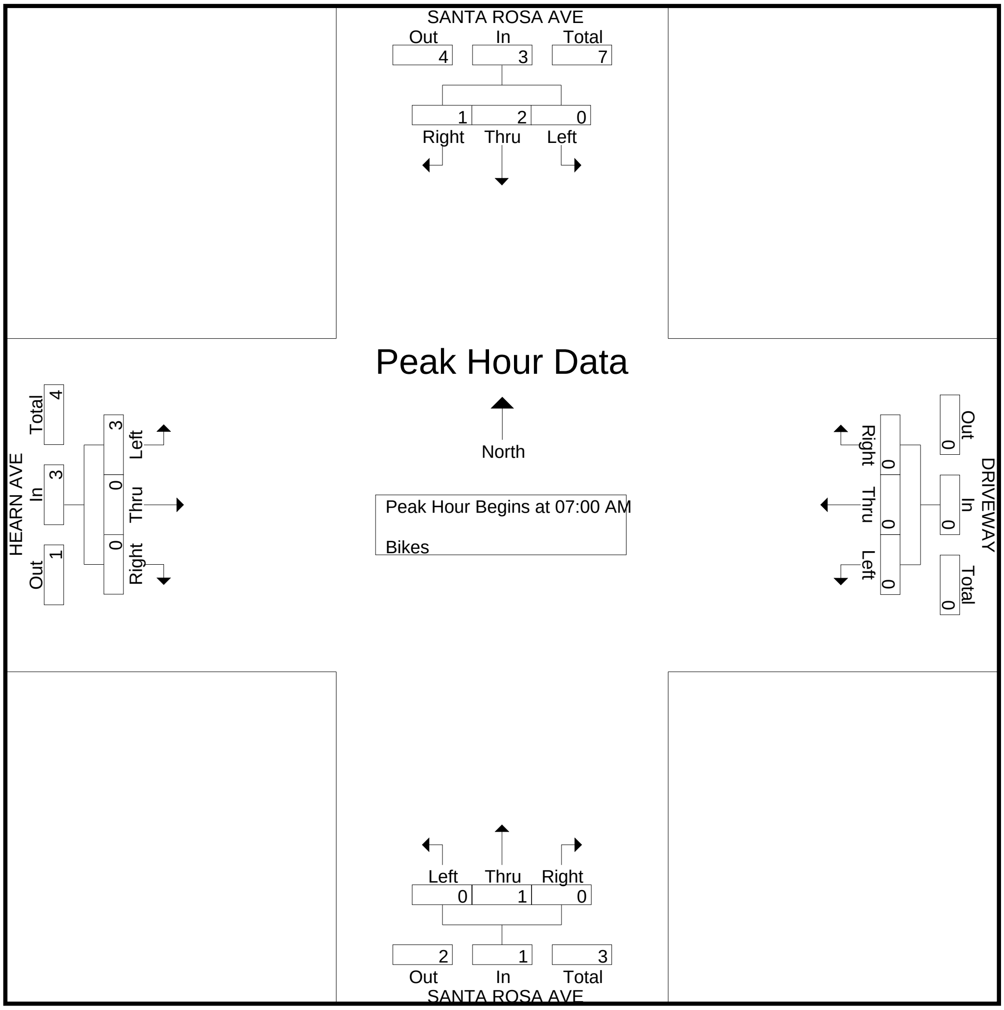
	SANTA ROSA AVE Southbound					DRIVEWAY Westbound					SANTA ROSA AVE Northbound					HEARN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
07:45 AM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
Total	1	2	0	0	3	0	0	0	0	0	0	1	0	0	1	0	0	3	0	3	7
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	1	3	0	0	4	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	5
Total	1	4	0	0	5	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	6
Grand Total	2	6	0	0	8	0	0	0	0	0	0	2	0	0	2	0	0	3	0	3	13
Apprch %	25	75	0	0		0	0	0	0		0	100	0	0		0	0	100	0		
Total %	15.4	46.2	0	0	61.5	0	0	0	0	0	0	15.4	0	0	15.4	0	0	23.1	0	23.1	

	SANTA ROSA AVE Southbound				DRIVEWAY Westbound				SANTA ROSA AVE Northbound				HEARN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**1**	**1**	0	**2**	0	0	0	0	0	0	0	0	0	0	1	1	**3**
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**	**2**	2
07:45 AM	0	1	0	1	0	0	0	0	0	**1**	0	**1**	0	0	0	0	2
Total Volume	1	2	0	3	0	0	0	0	0	1	0	1	0	0	3	3	7
% App. Total	33.3	66.7	0		0	0	0		0	100	0		0	0	100		
PHF	.250	.500	.000	.375	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.375	.375	.583

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 4AM FINAL
Site Code : 00000004
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 4PM FINAL
Site Code : 00000004
Start Date : 11/15/2018
Page No : 1

Groups Printed- Lights - Buses - Trucks

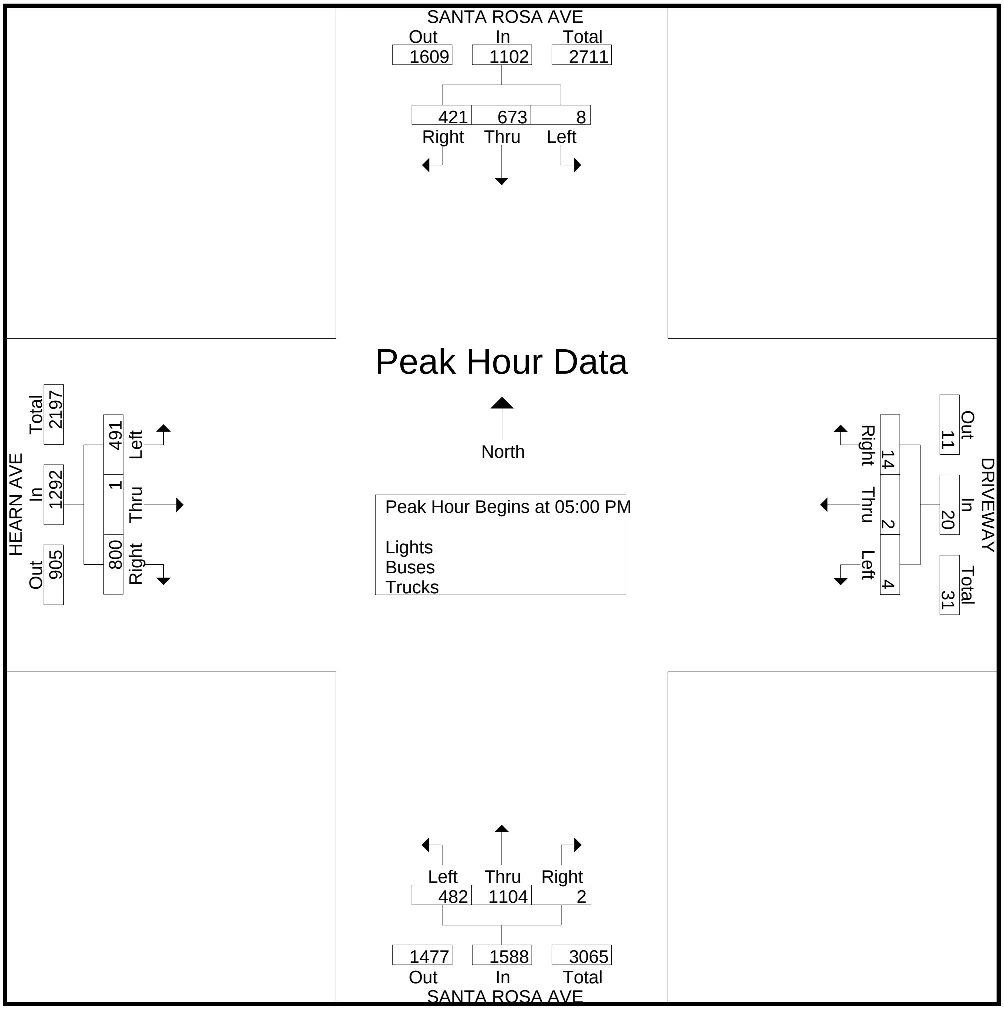
	SANTA ROSA AVE Southbound					DRIVEWAY Westbound					SANTA ROSA AVE Northbound					HEARN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	87	164	2	0	253	3	0	3	3	9	0	222	153	1	376	196	0	97	0	293	931
04:15 PM	98	182	4	0	284	0	3	2	2	7	0	231	115	0	346	203	0	98	0	301	938
04:30 PM	99	147	1	0	247	4	3	2	5	14	1	216	117	0	334	198	0	125	1	324	919
04:45 PM	109	172	3	0	284	4	1	0	6	11	0	208	108	1	317	196	0	123	0	319	931
Total	393	665	10	0	1068	11	7	7	16	41	1	877	493	2	1373	793	0	443	1	1237	3719
05:00 PM	106	182	5	0	293	6	0	0	5	11	0	284	118	4	406	191	1	132	0	324	1034
05:15 PM	97	170	1	0	268	2	1	3	2	8	0	249	135	0	384	202	0	132	0	334	994
05:30 PM	129	156	1	0	286	4	1	0	4	9	2	292	118	3	415	204	0	113	0	317	1027
05:45 PM	89	165	1	0	255	2	0	1	3	6	0	279	111	1	391	203	0	114	0	317	969
Total	421	673	8	0	1102	14	2	4	14	34	2	1104	482	8	1596	800	1	491	0	1292	4024
Grand Total	814	1338	18	0	2170	25	9	11	30	75	3	1981	975	10	2969	1593	1	934	1	2529	7743
Apprch %	37.5	61.7	0.8	0		33.3	12	14.7	40		0.1	66.7	32.8	0.3		63	0	36.9	0		
Total %	10.5	17.3	0.2	0	28	0.3	0.1	0.1	0.4	1	0	25.6	12.6	0.1	38.3	20.6	0	12.1	0	32.7	
Lights	808	1315	18	0	2141	25	9	11	30	75	3	1950	961	10	2924	1577	1	928	1	2507	7647
% Lights	99.3	98.3	100	0	98.7	100	100	100	100	100	100	98.4	98.6	100	98.5	99	100	99.4	100	99.1	98.8
Buses	3	6	0	0	9	0	0	0	0	0	0	18	3	0	21	1	0	3	0	4	34
% Buses	0.4	0.4	0	0	0.4	0	0	0	0	0	0	0.9	0.3	0	0.7	0.1	0	0.3	0	0.2	0.4
Trucks	3	17	0	0	20	0	0	0	0	0	0	13	11	0	24	15	0	3	0	18	62
% Trucks	0.4	1.3	0	0	0.9	0	0	0	0	0	0	0.7	1.1	0	0.8	0.9	0	0.3	0	0.7	0.8

	SANTA ROSA AVE Southbound				DRIVEWAY Westbound				SANTA ROSA AVE Northbound				HEARN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	106	**182**	**5**	**293**	**6**	0	0	**6**	0	284	118	402	191	**1**	**132**	324	**1025**
05:15 PM	97	170	1	268	2	**1**	**3**	6	0	249	**135**	384	202	0	132	**334**	992
05:30 PM	**129**	156	1	286	4	1	0	5	**2**	**292**	118	**412**	**204**	0	113	317	1020
05:45 PM	89	165	1	255	2	0	1	3	0	279	111	390	203	0	114	317	965
Total Volume	421	673	8	1102	14	2	4	20	2	1104	482	1588	800	1	491	1292	4002
% App. Total	38.2	61.1	0.7		70	10	20		0.1	69.5	30.4		61.9	0.1	38		
PHF	.816	.924	.400	.940	.583	.500	.333	.833	.250	.945	.893	.964	.980	.250	.930	.967	.976

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 4PM FINAL
Site Code : 00000004
Start Date : 11/15/2018
Page No : 2



Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 4PM FINAL
Site Code : 00000004
Start Date : 11/15/2018
Page No : 1

Groups Printed- Bikes

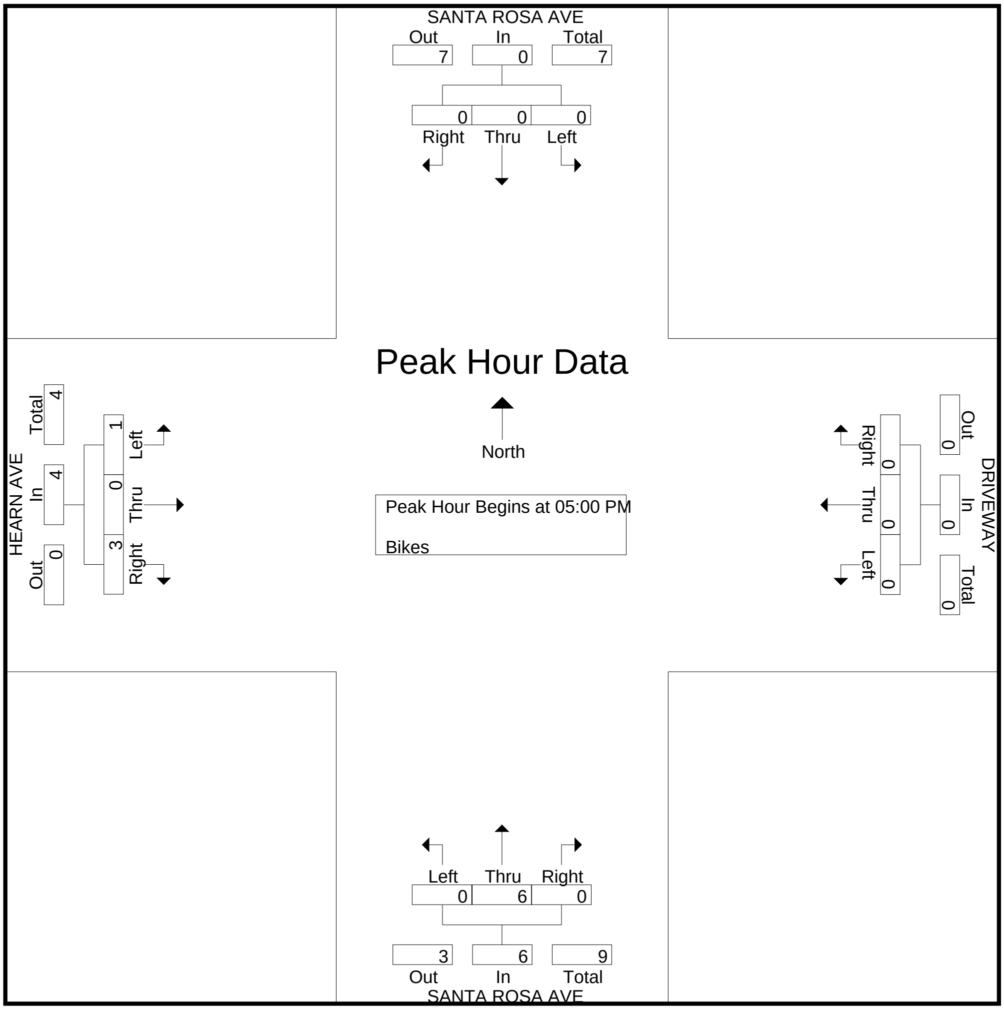
	SANTA ROSA AVE Southbound					DRIVEWAY Westbound					SANTA ROSA AVE Northbound					HEARN AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	0	0	1	0	1	5
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	2	3
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2	0	0	0	2	4
Total	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	3	0	1	0	4	10
Grand Total	0	0	0	0	0	0	0	0	0	0	1	9	0	0	10	3	0	2	0	5	15
Apprch %	0	0	0	0		0	0	0	0		10	90	0	0		60	0	40	0		
Total %	0	0	0	0	0	0	0	0	0	0	6.7	60	0	0	66.7	20	0	13.3	0	33.3	

	SANTA ROSA AVE Southbound				DRIVEWAY Westbound				SANTA ROSA AVE Northbound				HEARN AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	0	0	0	0	1	0	1	1	0	**1**	**2**	3
05:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	**2**	0	**2**	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	2	0	2	**2**	0	0	2	**4**
Total Volume	0	0	0	0	0	0	0	0	0	6	0	6	3	0	1	4	10
% App. Total	0	0	0		0	0	0		0	100	0		75	0	25		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.750	.000	.750	.375	.000	.250	.500	.625

Traffic Data Service

San Jose, CA
(408) 622-4787
tdsbay@cs.com

File Name : 4PM FINAL
Site Code : 00000004
Start Date : 11/15/2018
Page No : 2



Prepared by National Data & Surveying Services

Corby Ave & Hearn Ave

Peak Hour Turning Movement Count

ID: 18-8046-001
City: Santa Rosa

Day: Thursday
Date: 02/01/2018

PEAK HOURS		COUNT PERIODS
AM	07:30 AM - 08:30 AM	07:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:15 PM - 05:15 PM	04:00 PM - 06:00 PM

Corby Ave — SOUTHBOUND

	Right	Thru	Left	U-Turn	Out
AM	122	80	53	0	195
NOON	0	0	0	0	0
PM	136	136	104	0	409
	0	0	0	0	

Hearn Ave — EASTBOUND

	AM	NOON	PM	
Out	676	0	815	
U-Turn	0	0	0	0
Left	68	0	88	0
Thru	580	0	516	0
Right	293	0	210	0

Hearn Ave — WESTBOUND

		PM	NOON	AM
Right	0	89	0	44
Thru	0	561	0	475
Left	0	251	0	290
U-Turn	0	0	0	0
Out		1276	0	1101

Corby Ave — NORTHBOUND

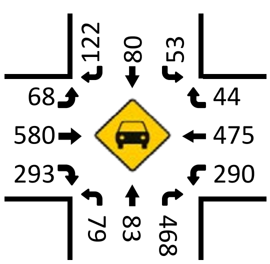
	Out	U-Turn	Left	Thru	Right
		0	0	0	0
PM	597	0	118	232	656
NOON	0	0	0	0	0
AM	663	0	79	83	468

CONTROL

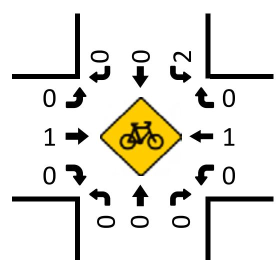
0

	AM	NOON	PM
TEV	2635	0	3097
PHF	0.94		0.99

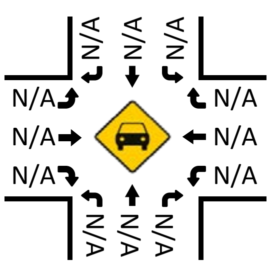
Total Vehicles (AM)



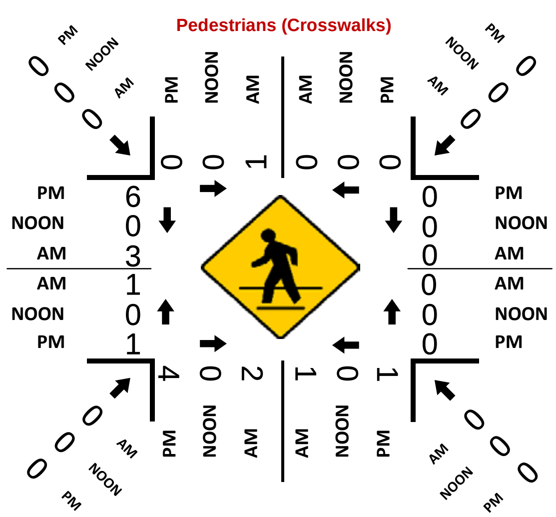
Bikes (AM)



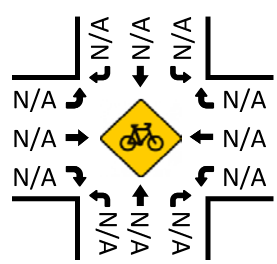
Total Vehicles (Noon)



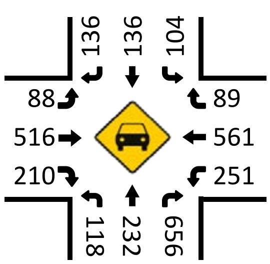
Pedestrians (Crosswalks)



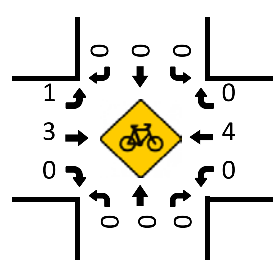
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



APPENDIX B: INTERSECTION LOS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	132	95	35	169	195	29	85	760	167	12	369	164
Future Volume (veh/h)	132	95	35	169	195	29	85	760	167	12	369	164
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	150	108	40	192	222	33	97	864	190	14	419	186
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	242	305	311	355	278	41	471	1431	315	267	1017	956
Arrive On Green	0.08	0.17	0.16	0.09	0.18	0.18	0.04	0.58	0.58	0.01	0.55	0.54
Sat Flow, veh/h	1757	1845	1556	1757	1565	233	1757	2446	538	1757	1845	1530
Grp Volume(v), veh/h	150	108	40	192	0	255	97	436	618	14	419	186
Grp Sat Flow(s),veh/h/ln	1757	1845	1556	1757	0	1798	1757	1236	1748	1757	1845	1530
Q Serve(g_s), s	7.8	5.7	2.3	10.1	0.0	15.0	2.5	24.9	24.9	0.4	14.5	5.7
Cycle Q Clear(g_c), s	7.8	5.7	2.3	10.1	0.0	15.0	2.5	24.9	24.9	0.4	14.5	5.7
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.31	1.00		1.00
Lane Grp Cap(c), veh/h	242	305	311	355	0	319	471	723	1022	267	1017	956
V/C Ratio(X)	0.62	0.35	0.13	0.54	0.00	0.80	0.21	0.60	0.60	0.05	0.41	0.19
Avail Cap(c_a), veh/h	263	535	505	355	0	521	557	723	1022	411	1017	956
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.0	40.7	36.2	35.0	0.0	43.4	10.5	14.6	14.7	13.2	14.3	8.9
Incr Delay (d2), s/veh	2.5	0.7	0.2	0.9	0.0	4.6	0.1	3.7	2.6	0.0	1.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	3.0	1.0	4.9	0.0	7.8	1.2	9.2	12.8	0.2	7.7	2.5
LnGrp Delay(d),s/veh	38.5	41.4	36.3	36.0	0.0	48.0	10.6	18.4	17.3	13.2	15.6	9.4
LnGrp LOS	D	D	D	D		D	B	B	B	B	B	A
Approach Vol, veh/h		298			447			1151			619	
Approach Delay, s/veh		39.3			42.8			17.1			13.6	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.1	22.2	8.7	65.0	12.8	23.5	5.1	68.6
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3
Max Green Setting (Gmax), s	11.1	32.0	11.1	* 42	11.1	32.0	11.1	41.6
Max Q Clear Time (g_c+I1), s	12.1	7.7	4.5	16.5	9.8	17.0	2.4	26.9
Green Ext Time (p_c), s	0.0	0.7	0.0	1.8	0.0	1.1	0.0	3.6

Intersection Summary	
HCM 2010 Ctrl Delay	23.5
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	130	132	318	871	432	133
Future Volume (veh/h)	130	132	318	871	432	133
Number	5	12	3	8	4	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1900	1845	1845	1845	1900
Adj Flow Rate, veh/h	137	139	335	917	455	140
Adj No. of Lanes	0	0	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	3	3	3	3
Cap, veh/h	160	162	373	1223	528	163
Arrive On Green	0.20	0.20	0.21	0.66	0.39	0.39
Sat Flow, veh/h	820	831	1757	1845	1346	414
Grp Volume(v), veh/h	277	0	335	917	0	595
Grp Sat Flow(s),veh/h/ln	1657	0	1757	1845	0	1760
Q Serve(g_s), s	11.1	0.0	12.8	23.0	0.0	21.4
Cycle Q Clear(g_c), s	11.1	0.0	12.8	23.0	0.0	21.4
Prop In Lane	0.49	0.50	1.00			0.24
Lane Grp Cap(c), veh/h	323	0	373	1223	0	691
V/C Ratio(X)	0.86	0.00	0.90	0.75	0.00	0.86
Avail Cap(c_a), veh/h	735	0	764	2112	0	1148
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.7	0.0	26.4	7.8	0.0	19.2
Incr Delay (d2), s/veh	6.5	0.0	7.9	0.9	0.0	3.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	7.0	11.8	0.0	11.0
LnGrp Delay(d),s/veh	33.3	0.0	34.3	8.7	0.0	22.9
LnGrp LOS	C		C	A		C
Approach Vol, veh/h	277			1252	595	
Approach Delay, s/veh	33.3			15.6	22.9	
Approach LOS	C			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		17.5	18.6	32.9				51.5
Change Period (Y+Rc), s		3.6	3.0	5.8				5.8
Max Green Setting (Gmax), s		31.0	31.0	45.0				79.0
Max Q Clear Time (g_c+I1), s		13.1	14.8	23.4				25.0
Green Ext Time (p_c), s		0.8	0.9	3.7				8.1

Intersection Summary	
HCM 2010 Ctrl Delay	20.0
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	41	9	104	275	140	325	811	135	263	484	336
Future Volume (veh/h)	200	41	9	104	275	140	325	811	135	263	484	336
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810
Adj Flow Rate, veh/h	222	46	10	116	306	156	361	901	150	292	538	373
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	300	71	60	355	275	231	417	1157	509	792	1555	832
Arrive On Green	0.09	0.04	0.04	0.21	0.15	0.15	0.12	0.34	0.34	0.40	0.76	0.76
Sat Flow, veh/h	3343	1810	1530	1723	1810	1514	3343	3438	1511	3343	3438	1534
Grp Volume(v), veh/h	222	46	10	116	306	156	361	901	150	292	538	373
Grp Sat Flow(s),veh/h/ln	1672	1810	1530	1723	1810	1514	1672	1719	1511	1672	1719	1534
Q Serve(g_s), s	5.8	2.3	0.4	5.2	13.7	5.4	9.5	21.2	6.6	5.6	4.7	7.5
Cycle Q Clear(g_c), s	5.8	2.3	0.4	5.2	13.7	5.4	9.5	21.2	6.6	5.6	4.7	7.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	300	71	60	355	275	231	417	1157	509	792	1555	832
V/C Ratio(X)	0.74	0.65	0.17	0.33	1.11	0.68	0.87	0.78	0.29	0.37	0.35	0.45
Avail Cap(c_a), veh/h	531	316	267	355	275	231	435	1157	509	792	1555	832
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.57	0.57	0.57
Uniform Delay (d), s/veh	39.9	42.6	25.9	30.4	38.2	13.8	38.7	26.8	22.0	22.4	6.6	5.0
Incr Delay (d2), s/veh	3.6	9.6	1.3	0.2	87.3	7.7	16.2	5.2	1.5	0.2	0.3	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	1.3	0.2	2.5	13.5	2.8	5.3	10.8	2.9	2.6	2.2	3.2
LnGrp Delay(d),s/veh	43.5	52.2	27.2	30.6	125.5	21.4	54.8	32.0	23.5	22.6	7.0	6.0
LnGrp LOS	D	D	C	C	F	C	D	C	C	C	A	A
Approach Vol, veh/h		278			578			1412			1203	
Approach Delay, s/veh		44.4			78.4			36.9			10.4	
Approach LOS		D			E			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.6	7.5	15.2	44.7	12.1	18.0	25.6	34.3
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9
Max Green Setting (Gmax), s	12.4	16.1	12.1	34.4	14.4	* 14	16.1	* 30
Max Q Clear Time (g_c+I1), s	7.2	4.3	11.5	9.5	7.8	15.7	7.6	23.2
Green Ext Time (p_c), s	0.1	0.1	0.1	5.1	0.4	0.0	0.6	3.7

Intersection Summary	
HCM 2010 Ctrl Delay	35.3
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	387	0	779	2	1	2	432	745	0	5	305	374
Future Volume (veh/h)	387	0	779	2	1	2	432	745	0	5	305	374
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1900	1810	1900	1810	1810	1900	1810	1810	1810
Adj Flow Rate, veh/h	416	0	838	2	1	2	465	801	0	5	328	402
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	871	0	871	1	0	1	1065	2848	0	2	863	758
Arrive On Green	0.25	0.00	0.25	0.01	0.00	0.01	0.64	1.00	0.00	0.00	0.25	0.25
Sat Flow, veh/h	3447	0	1510	657	329	657	3343	5103	0	1723	3438	1496
Grp Volume(v), veh/h	416	0	838	5	0	0	465	801	0	5	328	402
Grp Sat Flow(s),veh/h/ln	1723	0	1510	1644	0	0	1672	1647	0	1723	1719	1496
Q Serve(g_s), s	9.2	0.0	18.3	0.1	0.0	0.0	6.3	0.0	0.0	0.1	7.1	16.6
Cycle Q Clear(g_c), s	9.2	0.0	18.3	0.1	0.0	0.0	6.3	0.0	0.0	0.1	7.1	16.6
Prop In Lane	1.00		1.00	0.40		0.40	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	871	0	871	2	0	0	1065	2848	0	2	863	758
V/C Ratio(X)	0.48	0.00	0.96	2.74	0.00	0.00	0.44	0.28	0.00	2.61	0.38	0.53
Avail Cap(c_a), veh/h	996	0	926	88	0	0	1065	2848	0	92	863	758
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.77	0.77	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	0.0	18.2	44.8	0.0	0.0	12.3	0.0	0.0	45.0	27.9	15.4
Incr Delay (d2), s/veh	0.4	0.0	20.3	891.3	0.0	0.0	0.2	0.2	0.0	831.3	1.3	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	574.3	0.0	0.0	0.0	0.0	0.0	522.1	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	12.3	0.5	0.0	0.0	2.9	0.1	0.0	0.8	3.5	10.5
LnGrp Delay(d),s/veh	29.0	0.0	38.5	1510.4	0.0	0.0	12.5	0.2	0.0	1398.4	29.2	18.1
LnGrp LOS	C		D	F			B	A		F	C	B
Approach Vol, veh/h		1254			5			1266			735	
Approach Delay, s/veh		35.3			1510.3			4.7			32.4	
Approach LOS		D			F			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		26.7	33.1	26.6		3.6	3.8	55.9
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6
Max Green Setting (Gmax), s		26.8	21.4	* 23		5.8	5.6	38.8
Max Q Clear Time (g_c+I1), s		20.3	8.3	18.6		2.1	2.1	2.0
Green Ext Time (p_c), s		3.1	1.4	1.5		0.0	0.0	6.3

Intersection Summary	
HCM 2010 Ctrl Delay	25.0
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	614	293	290	473	44	79	83	496	56	80	122
Future Volume (veh/h)	68	614	293	290	473	44	79	83	496	56	80	122
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1676	1676	1676	1710	1676	1676	1676	1676	1676	1710
Adj Flow Rate, veh/h	74	667	318	315	514	48	86	90	539	61	87	133
Adj No. of Lanes	1	1	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	78	606	515	302	1478	138	92	445	671	62	147	224
Arrive On Green	0.05	0.36	0.36	0.19	0.50	0.51	0.06	0.27	0.27	0.04	0.24	0.25
Sat Flow, veh/h	1597	1676	1425	1597	2946	274	1597	1676	1425	1597	599	916
Grp Volume(v), veh/h	74	667	318	315	277	285	86	90	539	61	0	220
Grp Sat Flow(s),veh/h/ln	1597	1676	1425	1597	1593	1628	1597	1676	1425	1597	0	1515
Q Serve(g_s), s	5.1	39.7	20.2	20.8	11.6	11.6	5.9	4.6	30.0	4.2	0.0	14.1
Cycle Q Clear(g_c), s	5.1	39.7	20.2	20.8	11.6	11.6	5.9	4.6	30.0	4.2	0.0	14.1
Prop In Lane	1.00		1.00	1.00		0.17	1.00		1.00	1.00		0.60
Lane Grp Cap(c), veh/h	78	606	515	302	799	817	92	445	671	62	0	371
V/C Ratio(X)	0.95	1.10	0.62	1.04	0.35	0.35	0.93	0.20	0.80	0.99	0.00	0.59
Avail Cap(c_a), veh/h	142	606	515	302	799	817	142	445	671	142	0	402
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	52.2	35.1	28.9	44.6	16.5	16.5	51.6	31.4	24.8	52.8	0.0	36.4
Incr Delay (d2), s/veh	24.6	67.4	5.5	63.6	1.2	1.2	34.6	0.1	6.5	29.6	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	29.7	8.7	14.5	5.3	5.5	3.5	2.1	15.0	2.4	0.0	6.0
LnGrp Delay(d),s/veh	76.8	102.5	34.4	108.2	17.7	17.7	86.2	31.4	31.3	82.5	0.0	37.6
LnGrp LOS	E	F	C	F	B	B	F	C	C	F		D
Approach Vol, veh/h		1059			877			715			281	
Approach Delay, s/veh		80.2			50.2			37.9			47.3	
Approach LOS		F			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.8	43.7	10.3	31.1	9.4	59.2	8.3	33.2
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2
Max Green Setting (Gmax), s	21.8	35.0	10.8	* 30	10.8	46.0	10.8	30.0
Max Q Clear Time (g_c+I1), s	22.8	41.7	7.9	16.1	7.1	13.6	6.2	32.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.5	0.0	3.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	57.8
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	205	199	85	155	156	34	102	652	187	17	493	274
Future Volume (veh/h)	205	199	85	155	156	34	102	652	187	17	493	274
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	214	207	89	161	162	35	106	679	195	18	514	285
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	311	351	349	297	265	57	387	1334	383	335	1013	975
Arrive On Green	0.09	0.19	0.18	0.08	0.18	0.18	0.04	0.57	0.57	0.01	0.54	0.53
Sat Flow, veh/h	1792	1881	1564	1792	1493	323	1792	2347	674	1792	1881	1561
Grp Volume(v), veh/h	214	207	89	161	0	197	106	365	509	18	514	285
Grp Sat Flow(s),veh/h/ln	1792	1881	1564	1792	0	1816	1792	1260	1760	1792	1881	1561
Q Serve(g_s), s	10.1	11.1	5.2	8.1	0.0	11.0	2.8	19.3	19.3	0.5	19.1	9.3
Cycle Q Clear(g_c), s	10.1	11.1	5.2	8.1	0.0	11.0	2.8	19.3	19.3	0.5	19.1	9.3
Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.38	1.00		1.00
Lane Grp Cap(c), veh/h	311	351	349	297	0	322	387	717	1001	335	1013	975
V/C Ratio(X)	0.69	0.59	0.26	0.54	0.00	0.61	0.27	0.51	0.51	0.05	0.51	0.29
Avail Cap(c_a), veh/h	311	546	510	314	0	527	474	717	1001	475	1013	975
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.6	40.9	35.3	34.4	0.0	41.7	12.1	14.4	14.4	12.8	16.1	9.6
Incr Delay (d2), s/veh	5.2	1.6	0.4	0.7	0.0	1.9	0.1	2.6	1.8	0.0	1.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	5.9	2.3	4.1	0.0	5.7	1.4	7.2	9.9	0.2	10.4	4.2
LnGrp Delay(d),s/veh	40.8	42.4	35.7	35.1	0.0	43.6	12.3	17.0	16.3	12.8	17.9	10.4
LnGrp LOS	D	D	D	D		D	B	B	B	B	B	B
Approach Vol, veh/h		510			358			980			817	
Approach Delay, s/veh		40.6			39.8			16.1			15.2	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.1	24.5	8.8	63.6	14.1	23.5	5.5	66.8
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3
Max Green Setting (Gmax), s	11.1	32.0	11.1	* 42	11.1	32.0	11.1	41.6
Max Q Clear Time (g_c+I1), s	10.1	13.1	4.8	21.1	12.1	13.0	2.5	21.3
Green Ext Time (p_c), s	0.0	1.4	0.1	2.4	0.0	0.9	0.0	3.2

Intersection Summary	
HCM 2010 Ctrl Delay	23.7
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	219	104	274	744	674	77
Future Volume (veh/h)	219	104	274	744	674	77
Number	5	12	3	8	4	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1900	1881	1881	1881	1900
Adj Flow Rate, veh/h	228	108	285	775	702	80
Adj No. of Lanes	0	0	1	1	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	1	1	1	1
Cap, veh/h	253	120	313	1267	754	86
Arrive On Green	0.22	0.22	0.17	0.67	0.45	0.45
Sat Flow, veh/h	1167	553	1792	1881	1659	189
Grp Volume(v), veh/h	337	0	285	775	0	782
Grp Sat Flow(s),veh/h/ln	1725	0	1792	1881	0	1848
Q Serve(g_s), s	17.1	0.0	14.0	20.5	0.0	35.9
Cycle Q Clear(g_c), s	17.1	0.0	14.0	20.5	0.0	35.9
Prop In Lane	0.68	0.32	1.00			0.10
Lane Grp Cap(c), veh/h	375	0	313	1267	0	840
V/C Ratio(X)	0.90	0.00	0.91	0.61	0.00	0.93
Avail Cap(c_a), veh/h	588	0	599	1655	0	926
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.1	0.0	36.4	8.1	0.0	23.2
Incr Delay (d2), s/veh	11.4	0.0	10.1	0.5	0.0	14.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	0.0	7.8	10.7	0.0	21.7
LnGrp Delay(d),s/veh	45.5	0.0	46.5	8.6	0.0	38.0
LnGrp LOS	D		D	A		D
Approach Vol, veh/h	337			1060	782	
Approach Delay, s/veh	45.5			18.8	38.0	
Approach LOS	D			B	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		23.5	19.7	46.6				66.3
Change Period (Y+Rc), s		3.6	3.0	5.8				5.8
Max Green Setting (Gmax), s		31.0	31.0	45.0				79.0
Max Q Clear Time (g_c+I1), s		19.1	16.0	37.9				22.5
Green Ext Time (p_c), s		0.8	0.7	2.9				6.0

Intersection Summary		
HCM 2010 Ctrl Delay		29.8
HCM 2010 LOS		C

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	261	41	27	108	209	171	329	1064	181	201	993	278
Future Volume (veh/h)	261	41	27	108	209	171	329	1064	181	201	993	278
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	266	42	28	110	213	174	336	1086	185	205	1013	284
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	327	76	63	334	245	204	386	1543	671	685	1859	973
Arrive On Green	0.10	0.04	0.04	0.19	0.13	0.13	0.11	0.44	0.44	0.13	0.35	0.35
Sat Flow, veh/h	3442	1863	1549	1774	1863	1551	3442	3539	1541	3442	3539	1565
Grp Volume(v), veh/h	266	42	28	110	213	174	336	1086	185	205	1013	284
Grp Sat Flow(s),veh/h/ln	1721	1863	1549	1774	1863	1551	1721	1770	1541	1721	1770	1565
Q Serve(g_s), s	9.1	2.7	1.7	6.4	13.5	9.2	11.5	30.0	9.2	6.5	27.5	12.8
Cycle Q Clear(g_c), s	9.1	2.7	1.7	6.4	13.5	9.2	11.5	30.0	9.2	6.5	27.5	12.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	327	76	63	334	245	204	386	1543	671	685	1859	973
V/C Ratio(X)	0.81	0.55	0.44	0.33	0.87	0.85	0.87	0.70	0.28	0.30	0.54	0.29
Avail Cap(c_a), veh/h	467	306	254	334	306	255	450	1543	671	685	1859	973
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.60	0.60	0.60
Uniform Delay (d), s/veh	53.2	56.5	37.9	42.1	51.1	24.7	52.4	27.6	21.7	44.4	27.4	15.1
Incr Delay (d2), s/veh	7.1	6.2	4.8	0.2	19.1	19.7	15.1	2.7	1.0	0.1	0.7	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	1.5	0.8	3.2	8.2	5.1	6.3	15.2	4.1	3.1	13.7	5.7
LnGrp Delay(d),s/veh	60.4	62.6	42.7	42.3	70.2	44.3	67.5	30.3	22.7	44.6	28.1	15.6
LnGrp LOS	E	E	D	D	E	D	E	C	C	D	C	B
Approach Vol, veh/h		336			497			1607			1502	
Approach Delay, s/veh		59.2			55.0			37.2			28.0	
Approach LOS		E			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.6	8.9	17.4	67.0	15.4	20.1	28.2	56.3
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9
Max Green Setting (Gmax), s	16.4	20.1	16.1	52.4	16.4	* 20	16.1	* 52
Max Q Clear Time (g_c+I1), s	8.4	4.7	13.5	29.5	11.1	15.5	8.5	32.0
Green Ext Time (p_c), s	0.1	0.2	0.3	8.7	0.4	0.8	0.4	8.5

Intersection Summary	
HCM 2010 Ctrl Delay	37.8
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	491	1	800	4	2	14	482	1104	2	8	673	421
Future Volume (veh/h)	491	1	800	4	2	14	482	1104	2	8	673	421
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	502	0	816	4	2	14	492	1127	2	8	687	430
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	806	0	811	4	2	13	1001	3317	6	6	1209	889
Arrive On Green	0.22	0.00	0.22	0.02	0.01	0.02	0.58	1.00	1.00	0.00	0.34	0.33
Sat Flow, veh/h	3583	0	1557	318	159	1112	3476	5294	9	1792	3574	1579
Grp Volume(v), veh/h	502	0	816	20	0	0	492	729	400	8	687	430
Grp Sat Flow(s),veh/h/ln	1792	0	1557	1589	0	0	1738	1712	1879	1792	1787	1579
Q Serve(g_s), s	15.2	0.0	27.0	1.4	0.0	0.0	10.0	0.0	0.0	0.4	18.9	19.8
Cycle Q Clear(g_c), s	15.2	0.0	27.0	1.4	0.0	0.0	10.0	0.0	0.0	0.4	18.9	19.8
Prop In Lane	1.00		1.00	0.20		0.70	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	806	0	811	19	0	0	1001	2145	1178	6	1209	889
V/C Ratio(X)	0.62	0.00	1.01	1.05	0.00	0.00	0.49	0.34	0.34	1.45	0.57	0.48
Avail Cap(c_a), veh/h	806	0	811	103	0	0	1001	2145	1178	78	1209	889
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.77	0.77	0.77	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.9	0.0	29.0	58.8	0.0	0.0	20.2	0.0	0.0	59.8	32.5	16.0
Incr Delay (d2), s/veh	1.5	0.0	33.1	73.5	0.0	0.0	0.3	0.3	0.6	265.0	1.9	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	74.6	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	18.7	1.0	0.0	0.0	4.8	0.1	0.2	0.6	9.7	13.5
LnGrp Delay(d),s/veh	43.4	0.0	62.2	133.7	0.0	0.0	20.5	0.3	0.6	399.5	34.5	17.8
LnGrp LOS	D		F	F			C	A	A	F	C	B
Approach Vol, veh/h		1318			20			1621			1125	
Approach Delay, s/veh		55.0			133.7			6.5			30.7	
Approach LOS		E			F			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		31.0	39.0	44.6		5.4	4.4	79.2
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6
Max Green Setting (Gmax), s		27.8	29.4	* 41		8.8	6.0	38.4
Max Q Clear Time (g_c+I1), s		29.0	12.0	21.8		3.4	2.4	2.0
Green Ext Time (p_c), s		0.0	1.6	6.2		0.0	0.0	9.0

Intersection Summary		
HCM 2010 Ctrl Delay		29.5
HCM 2010 LOS		C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	522	210	252	564	89	118	232	664	106	136	136
Future Volume (veh/h)	88	522	210	252	564	89	118	232	664	106	136	136
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1676	1676	1676	1710	1676	1676	1676	1676	1676	1710
Adj Flow Rate, veh/h	96	567	228	274	613	97	128	252	722	115	148	148
Adj No. of Lanes	1	1	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	104	554	471	288	1230	194	140	445	659	125	195	195
Arrive On Green	0.06	0.33	0.33	0.18	0.45	0.45	0.09	0.27	0.27	0.08	0.25	0.26
Sat Flow, veh/h	1597	1676	1425	1597	2757	435	1597	1676	1425	1597	770	770
Grp Volume(v), veh/h	96	567	228	274	354	356	128	252	722	115	0	296
Grp Sat Flow(s),veh/h/ln	1597	1676	1425	1597	1593	1600	1597	1676	1425	1597	0	1541
Q Serve(g_s), s	6.6	36.4	14.0	18.7	17.4	17.4	8.7	14.3	30.0	7.9	0.0	19.5
Cycle Q Clear(g_c), s	6.6	36.4	14.0	18.7	17.4	17.4	8.7	14.3	30.0	7.9	0.0	19.5
Prop In Lane	1.00		1.00	1.00		0.27	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	104	554	471	288	711	714	140	445	659	125	0	391
V/C Ratio(X)	0.93	1.02	0.48	0.95	0.50	0.50	0.91	0.57	1.10	0.92	0.00	0.76
Avail Cap(c_a), veh/h	142	554	471	316	711	714	418	445	659	128	0	391
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.2	36.8	29.3	44.6	21.7	21.6	49.7	34.9	29.6	50.4	0.0	37.7
Incr Delay (d2), s/veh	39.8	44.2	3.5	36.2	2.5	2.5	8.7	1.1	64.2	54.9	0.0	7.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	23.6	5.9	11.1	8.2	8.2	4.2	6.7	31.5	5.4	0.0	9.1
LnGrp Delay(d),s/veh	90.9	81.0	32.9	80.8	24.2	24.1	58.5	36.0	93.8	105.3	0.0	45.1
LnGrp LOS	F	F	C	F	C	C	E	D	F	F		D
Approach Vol, veh/h		891			984			1102			411	
Approach Delay, s/veh		69.7			39.9			76.4			62.0	
Approach LOS		E			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.9	40.4	13.7	32.1	11.1	53.1	12.6	33.2
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2
Max Green Setting (Gmax), s	22.8	35.0	29.8	* 10	10.8	47.0	9.8	30.0
Max Q Clear Time (g_c+I1), s	20.7	38.4	10.7	21.5	8.6	19.4	9.9	32.0
Green Ext Time (p_c), s	0.2	0.0	0.1	0.0	0.0	4.9	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	62.3
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	120	50	200	290	70	110	820	190	30	400	180
Future Volume (veh/h)	140	120	50	200	290	70	110	820	190	30	400	180
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	159	136	13	227	330	71	125	932	206	34	455	94
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	225	435	426	430	366	79	398	1217	269	199	881	840
Arrive On Green	0.08	0.24	0.23	0.09	0.25	0.25	0.05	0.50	0.50	0.03	0.48	0.47
Sat Flow, veh/h	1757	1845	1560	1757	1466	316	1757	2444	540	1757	1845	1529
Grp Volume(v), veh/h	159	136	13	227	0	401	125	471	667	34	455	94
Grp Sat Flow(s),veh/h/ln	1757	1845	1560	1757	0	1782	1757	1236	1747	1757	1845	1529
Q Serve(g_s), s	7.6	6.7	0.7	10.1	0.0	24.0	4.1	34.0	34.1	1.1	18.8	3.3
Cycle Q Clear(g_c), s	7.6	6.7	0.7	10.1	0.0	24.0	4.1	34.0	34.1	1.1	18.8	3.3
Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.31	1.00		1.00
Lane Grp Cap(c), veh/h	225	435	426	430	0	445	398	615	870	199	881	840
V/C Ratio(X)	0.71	0.31	0.03	0.53	0.00	0.90	0.31	0.77	0.77	0.17	0.52	0.11
Avail Cap(c_a), veh/h	250	535	511	430	0	517	479	615	870	314	881	840
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.8	34.7	29.3	30.0	0.0	39.9	15.8	22.4	22.4	19.3	19.9	12.0
Incr Delay (d2), s/veh	6.1	0.4	0.0	0.6	0.0	17.2	0.2	8.8	6.4	0.1	2.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	3.4	0.3	1.1	0.0	13.9	2.0	13.0	17.9	0.5	10.0	1.4
LnGrp Delay(d),s/veh	37.9	35.1	29.3	30.6	0.0	57.1	15.9	31.2	28.8	19.4	22.1	12.3
LnGrp LOS	D	D	C	C		E	B	C	C	B	C	B
Approach Vol, veh/h		308			628			1263			583	
Approach Delay, s/veh		36.3			47.5			28.4			20.3	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.1	29.9	9.0	57.0	12.6	31.5	6.9	59.1
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3
Max Green Setting (Gmax), s	11.1	32.0	11.1	* 42	11.1	32.0	11.1	41.6
Max Q Clear Time (g_c+I1), s	12.1	8.7	6.1	20.8	9.6	26.0	3.1	36.1
Green Ext Time (p_c), s	0.0	0.7	0.1	1.8	0.0	1.2	0.0	2.3

Intersection Summary			
HCM 2010 Ctrl Delay			31.9
HCM 2010 LOS			C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	10	140	10	40	30	340	920	10	10	470	150
Future Volume (veh/h)	150	10	140	10	40	30	340	920	10	10	470	150
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1900	1863	1863	1900	1845	1845	1863	1863	1845	1900
Adj Flow Rate, veh/h	158	11	124	11	42	10	358	968	7	11	495	150
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	2	2	3	3
Cap, veh/h	174	12	137	73	60	14	376	2071	935	23	533	161
Arrive On Green	0.19	0.19	0.19	0.04	0.04	0.04	0.21	0.59	0.59	0.01	0.39	0.39
Sat Flow, veh/h	903	63	709	1774	1455	346	1757	3505	1583	1774	1352	410
Grp Volume(v), veh/h	293	0	0	11	0	52	358	968	7	11	0	645
Grp Sat Flow(s),veh/h/ln	1675	0	0	1774	0	1802	1757	1752	1583	1774	0	1761
Q Serve(g_s), s	19.4	0.0	0.0	0.7	0.0	3.2	22.7	17.7	0.2	0.7	0.0	39.6
Cycle Q Clear(g_c), s	19.4	0.0	0.0	0.7	0.0	3.2	22.7	17.7	0.2	0.7	0.0	39.6
Prop In Lane	0.54		0.42	1.00		0.19	1.00		1.00	1.00		0.23
Lane Grp Cap(c), veh/h	323	0	0	73	0	74	376	2071	935	23	0	694
V/C Ratio(X)	0.91	0.00	0.00	0.15	0.00	0.71	0.95	0.47	0.01	0.48	0.00	0.93
Avail Cap(c_a), veh/h	355	0	0	282	0	287	435	2312	1044	78	0	811
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.8	0.0	0.0	52.3	0.0	53.6	43.9	13.1	9.5	55.4	0.0	32.7
Incr Delay (d2), s/veh	24.9	0.0	0.0	1.0	0.0	11.6	29.2	0.2	0.0	14.7	0.0	15.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.2	0.0	0.0	0.4	0.0	1.8	14.1	8.5	0.1	0.4	0.0	22.2
LnGrp Delay(d),s/veh	69.7	0.0	0.0	53.3	0.0	65.2	73.1	13.2	9.5	70.2	0.0	48.3
LnGrp LOS	E			D		E	E	B	A	E		D
Approach Vol, veh/h		293			63			1333			656	
Approach Delay, s/veh		69.7			63.1			29.3			48.6	
Approach LOS		E			E			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		25.4	28.2	50.4		9.1	6.0	72.6
Change Period (Y+Rc), s		3.6	3.0	5.8		4.5	4.5	5.8
Max Green Setting (Gmax), s		24.0	29.0	52.1		18.0	5.0	74.6
Max Q Clear Time (g_c+I1), s		21.4	24.7	41.6		5.2	2.7	19.7
Green Ext Time (p_c), s		0.4	0.4	3.0		0.1	0.0	7.8

Intersection Summary	
HCM 2010 Ctrl Delay	40.7
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	70	10	130	300	170	350	860	150	290	510	360
Future Volume (veh/h)	220	70	10	130	300	170	350	860	150	290	510	360
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810
Adj Flow Rate, veh/h	244	78	0	144	333	12	389	956	53	322	567	371
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	323	99	84	341	275	231	435	1157	509	769	1513	824
Arrive On Green	0.10	0.05	0.00	0.20	0.15	0.15	0.13	0.34	0.34	0.38	0.74	0.74
Sat Flow, veh/h	3343	1810	1538	1723	1810	1514	3343	3438	1511	3343	3438	1534
Grp Volume(v), veh/h	244	78	0	144	333	12	389	956	53	322	567	371
Grp Sat Flow(s),veh/h/ln	1672	1810	1538	1723	1810	1514	1672	1719	1511	1672	1719	1534
Q Serve(g_s), s	6.4	3.8	0.0	6.6	13.7	0.4	10.3	23.0	2.2	6.4	5.4	8.0
Cycle Q Clear(g_c), s	6.4	3.8	0.0	6.6	13.7	0.4	10.3	23.0	2.2	6.4	5.4	8.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	323	99	84	341	275	231	435	1157	509	769	1513	824
V/C Ratio(X)	0.76	0.79	0.00	0.42	1.21	0.05	0.90	0.83	0.10	0.42	0.37	0.45
Avail Cap(c_a), veh/h	531	316	268	341	275	231	435	1157	509	769	1513	824
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.46	0.46	0.46
Uniform Delay (d), s/veh	39.6	42.0	0.0	31.6	38.1	12.8	38.5	27.4	20.5	23.3	7.4	5.5
Incr Delay (d2), s/veh	3.6	13.1	0.0	0.3	122.9	0.1	20.6	6.8	0.4	0.2	0.3	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	2.3	0.0	3.1	16.2	0.2	6.0	12.0	1.0	2.9	2.6	3.4
LnGrp Delay(d),s/veh	43.2	55.2	0.0	31.9	161.1	12.9	59.1	34.2	20.9	23.5	7.7	6.3
LnGrp LOS	D	E		C	F	B	E	C	C	C	A	A
Approach Vol, veh/h		322			489			1398			1260	
Approach Delay, s/veh		46.1			119.4			40.6			11.3	
Approach LOS		D			F			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.8	8.9	15.7	43.6	12.7	18.0	25.0	34.3
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9
Max Green Setting (Gmax), s	12.4	16.1	12.1	34.4	14.4	* 14	16.1	* 30
Max Q Clear Time (g_c+I1), s	8.6	5.8	12.3	10.0	8.4	15.7	8.4	25.0
Green Ext Time (p_c), s	0.1	0.2	0.0	5.4	0.4	0.0	0.7	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	41.6
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	420	0	820	10	10	10	470	800	0	10	330	430
Future Volume (veh/h)	420	0	820	10	10	10	470	800	0	10	330	430
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1900	1810	1900	1810	1810	1900	1810	1810	1810
Adj Flow Rate, veh/h	452	0	709	11	11	0	505	860	0	11	355	362
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	650	0	847	11	11	0	1223	3047	0	8	863	659
Arrive On Green	0.19	0.00	0.19	0.02	0.01	0.00	0.73	1.00	0.00	0.00	0.25	0.25
Sat Flow, veh/h	3447	0	1506	883	883	0	3343	5103	0	1723	3438	1496
Grp Volume(v), veh/h	452	0	709	22	0	0	505	860	0	11	355	362
Grp Sat Flow(s),veh/h/ln	1723	0	1506	1765	0	0	1672	1647	0	1723	1719	1496
Q Serve(g_s), s	11.0	0.0	1.4	1.1	0.0	0.0	5.2	0.0	0.0	0.4	7.8	16.2
Cycle Q Clear(g_c), s	11.0	0.0	1.4	1.1	0.0	0.0	5.2	0.0	0.0	0.4	7.8	16.2
Prop In Lane	1.00		1.00	0.50		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	650	0	847	22	0	0	1223	3047	0	8	863	659
V/C Ratio(X)	0.70	0.00	0.84	1.01	0.00	0.00	0.41	0.28	0.00	1.43	0.41	0.55
Avail Cap(c_a), veh/h	996	0	998	94	0	0	1223	3047	0	92	863	659
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.71	0.71	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.1	0.0	16.6	44.2	0.0	0.0	8.4	0.0	0.0	44.8	28.1	18.9
Incr Delay (d2), s/veh	1.4	0.0	5.6	55.9	0.0	0.0	0.2	0.2	0.0	242.4	1.4	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.9	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	0.0	1.6	0.9	0.0	0.0	2.3	0.0	0.0	0.7	3.9	9.5
LnGrp Delay(d),s/veh	35.5	0.0	22.2	100.2	0.0	0.0	8.5	0.2	0.0	353.1	29.6	22.2
LnGrp LOS	D		C	F			A	A		F	C	C
Approach Vol, veh/h		1161			22			1365			728	
Approach Delay, s/veh		27.3			100.2			3.3			30.8	
Approach LOS		C			F			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.0	37.3	26.6		5.1	4.4	59.5
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6
Max Green Setting (Gmax), s		26.8	21.4	* 23		5.8	5.6	38.8
Max Q Clear Time (g_c+I1), s		13.0	7.2	18.2		3.1	2.4	2.0
Green Ext Time (p_c), s		4.3	1.6	1.6		0.0	0.0	6.9

Intersection Summary		
HCM 2010 Ctrl Delay		18.6
HCM 2010 LOS		B

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	650	310	350	510	50	90	90	530	60	90	130
Future Volume (veh/h)	80	650	310	350	510	50	90	90	530	60	90	130
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1676	1676	1676	1710	1676	1676	1676	1676	1676	1710
Adj Flow Rate, veh/h	87	707	164	380	554	47	98	98	498	65	98	87
Adj No. of Lanes	1	1	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	600	510	302	1453	123	106	445	671	67	196	174
Arrive On Green	0.06	0.36	0.36	0.19	0.49	0.50	0.07	0.27	0.27	0.04	0.24	0.25
Sat Flow, veh/h	1597	1676	1425	1597	2973	252	1597	1676	1425	1597	820	728
Grp Volume(v), veh/h	87	707	164	380	296	305	98	98	498	65	0	185
Grp Sat Flow(s),veh/h/ln	1597	1676	1425	1597	1593	1632	1597	1676	1425	1597	0	1548
Q Serve(g_s), s	6.0	39.4	9.2	20.8	12.8	12.9	6.7	5.0	30.0	4.5	0.0	11.3
Cycle Q Clear(g_c), s	6.0	39.4	9.2	20.8	12.8	12.9	6.7	5.0	30.0	4.5	0.0	11.3
Prop In Lane	1.00		1.00	1.00		0.15	1.00		1.00	1.00		0.47
Lane Grp Cap(c), veh/h	93	600	510	302	778	798	106	445	671	67	0	370
V/C Ratio(X)	0.93	1.18	0.32	1.26	0.38	0.38	0.93	0.22	0.74	0.97	0.00	0.50
Avail Cap(c_a), veh/h	142	600	510	302	778	798	142	445	671	142	0	411
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.6	35.3	25.6	44.6	17.7	17.6	51.1	31.5	23.7	52.6	0.0	35.9
Incr Delay (d2), s/veh	35.1	96.3	1.7	140.4	1.4	1.4	40.7	0.1	3.9	25.3	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	34.2	3.9	20.9	5.9	6.1	4.2	2.3	12.9	2.4	0.0	4.9
LnGrp Delay(d),s/veh	86.7	131.6	27.3	185.0	19.1	19.0	91.8	31.6	27.6	78.0	0.0	36.3
LnGrp LOS	F	F	C	F	B	B	F	C	C	E		D
Approach Vol, veh/h		958			981			694			250	
Approach Delay, s/veh		109.7			83.3			37.2			47.2	
Approach LOS		F			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.8	43.4	11.3	30.5	10.4	57.8	8.6	33.2
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2
Max Green Setting (Gmax), s	21.8	35.0	10.8	* 30	10.8	46.0	10.8	30.0
Max Q Clear Time (g_c+I1), s	22.8	41.4	8.7	13.3	8.0	14.9	6.5	32.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.4	0.0	4.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	77.9
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	290	110	180	220	60	120	700	240	50	540	290
Future Volume (veh/h)	220	290	110	180	220	60	120	700	240	50	540	290
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	229	302	26	188	229	52	125	729	236	52	562	169
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	292	394	386	282	310	70	354	1174	380	290	951	923
Arrive On Green	0.09	0.21	0.20	0.09	0.21	0.21	0.04	0.52	0.52	0.03	0.51	0.50
Sat Flow, veh/h	1792	1881	1568	1792	1479	336	1792	2273	736	1792	1881	1561
Grp Volume(v), veh/h	229	302	26	188	0	281	125	404	561	52	562	169
Grp Sat Flow(s),veh/h/ln	1792	1881	1568	1792	0	1814	1792	1260	1749	1792	1881	1561
Q Serve(g_s), s	10.1	16.6	1.4	9.1	0.0	15.9	3.8	25.1	25.1	1.5	23.2	5.5
Cycle Q Clear(g_c), s	10.1	16.6	1.4	9.1	0.0	15.9	3.8	25.1	25.1	1.5	23.2	5.5
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.42	1.00		1.00
Lane Grp Cap(c), veh/h	292	394	386	282	0	380	354	651	903	290	951	923
V/C Ratio(X)	0.79	0.77	0.07	0.67	0.00	0.74	0.35	0.62	0.62	0.18	0.59	0.18
Avail Cap(c_a), veh/h	292	546	513	283	0	526	439	651	903	393	951	923
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.6	40.9	31.8	32.3	0.0	40.7	15.4	18.9	18.9	15.3	19.2	10.4
Incr Delay (d2), s/veh	12.2	4.3	0.1	4.7	0.0	3.5	0.2	4.4	3.2	0.1	2.7	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	9.1	0.6	4.8	0.0	8.3	1.9	9.4	12.8	0.8	12.7	2.5
LnGrp Delay(d),s/veh	46.8	45.3	31.9	37.0	0.0	44.2	15.6	23.4	22.1	15.4	21.9	10.8
LnGrp LOS	D	D	C	D		D	B	C	C	B	C	B
Approach Vol, veh/h		557			469			1090			783	
Approach Delay, s/veh		45.3			41.3			21.8			19.1	
Approach LOS		D			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.1	27.0	8.9	60.0	14.1	27.0	7.8	61.1
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3
Max Green Setting (Gmax), s	11.1	32.0	11.1	* 42	11.1	32.0	11.1	41.6
Max Q Clear Time (g_c+I1), s	11.1	18.6	5.8	25.2	12.1	17.9	3.5	27.1
Green Ext Time (p_c), s	0.0	1.5	0.1	2.3	0.0	1.3	0.0	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	28.7
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	40	110	10	20	20	290	800	10	40	720	90
Future Volume (veh/h)	250	40	110	10	20	20	290	800	10	40	720	90
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1879	1900	1863	1863	1900	1881	1881	1863	1863	1881	1900
Adj Flow Rate, veh/h	260	42	106	10	21	0	302	833	6	42	750	91
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	2	2	1	1
Cap, veh/h	241	39	98	45	47	0	291	2113	936	54	762	92
Arrive On Green	0.21	0.22	0.22	0.03	0.03	0.00	0.16	0.59	0.59	0.03	0.46	0.46
Sat Flow, veh/h	1111	180	453	1774	1863	0	1792	3574	1583	1774	1646	200
Grp Volume(v), veh/h	408	0	0	10	21	0	302	833	6	42	0	841
Grp Sat Flow(s),veh/h/ln	1744	0	0	1774	1863	0	1792	1787	1583	1774	0	1846
Q Serve(g_s), s	29.4	0.0	0.0	0.7	1.5	0.0	22.0	16.8	0.2	3.2	0.0	60.9
Cycle Q Clear(g_c), s	29.4	0.0	0.0	0.7	1.5	0.0	22.0	16.8	0.2	3.2	0.0	60.9
Prop In Lane	0.64		0.26	1.00		0.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	379	0	0	45	47	0	291	2113	936	54	0	855
V/C Ratio(X)	1.08	0.00	0.00	0.22	0.44	0.00	1.04	0.39	0.01	0.78	0.00	0.98
Avail Cap(c_a), veh/h	379	0	0	236	248	0	291	2113	936	121	0	855
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	53.1	0.0	0.0	64.7	65.1	0.0	56.7	14.8	11.4	65.2	0.0	35.9
Incr Delay (d2), s/veh	68.6	0.0	0.0	2.4	6.4	0.0	62.9	0.1	0.0	20.7	0.0	26.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.3	0.0	0.0	0.4	0.9	0.0	15.9	8.2	0.1	1.9	0.0	37.2
LnGrp Delay(d),s/veh	121.8	0.0	0.0	67.1	71.4	0.0	119.6	14.9	11.4	85.9	0.0	62.7
LnGrp LOS	F			E	E		F	B	B	F		E
Approach Vol, veh/h		408			31			1141			883	
Approach Delay, s/veh		121.8			70.0			42.6			63.8	
Approach LOS		F			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		33.0	26.0	68.5		7.9	8.6	85.9
Change Period (Y+Rc), s		3.6	3.0	5.8		4.5	4.5	5.8
Max Green Setting (Gmax), s		29.4	23.0	62.7		18.0	9.2	75.0
Max Q Clear Time (g_c+I1), s		31.4	24.0	62.9		3.5	5.2	18.8
Green Ext Time (p_c), s		0.0	0.0	0.0		0.1	0.0	6.3

Intersection Summary	
HCM 2010 Ctrl Delay	63.7
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	70	30	130	240	190	350	1120	220	230	1050	300
Future Volume (veh/h)	300	70	30	130	240	190	350	1120	220	230	1050	300
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	306	71	1	133	245	28	357	1143	129	235	1071	269
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	366	99	83	357	271	226	405	1543	671	599	1751	942
Arrive On Green	0.11	0.05	0.05	0.20	0.15	0.15	0.12	0.44	0.44	0.12	0.33	0.33
Sat Flow, veh/h	3442	1863	1557	1774	1863	1552	3442	3539	1541	3442	3539	1564
Grp Volume(v), veh/h	306	71	1	133	245	28	357	1143	129	235	1071	269
Grp Sat Flow(s),veh/h/ln	1721	1863	1557	1774	1863	1552	1721	1770	1541	1721	1770	1564
Q Serve(g_s), s	10.5	4.5	0.1	7.8	15.5	1.4	12.3	32.3	6.2	7.6	30.5	12.3
Cycle Q Clear(g_c), s	10.5	4.5	0.1	7.8	15.5	1.4	12.3	32.3	6.2	7.6	30.5	12.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	366	99	83	357	271	226	405	1543	671	599	1751	942
V/C Ratio(X)	0.84	0.72	0.01	0.37	0.90	0.12	0.88	0.74	0.19	0.39	0.61	0.29
Avail Cap(c_a), veh/h	467	306	256	357	306	255	450	1543	671	599	1751	942
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.48	0.48	0.48
Uniform Delay (d), s/veh	52.6	55.9	35.5	41.4	50.4	23.1	52.1	28.2	20.8	47.1	30.5	15.9
Incr Delay (d2), s/veh	10.1	9.2	0.1	0.2	26.6	0.2	17.0	3.2	0.6	0.2	0.8	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	2.6	0.0	3.8	10.0	0.6	6.8	16.4	2.8	3.6	15.1	5.4
LnGrp Delay(d),s/veh	62.7	65.1	35.6	41.6	77.0	23.4	69.1	31.5	21.5	47.3	31.2	16.3
LnGrp LOS	E	E	D	D	E	C	E	C	C	D	C	B
Approach Vol, veh/h		378			406			1629			1575	
Approach Delay, s/veh		63.1			61.7			38.9			31.1	
Approach LOS		E			E			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.1	10.4	18.1	63.4	16.8	21.8	25.2	56.3
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9
Max Green Setting (Gmax), s	16.4	20.1	16.1	52.4	16.4	* 20	16.1	* 52
Max Q Clear Time (g_c+I1), s	9.8	6.5	14.3	32.5	12.5	17.5	9.6	34.3
Green Ext Time (p_c), s	0.1	0.2	0.3	8.6	0.4	0.3	0.4	8.3

Intersection Summary	
HCM 2010 Ctrl Delay	40.4
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	530	10	850	10	10	20	520	1190	10	10	720	470
Future Volume (veh/h)	530	10	850	10	10	20	520	1190	10	10	720	470
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	548	0	751	10	10	1	531	1214	10	10	735	391
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	686	0	810	11	11	1	1115	3453	28	9	1209	835
Arrive On Green	0.19	0.00	0.19	0.02	0.01	0.02	0.64	1.00	1.00	0.01	0.34	0.33
Sat Flow, veh/h	3583	0	1553	865	865	86	3476	5252	43	1792	3574	1579
Grp Volume(v), veh/h	548	0	751	21	0	0	531	791	433	10	735	391
Grp Sat Flow(s),veh/h/ln	1792	0	1553	1816	0	0	1738	1712	1872	1792	1787	1579
Q Serve(g_s), s	17.5	0.0	14.1	1.4	0.0	0.0	9.5	0.0	0.0	0.6	20.6	18.7
Cycle Q Clear(g_c), s	17.5	0.0	14.1	1.4	0.0	0.0	9.5	0.0	0.0	0.6	20.6	18.7
Prop In Lane	1.00		1.00	0.48		0.05	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	686	0	810	23	0	0	1115	2251	1231	9	1209	835
V/C Ratio(X)	0.80	0.00	0.93	0.91	0.00	0.00	0.48	0.35	0.35	1.08	0.61	0.47
Avail Cap(c_a), veh/h	806	0	863	118	0	0	1115	2251	1231	78	1209	835
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.70	0.70	0.70	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.3	0.0	27.0	58.9	0.0	0.0	16.3	0.0	0.0	59.7	33.1	17.9
Incr Delay (d2), s/veh	4.9	0.0	15.3	35.1	0.0	0.0	0.2	0.3	0.6	108.5	2.3	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	0.0	9.3	0.9	0.0	0.0	4.5	0.1	0.2	0.6	10.5	11.8
LnGrp Delay(d),s/veh	51.2	0.0	42.2	94.1	0.0	0.0	16.5	0.3	0.6	171.4	35.3	19.8
LnGrp LOS	D		D	F			B	A	A	F	D	B
Approach Vol, veh/h		1299			21			1755			1136	
Approach Delay, s/veh		46.0			94.1			5.3			31.2	
Approach LOS		D			F			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		27.0	42.9	44.6		5.5	4.6	82.9
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6
Max Green Setting (Gmax), s		27.8	29.4	* 41		8.8	6.0	38.4
Max Q Clear Time (g_c+I1), s		19.5	11.5	22.6		3.4	2.6	2.0
Green Ext Time (p_c), s		3.7	1.8	6.2		0.0	0.0	10.1

Intersection Summary	
HCM 2010 Ctrl Delay	25.3
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	560	230	290	610	100	130	250	710	120	150	150
Future Volume (veh/h)	100	560	230	290	610	100	130	250	710	120	150	150
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1676	1676	1676	1710	1676	1676	1676	1676	1676	1710
Adj Flow Rate, veh/h	109	609	90	315	663	96	141	272	723	130	163	133
Adj No. of Lanes	1	1	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	118	521	443	316	1216	176	154	445	684	128	211	172
Arrive On Green	0.07	0.31	0.31	0.20	0.44	0.44	0.10	0.27	0.27	0.08	0.25	0.26
Sat Flow, veh/h	1597	1676	1425	1597	2794	404	1597	1676	1425	1597	855	698
Grp Volume(v), veh/h	109	609	90	315	378	381	141	272	723	130	0	296
Grp Sat Flow(s),veh/h/ln	1597	1676	1425	1597	1593	1605	1597	1676	1425	1597	0	1553
Q Serve(g_s), s	7.5	34.2	5.1	21.7	19.3	19.3	9.6	15.6	30.0	8.8	0.0	19.5
Cycle Q Clear(g_c), s	7.5	34.2	5.1	21.7	19.3	19.3	9.6	15.6	30.0	8.8	0.0	19.5
Prop In Lane	1.00		1.00	1.00		0.25	1.00		1.00	1.00		0.45
Lane Grp Cap(c), veh/h	118	521	443	316	693	698	154	445	684	128	0	384
V/C Ratio(X)	0.92	1.17	0.20	1.00	0.54	0.55	0.91	0.61	1.06	1.02	0.00	0.77
Avail Cap(c_a), veh/h	142	521	443	316	693	698	418	445	684	128	0	384
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.6	37.9	27.9	44.1	23.0	22.9	49.2	35.4	28.6	50.6	0.0	38.3
Incr Delay (d2), s/veh	45.1	94.9	1.0	49.3	3.1	3.1	8.2	1.8	50.5	84.4	0.0	8.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	29.5	2.1	13.9	9.1	9.2	4.6	7.5	30.1	6.9	0.0	9.3
LnGrp Delay(d),s/veh	95.7	132.8	28.9	93.4	26.1	26.0	57.5	37.2	79.1	135.2	0.0	46.8
LnGrp LOS	F	F	C	F	C	C	E	D	F	F		D
Approach Vol, veh/h		808			1074			1136			426	
Approach Delay, s/veh		116.2			45.8			66.4			73.8	
Approach LOS		F			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.8	38.2	14.6	31.4	12.1	51.9	12.8	33.2
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2
Max Green Setting (Gmax), s	22.8	35.0	29.8	* 10	10.8	47.0	9.8	30.0
Max Q Clear Time (g_c+I1), s	23.7	36.2	11.6	21.5	9.5	21.3	10.8	32.0
Green Ext Time (p_c), s	0.0	0.0	0.2	0.0	0.0	5.2	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	72.6
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	120	50	200	290	70	110	820	190	30	405	180
Future Volume (veh/h)	140	120	50	200	290	70	110	820	190	30	405	180
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	159	136	13	227	330	71	125	932	206	34	460	94
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	225	435	426	430	366	79	395	1217	269	199	881	840
Arrive On Green	0.08	0.24	0.23	0.09	0.25	0.25	0.05	0.50	0.50	0.03	0.48	0.47
Sat Flow, veh/h	1757	1845	1560	1757	1466	316	1757	2444	540	1757	1845	1529
Grp Volume(v), veh/h	159	136	13	227	0	401	125	471	667	34	460	94
Grp Sat Flow(s),veh/h/ln	1757	1845	1560	1757	0	1782	1757	1236	1747	1757	1845	1529
Q Serve(g_s), s	7.6	6.7	0.7	10.1	0.0	24.0	4.1	34.0	34.1	1.1	19.1	3.3
Cycle Q Clear(g_c), s	7.6	6.7	0.7	10.1	0.0	24.0	4.1	34.0	34.1	1.1	19.1	3.3
Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.31	1.00		1.00
Lane Grp Cap(c), veh/h	225	435	426	430	0	445	395	615	870	199	881	840
V/C Ratio(X)	0.71	0.31	0.03	0.53	0.00	0.90	0.32	0.77	0.77	0.17	0.52	0.11
Avail Cap(c_a), veh/h	250	535	511	430	0	517	476	615	870	314	881	840
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.8	34.7	29.3	30.0	0.0	39.9	15.8	22.4	22.4	19.3	20.0	12.0
Incr Delay (d2), s/veh	6.1	0.4	0.0	0.6	0.0	17.2	0.2	8.8	6.4	0.1	2.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	3.4	0.3	1.1	0.0	13.9	2.0	13.0	17.9	0.5	10.3	1.4
LnGrp Delay(d),s/veh	37.9	35.1	29.3	30.6	0.0	57.1	16.0	31.2	28.8	19.4	22.2	12.3
LnGrp LOS	D	D	C	C		E	B	C	C	B	C	B
Approach Vol, veh/h		308			628			1263			588	
Approach Delay, s/veh		36.3			47.5			28.4			20.4	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.1	29.9	9.0	57.0	12.6	31.5	6.9	59.1
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3
Max Green Setting (Gmax), s	11.1	32.0	11.1	* 42	11.1	32.0	11.1	41.6
Max Q Clear Time (g_c+I1), s	12.1	8.7	6.1	21.1	9.6	26.0	3.1	36.1
Green Ext Time (p_c), s	0.0	0.7	0.1	1.8	0.0	1.2	0.0	2.3

Intersection Summary	
HCM 2010 Ctrl Delay	31.9
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	10	141	10	40	30	348	920	10	10	470	155
Future Volume (veh/h)	150	10	141	10	40	30	348	920	10	10	470	155
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1900	1863	1863	1900	1845	1845	1863	1863	1845	1900
Adj Flow Rate, veh/h	158	11	125	11	42	10	366	968	7	11	495	155
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	3	3	2	2	3	3
Cap, veh/h	173	12	137	72	59	14	382	2088	943	23	529	166
Arrive On Green	0.19	0.19	0.19	0.04	0.04	0.04	0.22	0.60	0.60	0.01	0.40	0.40
Sat Flow, veh/h	900	63	712	1774	1455	346	1757	3505	1583	1774	1340	419
Grp Volume(v), veh/h	294	0	0	11	0	52	366	968	7	11	0	650
Grp Sat Flow(s),veh/h/ln	1675	0	0	1774	0	1802	1757	1752	1583	1774	0	1759
Q Serve(g_s), s	20.0	0.0	0.0	0.7	0.0	3.3	23.9	17.9	0.2	0.7	0.0	41.2
Cycle Q Clear(g_c), s	20.0	0.0	0.0	0.7	0.0	3.3	23.9	17.9	0.2	0.7	0.0	41.2
Prop In Lane	0.54		0.43	1.00		0.19	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	322	0	0	72	0	74	382	2088	943	23	0	695
V/C Ratio(X)	0.91	0.00	0.00	0.15	0.00	0.71	0.96	0.46	0.01	0.48	0.00	0.94
Avail Cap(c_a), veh/h	346	0	0	275	0	279	424	2252	1017	76	0	789
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.1	0.0	0.0	53.7	0.0	55.0	44.9	13.1	9.5	56.9	0.0	33.7
Incr Delay (d2), s/veh	26.7	0.0	0.0	1.0	0.0	11.7	31.5	0.2	0.0	14.9	0.0	17.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.6	0.0	0.0	0.4	0.0	1.9	14.9	8.7	0.1	0.4	0.0	23.1
LnGrp Delay(d),s/veh	72.8	0.0	0.0	54.7	0.0	66.7	76.4	13.3	9.5	71.8	0.0	50.7
LnGrp LOS	E			D		E	E	B	A	E		D
Approach Vol, veh/h		294			63			1341			661	
Approach Delay, s/veh		72.8			64.6			30.5			51.1	
Approach LOS		E			E			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		25.9	29.3	51.7		9.2	6.0	75.0
Change Period (Y+Rc), s		3.6	3.0	5.8		4.5	4.5	5.8
Max Green Setting (Gmax), s		24.0	29.0	52.1		18.0	5.0	74.6
Max Q Clear Time (g_c+I1), s		22.0	25.9	43.2		5.3	2.7	19.9
Green Ext Time (p_c), s		0.3	0.4	2.7		0.1	0.0	7.8

Intersection Summary	
HCM 2010 Ctrl Delay	42.4
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	86	10	131	304	173	350	860	153	312	510	360
Future Volume (veh/h)	220	86	10	131	304	173	350	860	153	312	510	360
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810
Adj Flow Rate, veh/h	244	96	0	146	338	12	389	956	54	347	567	371
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	323	121	103	319	275	231	435	1157	509	769	1513	824
Arrive On Green	0.10	0.07	0.00	0.19	0.15	0.15	0.13	0.34	0.34	0.38	0.74	0.74
Sat Flow, veh/h	3343	1810	1538	1723	1810	1514	3343	3438	1511	3343	3438	1534
Grp Volume(v), veh/h	244	96	0	146	338	12	389	956	54	347	567	371
Grp Sat Flow(s),veh/h/ln	1672	1810	1538	1723	1810	1514	1672	1719	1511	1672	1719	1534
Q Serve(g_s), s	6.4	4.7	0.0	6.8	13.7	0.4	10.3	23.0	2.2	7.0	5.4	8.0
Cycle Q Clear(g_c), s	6.4	4.7	0.0	6.8	13.7	0.4	10.3	23.0	2.2	7.0	5.4	8.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	323	121	103	319	275	231	435	1157	509	769	1513	824
V/C Ratio(X)	0.76	0.79	0.00	0.46	1.23	0.05	0.90	0.83	0.11	0.45	0.37	0.45
Avail Cap(c_a), veh/h	531	316	268	319	275	231	435	1157	509	769	1513	824
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.42	0.42	0.42
Uniform Delay (d), s/veh	39.6	41.4	0.0	32.7	38.2	12.8	38.5	27.4	20.5	23.5	7.4	5.5
Incr Delay (d2), s/veh	3.6	10.9	0.0	0.4	130.0	0.1	20.6	6.8	0.4	0.2	0.3	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	2.7	0.0	3.3	16.8	0.2	6.0	12.0	1.0	3.2	2.5	3.4
LnGrp Delay(d),s/veh	43.2	52.3	0.0	33.0	168.1	12.9	59.1	34.2	21.0	23.6	7.7	6.2
LnGrp LOS	D	D		C	F	B	E	C	C	C	A	A
Approach Vol, veh/h		340			496			1399			1285	
Approach Delay, s/veh		45.8			124.6			40.6			11.6	
Approach LOS		D			F			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.7	10.0	15.7	43.6	12.7	18.0	25.0	34.3
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9
Max Green Setting (Gmax), s	12.4	16.1	12.1	34.4	14.4	* 14	16.1	* 30
Max Q Clear Time (g_c+I1), s	18.8	6.7	12.3	10.0	8.4	15.7	9.0	25.0
Green Ext Time (p_c), s	0.1	0.2	0.0	5.4	0.4	0.0	0.7	3.0

Intersection Summary	
HCM 2010 Ctrl Delay	42.3
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	420	0	841	10	10	10	473	800	0	10	331	430
Future Volume (veh/h)	420	0	841	10	10	10	473	800	0	10	331	430
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1900	1810	1900	1810	1810	1900	1810	1810	1810
Adj Flow Rate, veh/h	452	0	731	11	11	0	509	860	0	11	356	363
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	654	0	847	11	11	0	1219	3041	0	8	863	661
Arrive On Green	0.19	0.00	0.19	0.02	0.01	0.00	0.73	1.00	0.00	0.00	0.25	0.25
Sat Flow, veh/h	3447	0	1507	883	883	0	3343	5103	0	1723	3438	1496
Grp Volume(v), veh/h	452	0	731	22	0	0	509	860	0	11	356	363
Grp Sat Flow(s),veh/h/ln	1723	0	1507	1765	0	0	1672	1647	0	1723	1719	1496
Q Serve(g_s), s	11.0	0.0	3.7	1.1	0.0	0.0	5.3	0.0	0.0	0.4	7.8	16.2
Cycle Q Clear(g_c), s	11.0	0.0	3.7	1.1	0.0	0.0	5.3	0.0	0.0	0.4	7.8	16.2
Prop In Lane	1.00		1.00	0.50		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	654	0	847	22	0	0	1219	3041	0	8	863	661
V/C Ratio(X)	0.69	0.00	0.86	1.01	0.00	0.00	0.42	0.28	0.00	1.43	0.41	0.55
Avail Cap(c_a), veh/h	996	0	996	94	0	0	1219	3041	0	92	863	661
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.70	0.70	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.0	0.0	17.0	44.2	0.0	0.0	8.5	0.0	0.0	44.8	28.2	18.9
Incr Delay (d2), s/veh	1.3	0.0	7.0	55.9	0.0	0.0	0.2	0.2	0.0	242.4	1.5	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.9	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	0.0	2.8	0.9	0.0	0.0	2.4	0.0	0.0	0.7	3.9	9.6
LnGrp Delay(d),s/veh	35.3	0.0	24.1	100.2	0.0	0.0	8.6	0.2	0.0	353.1	29.6	22.1
LnGrp LOS	D		C	F			A	A		F	C	C
Approach Vol, veh/h		1183			22			1369			730	
Approach Delay, s/veh		28.4			100.2			3.3			30.8	
Approach LOS		C			F			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		21.1	37.2	26.6		5.1	4.4	59.4
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6
Max Green Setting (Gmax), s		26.8	21.4	* 23		5.8	5.6	38.8
Max Q Clear Time (g_c+I1), s		13.0	7.3	18.2		3.1	2.4	2.0
Green Ext Time (p_c), s		4.4	1.6	1.6		0.0	0.0	6.9

Intersection Summary	
HCM 2010 Ctrl Delay	19.0
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	653	310	353	510	50	90	90	548	60	90	130
Future Volume (veh/h)	80	653	310	353	510	50	90	90	548	60	90	130
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1676	1676	1676	1710	1676	1676	1676	1676	1676	1710
Adj Flow Rate, veh/h	87	710	163	384	554	47	98	98	518	65	98	88
Adj No. of Lanes	1	1	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	600	510	302	1453	123	106	445	671	67	195	175
Arrive On Green	0.06	0.36	0.36	0.19	0.49	0.50	0.07	0.27	0.27	0.04	0.24	0.25
Sat Flow, veh/h	1597	1676	1425	1597	2973	252	1597	1676	1425	1597	815	732
Grp Volume(v), veh/h	87	710	163	384	296	305	98	98	518	65	0	186
Grp Sat Flow(s),veh/h/ln	1597	1676	1425	1597	1593	1632	1597	1676	1425	1597	0	1547
Q Serve(g_s), s	6.0	39.4	9.1	20.8	12.8	12.9	6.7	5.0	30.0	4.5	0.0	11.4
Cycle Q Clear(g_c), s	6.0	39.4	9.1	20.8	12.8	12.9	6.7	5.0	30.0	4.5	0.0	11.4
Prop In Lane	1.00		1.00	1.00		0.15	1.00		1.00	1.00		0.47
Lane Grp Cap(c), veh/h	93	600	510	302	778	798	106	445	671	67	0	370
V/C Ratio(X)	0.93	1.18	0.32	1.27	0.38	0.38	0.93	0.22	0.77	0.97	0.00	0.50
Avail Cap(c_a), veh/h	142	600	510	302	778	798	142	445	671	142	0	411
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.6	35.3	25.6	44.6	17.7	17.6	51.1	31.5	24.2	52.6	0.0	36.0
Incr Delay (d2), s/veh	35.1	98.3	1.6	145.8	1.4	1.4	40.7	0.1	5.0	25.3	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	34.6	3.8	21.4	5.9	6.1	4.2	2.3	13.9	2.4	0.0	4.9
LnGrp Delay(d),s/veh	86.7	133.6	27.2	190.4	19.1	19.0	91.8	31.6	29.2	78.0	0.0	36.4
LnGrp LOS	F	F	C	F	B	B	F	C	C	E		D
Approach Vol, veh/h		960			985			714			251	
Approach Delay, s/veh		111.3			85.8			38.1			47.1	
Approach LOS		F			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.8	43.4	11.3	30.5	10.4	57.8	8.6	33.2
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2
Max Green Setting (Gmax), s	21.8	35.0	10.8	* 30	10.8	46.0	10.8	30.0
Max Q Clear Time (g_c+I1), s	22.8	41.4	8.7	13.4	8.0	14.9	6.5	32.0
Green Ext Time (p_c), s	0.0	0.0	0.0	0.4	0.0	4.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	79.2
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	300	13	4	539	7	1
Future Vol, veh/h	300	13	4	539	7	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	326	14	4	586	8	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	340	0	927	333
Stage 1	-	-	-	-	333	-
Stage 2	-	-	-	-	594	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1219	-	298	709
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	552	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1219	-	297	709
Mov Cap-2 Maneuver	-	-	-	-	297	-
Stage 1	-	-	-	-	722	-
Stage 2	-	-	-	-	552	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	16.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	320	-	-	1219	-
HCM Lane V/C Ratio	0.027	-	-	0.004	-
HCM Control Delay (s)	16.6	-	-	8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	313	28	9	537	1	0
Future Vol, veh/h	313	28	9	537	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	340	30	10	584	1	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	370	0	959	355
Stage 1	-	-	-	-	355	-
Stage 2	-	-	-	-	604	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1189	-	285	689
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	546	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1189	-	282	689
Mov Cap-2 Maneuver	-	-	-	-	282	-
Stage 1	-	-	-	-	701	-
Stage 2	-	-	-	-	546	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	17.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	282	-	-	1189	-
HCM Lane V/C Ratio	0.004	-	-	0.008	-
HCM Control Delay (s)	17.8	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	290	110	180	220	60	120	706	240	50	543	290
Future Volume (veh/h)	220	290	110	180	220	60	120	706	240	50	543	290
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	229	302	26	188	229	52	125	735	236	52	566	169
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	292	394	386	282	310	70	351	1177	378	288	951	923
Arrive On Green	0.09	0.21	0.20	0.09	0.21	0.21	0.04	0.52	0.52	0.03	0.51	0.50
Sat Flow, veh/h	1792	1881	1568	1792	1479	336	1792	2278	732	1792	1881	1561
Grp Volume(v), veh/h	229	302	26	188	0	281	125	407	564	52	566	169
Grp Sat Flow(s),veh/h/ln	1792	1881	1568	1792	0	1814	1792	1260	1750	1792	1881	1561
Q Serve(g_s), s	10.1	16.6	1.4	9.1	0.0	15.9	3.8	25.3	25.3	1.5	23.4	5.5
Cycle Q Clear(g_c), s	10.1	16.6	1.4	9.1	0.0	15.9	3.8	25.3	25.3	1.5	23.4	5.5
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.42	1.00		1.00
Lane Grp Cap(c), veh/h	292	394	386	282	0	380	351	651	903	288	951	923
V/C Ratio(X)	0.79	0.77	0.07	0.67	0.00	0.74	0.36	0.62	0.62	0.18	0.60	0.18
Avail Cap(c_a), veh/h	292	546	513	283	0	526	437	651	903	391	951	923
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.6	40.9	31.8	32.3	0.0	40.7	15.4	19.0	19.0	15.4	19.2	10.4
Incr Delay (d2), s/veh	12.2	4.3	0.1	4.7	0.0	3.5	0.2	4.5	3.3	0.1	2.7	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	9.1	0.6	4.8	0.0	8.3	1.9	9.6	13.0	0.8	12.8	2.5
LnGrp Delay(d),s/veh	46.8	45.3	31.9	37.0	0.0	44.2	15.7	23.5	22.2	15.5	22.0	10.8
LnGrp LOS	D	D	C	D		D	B	C	C	B	C	B
Approach Vol, veh/h		557			469			1096			787	
Approach Delay, s/veh		45.3			41.3			22.0			19.2	
Approach LOS		D			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.1	27.0	8.9	60.0	14.1	27.0	7.8	61.1
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3
Max Green Setting (Gmax), s	11.1	32.0	11.1	* 42	11.1	32.0	11.1	41.6
Max Q Clear Time (g_c+I1), s	11.1	18.6	5.8	25.4	12.1	17.9	3.5	27.3
Green Ext Time (p_c), s	0.0	1.5	0.1	2.3	0.0	1.3	0.0	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	28.8
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	256	40	117	10	20	20	293	800	10	40	720	93
Future Volume (veh/h)	256	40	117	10	20	20	293	800	10	40	720	93
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1879	1900	1863	1863	1900	1881	1881	1863	1863	1881	1900
Adj Flow Rate, veh/h	267	42	113	10	21	0	305	833	6	42	750	94
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	1	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	1	1	2	2	1	1
Cap, veh/h	239	38	101	45	47	0	291	2113	936	54	759	95
Arrive On Green	0.21	0.22	0.22	0.03	0.03	0.00	0.16	0.59	0.59	0.03	0.46	0.46
Sat Flow, veh/h	1102	173	466	1774	1863	0	1792	3574	1583	1774	1639	205
Grp Volume(v), veh/h	422	0	0	10	21	0	305	833	6	42	0	844
Grp Sat Flow(s),veh/h/ln	1742	0	0	1774	1863	0	1792	1787	1583	1774	0	1845
Q Serve(g_s), s	29.4	0.0	0.0	0.7	1.5	0.0	22.0	16.8	0.2	3.2	0.0	61.3
Cycle Q Clear(g_c), s	29.4	0.0	0.0	0.7	1.5	0.0	22.0	16.8	0.2	3.2	0.0	61.3
Prop In Lane	0.63		0.27	1.00		0.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	378	0	0	45	47	0	291	2113	936	54	0	854
V/C Ratio(X)	1.12	0.00	0.00	0.22	0.44	0.00	1.05	0.39	0.01	0.78	0.00	0.99
Avail Cap(c_a), veh/h	378	0	0	236	248	0	291	2113	936	121	0	854
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	53.1	0.0	0.0	64.7	65.1	0.0	56.7	14.8	11.4	65.2	0.0	36.0
Incr Delay (d2), s/veh	81.5	0.0	0.0	2.4	6.4	0.0	65.9	0.1	0.0	20.7	0.0	27.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.6	0.0	0.0	0.4	0.9	0.0	16.2	8.2	0.1	1.9	0.0	37.8
LnGrp Delay(d),s/veh	134.7	0.0	0.0	67.1	71.4	0.0	122.6	14.9	11.4	85.9	0.0	63.8
LnGrp LOS	F			E	E		F	B	B	F		E
Approach Vol, veh/h		422			31			1144			886	
Approach Delay, s/veh		134.7			70.0			43.6			64.8	
Approach LOS		F			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		33.0	26.0	68.5		7.9	8.6	85.9
Change Period (Y+Rc), s		3.6	3.0	5.8		4.5	4.5	5.8
Max Green Setting (Gmax), s		29.4	23.0	62.7		18.0	9.2	75.0
Max Q Clear Time (g_c+I1), s		31.4	24.0	63.3		3.5	5.2	18.8
Green Ext Time (p_c), s		0.0	0.0	0.0		0.1	0.0	6.3

Intersection Summary	
HCM 2010 Ctrl Delay	67.0
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	79	30	132	256	208	350	1120	222	242	1050	300
Future Volume (veh/h)	300	79	30	132	256	208	350	1120	222	242	1050	300
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	306	81	1	135	261	30	357	1143	129	247	1071	272
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	366	111	93	359	285	238	405	1543	671	572	1723	930
Arrive On Green	0.11	0.06	0.06	0.20	0.15	0.15	0.12	0.44	0.44	0.11	0.33	0.33
Sat Flow, veh/h	3442	1863	1559	1774	1863	1553	3442	3539	1541	3442	3539	1564
Grp Volume(v), veh/h	306	81	1	135	261	30	357	1143	129	247	1071	272
Grp Sat Flow(s),veh/h/ln	1721	1863	1559	1774	1863	1553	1721	1770	1541	1721	1770	1564
Q Serve(g_s), s	10.5	5.1	0.1	7.9	16.6	1.5	12.3	32.3	6.2	8.0	30.7	12.6
Cycle Q Clear(g_c), s	10.5	5.1	0.1	7.9	16.6	1.5	12.3	32.3	6.2	8.0	30.7	12.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	366	111	93	359	285	238	405	1543	671	572	1723	930
V/C Ratio(X)	0.84	0.73	0.01	0.38	0.91	0.13	0.88	0.74	0.19	0.43	0.62	0.29
Avail Cap(c_a), veh/h	467	306	256	359	306	255	450	1543	671	572	1723	930
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.46	0.46	0.46
Uniform Delay (d), s/veh	52.6	55.5	34.9	41.3	50.0	23.2	52.1	28.2	20.8	48.0	31.1	16.4
Incr Delay (d2), s/veh	10.1	8.9	0.0	0.2	29.4	0.2	17.0	3.2	0.6	0.2	0.8	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	2.9	0.0	3.9	10.9	0.6	6.8	16.4	2.8	3.9	15.3	5.5
LnGrp Delay(d),s/veh	62.7	64.3	35.0	41.5	79.4	23.4	69.1	31.5	21.5	48.3	31.9	16.8
LnGrp LOS	E	E	C	D	E	C	E	C	C	D	C	B
Approach Vol, veh/h		388			426			1629			1590	
Approach Delay, s/veh		63.0			63.5			38.9			31.8	
Approach LOS		E			E			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.3	11.1	18.1	62.4	16.8	22.7	24.2	56.3
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9
Max Green Setting (Gmax), s	16.4	20.1	16.1	52.4	16.4	* 20	16.1	* 52
Max Q Clear Time (g_c+I1), s	9.9	7.1	14.3	32.7	12.5	18.6	10.0	34.3
Green Ext Time (p_c), s	0.1	0.2	0.3	8.6	0.4	0.2	0.4	8.3

Intersection Summary	
HCM 2010 Ctrl Delay	41.0
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	530	10	861	10	10	20	537	1191	10	10	721	470
Future Volume (veh/h)	530	10	861	10	10	20	537	1191	10	10	721	470
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.94	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	548	0	763	10	10	1	548	1215	10	10	736	393
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	687	0	810	11	11	1	1115	3452	28	9	1209	835
Arrive On Green	0.19	0.00	0.19	0.02	0.01	0.02	0.64	1.00	1.00	0.01	0.34	0.33
Sat Flow, veh/h	3583	0	1553	865	865	86	3476	5252	43	1792	3574	1579
Grp Volume(v), veh/h	548	0	763	21	0	0	548	792	433	10	736	393
Grp Sat Flow(s),veh/h/ln	1792	0	1553	1816	0	0	1738	1712	1872	1792	1787	1579
Q Serve(g_s), s	17.5	0.0	15.8	1.4	0.0	0.0	9.9	0.0	0.0	0.6	20.6	18.8
Cycle Q Clear(g_c), s	17.5	0.0	15.8	1.4	0.0	0.0	9.9	0.0	0.0	0.6	20.6	18.8
Prop In Lane	1.00		1.00	0.48		0.05	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	687	0	810	23	0	0	1115	2250	1230	9	1209	835
V/C Ratio(X)	0.80	0.00	0.94	0.91	0.00	0.00	0.49	0.35	0.35	1.08	0.61	0.47
Avail Cap(c_a), veh/h	806	0	862	118	0	0	1115	2250	1230	78	1209	835
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.70	0.70	0.70	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.3	0.0	27.3	58.9	0.0	0.0	16.4	0.0	0.0	59.7	33.1	17.9
Incr Delay (d2), s/veh	4.9	0.0	17.6	35.1	0.0	0.0	0.2	0.3	0.6	108.5	2.3	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	0.0	10.4	0.9	0.0	0.0	4.7	0.1	0.2	0.6	10.5	11.9
LnGrp Delay(d),s/veh	51.2	0.0	44.9	94.1	0.0	0.0	16.6	0.3	0.6	171.4	35.4	19.8
LnGrp LOS	D		D	F			B	A	A	F	D	B
Approach Vol, veh/h		1311			21			1773			1139	
Approach Delay, s/veh		47.5			94.1			5.4			31.2	
Approach LOS		D			F			A			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		27.0	42.9	44.6		5.5	4.6	82.9
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6
Max Green Setting (Gmax), s		27.8	29.4	* 41		8.8	6.0	38.4
Max Q Clear Time (g_c+I1), s		19.5	11.9	22.6		3.4	2.6	2.0
Green Ext Time (p_c), s		3.7	1.9	6.2		0.0	0.0	10.1

Intersection Summary	
HCM 2010 Ctrl Delay	25.8
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	561	230	305	612	100	130	250	720	120	150	150
Future Volume (veh/h)	100	561	230	305	612	100	130	250	720	120	150	150
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1676	1676	1676	1710	1676	1676	1676	1676	1676	1710
Adj Flow Rate, veh/h	109	610	90	332	665	96	141	272	735	130	163	133
Adj No. of Lanes	1	1	1	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	118	521	443	316	1216	175	154	445	684	128	211	172
Arrive On Green	0.07	0.31	0.31	0.20	0.44	0.44	0.10	0.27	0.27	0.08	0.25	0.26
Sat Flow, veh/h	1597	1676	1425	1597	2795	403	1597	1676	1425	1597	855	698
Grp Volume(v), veh/h	109	610	90	332	379	382	141	272	735	130	0	296
Grp Sat Flow(s),veh/h/ln	1597	1676	1425	1597	1593	1605	1597	1676	1425	1597	0	1553
Q Serve(g_s), s	7.5	34.2	5.1	21.8	19.4	19.4	9.6	15.6	30.0	8.8	0.0	19.5
Cycle Q Clear(g_c), s	7.5	34.2	5.1	21.8	19.4	19.4	9.6	15.6	30.0	8.8	0.0	19.5
Prop In Lane	1.00		1.00	1.00		0.25	1.00		1.00	1.00		0.45
Lane Grp Cap(c), veh/h	118	521	443	316	693	698	154	445	684	128	0	384
V/C Ratio(X)	0.92	1.17	0.20	1.05	0.55	0.55	0.91	0.61	1.07	1.02	0.00	0.77
Avail Cap(c_a), veh/h	142	521	443	316	693	698	418	445	684	128	0	384
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.6	37.9	27.9	44.1	23.0	23.0	49.2	35.4	28.6	50.6	0.0	38.3
Incr Delay (d2), s/veh	45.1	95.7	1.0	64.1	3.1	3.1	8.2	1.8	56.2	84.4	0.0	8.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	29.6	2.1	15.2	9.1	9.2	4.6	7.5	31.2	6.9	0.0	9.3
LnGrp Delay(d),s/veh	95.7	133.6	28.9	108.2	26.1	26.0	57.5	37.2	84.8	135.2	0.0	46.8
LnGrp LOS	F	F	C	F	C	C	E	D	F	F		D
Approach Vol, veh/h		809			1093			1148			426	
Approach Delay, s/veh		116.8			51.0			70.2			73.8	
Approach LOS		F			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.8	38.2	14.6	31.4	12.1	51.9	12.8	33.2
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2
Max Green Setting (Gmax), s	22.8	35.0	29.8	* 10	10.8	47.0	9.8	30.0
Max Q Clear Time (g_c+I1), s	23.8	36.2	11.6	21.5	9.5	21.4	10.8	32.0
Green Ext Time (p_c), s	0.0	0.0	0.2	0.0	0.0	5.2	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	75.4
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	401	8	2	404	32	12
Future Vol, veh/h	401	8	2	404	32	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	436	9	2	439	35	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	445	0	884	441
Stage 1	-	-	-	-	441	-
Stage 2	-	-	-	-	443	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1115	-	316	616
Stage 1	-	-	-	-	648	-
Stage 2	-	-	-	-	647	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1115	-	315	616
Mov Cap-2 Maneuver	-	-	-	-	315	-
Stage 1	-	-	-	-	647	-
Stage 2	-	-	-	-	647	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	16.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	363	-	-	1115	-
HCM Lane V/C Ratio	0.132	-	-	0.002	-
HCM Control Delay (s)	16.4	-	-	8.2	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	408	15	4	432	4	1
Future Vol, veh/h	408	15	4	432	4	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	443	16	4	470	4	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	459	0	929	451
Stage 1	-	-	-	-	451	-
Stage 2	-	-	-	-	478	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1102	-	297	608
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	624	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1102	-	296	608
Mov Cap-2 Maneuver	-	-	-	-	296	-
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	624	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	16.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	330	-	-	1102	-
HCM Lane V/C Ratio	0.016	-	-	0.004	-
HCM Control Delay (s)	16.1	-	-	8.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	250	60	210	520	80	150	980	240	40	540	210
Future Volume (veh/h)	170	250	60	210	520	80	150	980	240	40	540	210
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	193	284	16	239	591	88	170	1114	257	45	614	172
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	165	509	511	378	491	73	276	1396	320	156	853	802
Arrive On Green	0.07	0.28	0.27	0.10	0.31	0.31	0.06	0.49	0.49	0.03	0.46	0.46
Sat Flow, veh/h	1757	1845	1561	1757	1566	233	1757	2831	649	1757	1845	1529
Grp Volume(v), veh/h	193	284	16	239	0	679	170	687	684	45	614	172
Grp Sat Flow(s),veh/h/ln	1757	1845	1561	1757	0	1799	1757	1752	1728	1757	1845	1529
Q Serve(g_s), s	10.0	19.8	1.0	14.5	0.0	47.0	7.6	49.0	49.9	2.0	40.2	9.1
Cycle Q Clear(g_c), s	10.0	19.8	1.0	14.5	0.0	47.0	7.6	49.0	49.9	2.0	40.2	9.1
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.38	1.00		1.00
Lane Grp Cap(c), veh/h	165	509	511	378	0	564	276	864	852	156	853	802
V/C Ratio(X)	1.17	0.56	0.03	0.63	0.00	1.20	0.62	0.79	0.80	0.29	0.72	0.21
Avail Cap(c_a), veh/h	165	509	511	429	0	564	281	864	852	167	853	802
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.7	46.5	34.3	34.6	0.0	51.5	26.5	31.7	31.9	28.3	32.5	19.2
Incr Delay (d2), s/veh	122.7	1.4	0.0	1.5	0.0	108.1	2.8	7.5	7.9	0.4	5.2	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	10.3	0.5	7.1	0.0	40.3	3.9	25.4	25.6	1.0	21.7	3.9
LnGrp Delay(d),s/veh	165.4	47.8	34.3	36.1	0.0	159.6	29.3	39.2	39.8	28.7	37.7	19.8
LnGrp LOS	F	D	C	D		F	C	D	D	C	D	B
Approach Vol, veh/h		493			918			1541			831	
Approach Delay, s/veh		93.4			127.5			38.4			33.5	
Approach LOS		F			F			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.6	45.4	12.6	73.7	14.0	51.0	8.1	78.3
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3
Max Green Setting (Gmax), s	21.0	37.1	10.0	* 68	11.0	47.1	6.0	71.7
Max Q Clear Time (g_c+I1), s	16.5	21.8	9.6	42.2	12.0	49.0	4.0	51.9
Green Ext Time (p_c), s	0.1	1.5	0.0	2.7	0.0	0.0	0.0	5.7

Intersection Summary	
HCM 2010 Ctrl Delay	66.1
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	60	250	230	290	140	390	1070	120	50	560	200
Future Volume (veh/h)	160	60	250	230	290	140	390	1070	120	50	560	200
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1848	1900	1863	1863	1900	1845	1845	1863	1863	1845	1845
Adj Flow Rate, veh/h	168	63	22	242	305	96	411	1126	52	53	589	52
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	2	2	2	2	2	3	3	2	2	3	3
Cap, veh/h	201	292	97	291	418	129	448	1503	679	78	786	343
Arrive On Green	0.11	0.11	0.11	0.16	0.16	0.16	0.26	0.43	0.43	0.04	0.22	0.22
Sat Flow, veh/h	1757	2589	862	1774	2664	823	1757	3505	1583	1774	3505	1529
Grp Volume(v), veh/h	168	42	43	242	201	200	411	1126	52	53	589	52
Grp Sat Flow(s),veh/h/ln	1757	1756	1696	1774	1770	1717	1757	1752	1583	1774	1752	1529
Q Serve(g_s), s	7.2	1.7	1.8	10.2	8.3	8.6	17.5	20.8	1.5	2.3	12.1	2.1
Cycle Q Clear(g_c), s	7.2	1.7	1.8	10.2	8.3	8.6	17.5	20.8	1.5	2.3	12.1	2.1
Prop In Lane	1.00		0.51	1.00		0.48	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	201	198	191	291	277	269	448	1503	679	78	786	343
V/C Ratio(X)	0.84	0.21	0.23	0.83	0.72	0.74	0.92	0.75	0.08	0.68	0.75	0.15
Avail Cap(c_a), veh/h	390	328	317	541	448	435	821	2480	1120	212	1283	560
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.4	31.1	31.1	31.2	30.9	31.0	27.9	18.5	13.0	36.3	27.8	24.0
Incr Delay (d2), s/veh	8.8	0.5	0.6	6.2	3.6	4.0	7.9	0.8	0.0	9.8	1.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.8	0.9	5.5	4.3	4.4	9.4	10.2	0.7	1.3	6.0	0.9
LnGrp Delay(d),s/veh	42.2	31.6	31.7	37.3	34.5	35.0	35.8	19.3	13.0	46.1	29.3	24.2
LnGrp LOS	D	C	C	D	C	D	D	B	B	D	C	C
Approach Vol, veh/h		253			643			1589			694	
Approach Delay, s/veh		38.6			35.7			23.3			30.2	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.1	13.2	23.6	23.1	13.7	16.6	7.9	38.8
Change Period (Y+Rc), s	4.5	* 4.5	3.0	5.8	4.5	4.5	4.5	5.8
Max Green Setting (Gmax), s	23.5	* 14	37.0	28.2	17.5	19.5	9.2	54.5
Max Q Clear Time (g_c+I1), s	12.2	3.8	19.5	14.1	9.2	10.6	4.3	22.8
Green Ext Time (p_c), s	0.5	0.2	1.1	3.2	0.3	1.5	0.0	9.1

Intersection Summary	
HCM 2010 Ctrl Delay	28.6
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	80	20	140	340	180	400	1030	170	380	630	450
Future Volume (veh/h)	250	80	20	140	340	180	400	1030	170	380	630	450
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810
Adj Flow Rate, veh/h	278	89	0	156	378	62	444	1144	118	422	700	447
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	325	115	97	445	402	337	494	1300	572	642	1458	800
Arrive On Green	0.10	0.06	0.00	0.26	0.22	0.22	0.15	0.38	0.38	0.19	0.42	0.42
Sat Flow, veh/h	3343	1810	1538	1723	1810	1516	3343	3438	1512	3343	3438	1534
Grp Volume(v), veh/h	278	89	0	156	378	62	444	1144	118	422	700	447
Grp Sat Flow(s),veh/h/ln	1672	1810	1538	1723	1810	1516	1672	1719	1512	1672	1719	1534
Q Serve(g_s), s	12.3	7.3	0.0	11.1	30.8	3.4	19.6	46.5	7.9	17.5	22.1	29.5
Cycle Q Clear(g_c), s	12.3	7.3	0.0	11.1	30.8	3.4	19.6	46.5	7.9	17.5	22.1	29.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	325	115	97	445	402	337	494	1300	572	642	1458	800
V/C Ratio(X)	0.86	0.78	0.00	0.35	0.94	0.18	0.90	0.88	0.21	0.66	0.48	0.56
Avail Cap(c_a), veh/h	412	416	354	445	442	370	637	1300	572	642	1458	800
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.26	0.26	0.26
Uniform Delay (d), s/veh	66.7	69.2	0.0	45.4	57.3	22.3	62.8	43.5	31.5	56.0	31.2	24.3
Incr Delay (d2), s/veh	13.4	10.7	0.0	0.2	27.1	0.3	13.1	8.8	0.8	0.6	0.3	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	4.0	0.0	5.3	18.5	1.5	10.0	23.7	3.4	8.1	10.6	12.7
LnGrp Delay(d),s/veh	80.1	79.9	0.0	45.6	84.4	22.5	75.9	52.2	32.3	56.7	31.5	25.0
LnGrp LOS	F	E		D	F	C	E	D	C	E	C	C
Approach Vol, veh/h		367			596			1706			1569	
Approach Delay, s/veh		80.0			67.8			57.0			36.4	
Approach LOS		F			E			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	42.7	13.5	26.2	67.6	18.6	37.6	33.1	60.7
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9
Max Green Setting (Gmax), s	20.7	34.9	29.0	50.4	18.6	* 37	22.6	* 57
Max Q Clear Time (g_c+I1), s	13.1	9.3	21.6	31.5	14.3	32.8	19.5	48.5
Green Ext Time (p_c), s	0.1	0.4	1.0	6.3	0.4	0.9	0.5	4.9

Intersection Summary	
HCM 2010 Ctrl Delay	52.9
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	750	0	1000	20	20	20	530	930	0	20	440	630
Future Volume (veh/h)	750	0	1000	20	20	20	530	930	0	20	440	630
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1900	1810	1900	1810	1810	1900	1810	1810	1810
Adj Flow Rate, veh/h	806	0	1037	22	22	8	570	1000	0	22	473	569
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	847	0	984	21	21	8	1333	2947	0	26	722	687
Arrive On Green	0.25	0.00	0.25	0.04	0.03	0.04	0.40	0.60	0.00	0.01	0.21	0.21
Sat Flow, veh/h	3447	0	1510	726	726	264	3343	5103	0	1723	3438	1492
Grp Volume(v), veh/h	806	0	1037	52	0	0	570	1000	0	22	473	569
Grp Sat Flow(s),veh/h/ln	1723	0	1510	1716	0	0	1672	1647	0	1723	1719	1492
Q Serve(g_s), s	32.2	0.0	34.4	4.0	0.0	0.0	17.3	14.3	0.0	1.8	17.6	29.0
Cycle Q Clear(g_c), s	32.2	0.0	34.4	4.0	0.0	0.0	17.3	14.3	0.0	1.8	17.6	29.0
Prop In Lane	1.00		1.00	0.42		0.15	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	847	0	984	49	0	0	1333	2947	0	26	722	687
V/C Ratio(X)	0.95	0.00	1.05	1.06	0.00	0.00	0.43	0.34	0.00	0.86	0.66	0.83
Avail Cap(c_a), veh/h	847	0	984	49	0	0	1342	2947	0	75	722	687
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.00	0.09	1.00	0.00	0.00	0.58	0.58	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.0	0.0	24.7	67.7	0.0	0.0	30.5	14.3	0.0	68.8	50.7	28.9
Incr Delay (d2), s/veh	3.1	0.0	27.1	146.7	0.0	0.0	0.1	0.2	0.0	25.0	4.6	11.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.7	0.0	21.2	3.9	0.0	0.0	8.0	6.5	0.0	1.0	8.9	24.1
LnGrp Delay(d),s/veh	55.0	0.0	51.8	216.3	0.0	0.0	30.6	14.5	0.0	93.8	55.3	39.9
LnGrp LOS	E		F	F			C	B		F	E	D
Approach Vol, veh/h		1843			52			1570			1064	
Approach Delay, s/veh		53.2			216.3			20.3			47.9	
Approach LOS		D			F			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		38.4	60.2	33.4		8.0	6.1	87.5
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6
Max Green Setting (Gmax), s		35.2	57.0	* 30		5.0	6.9	79.9
Max Q Clear Time (g_c+I1), s		36.4	19.3	31.0		6.0	3.8	16.3
Green Ext Time (p_c), s		0.0	2.2	0.0		0.0	0.0	8.9

Intersection Summary		
HCM 2010 Ctrl Delay		42.4
HCM 2010 LOS		D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	950	490	400	680	100	100	110	610	190	150	250
Future Volume (veh/h)	120	950	490	400	680	100	100	110	610	190	150	250
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1676	1676	1676	1676	1676	1710
Adj Flow Rate, veh/h	130	1033	485	435	739	101	109	120	565	207	163	229
Adj No. of Lanes	1	2	0	1	2	0	1	1	2	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	140	1000	458	319	1642	224	85	221	863	217	135	189
Arrive On Green	0.09	0.47	0.47	0.20	0.58	0.59	0.05	0.13	0.14	0.14	0.21	0.22
Sat Flow, veh/h	1597	2124	973	1597	2816	385	1597	1676	2508	1597	632	888
Grp Volume(v), veh/h	130	768	750	435	418	422	109	120	565	207	0	392
Grp Sat Flow(s),veh/h/ln	1597	1593	1505	1597	1593	1609	1597	1676	1254	1597	0	1520
Q Serve(g_s), s	12.1	70.6	70.6	30.0	22.2	22.2	8.0	10.0	20.6	19.3	0.0	32.0
Cycle Q Clear(g_c), s	12.1	70.6	70.6	30.0	22.2	22.2	8.0	10.0	20.6	19.3	0.0	32.0
Prop In Lane	1.00		0.65	1.00		0.24	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	140	750	708	319	928	938	85	221	863	217	0	324
V/C Ratio(X)	0.93	1.02	1.06	1.36	0.45	0.45	1.28	0.54	0.65	0.95	0.00	1.21
Avail Cap(c_a), veh/h	224	750	708	319	928	938	85	221	863	245	0	324
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	68.0	39.7	39.7	60.0	17.7	17.6	71.0	60.8	41.6	64.3	0.0	58.7
Incr Delay (d2), s/veh	22.5	39.3	50.5	176.2	1.1	1.1	190.1	1.5	1.4	41.2	0.0	119.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	39.2	39.2	28.8	10.0	10.1	8.0	4.8	10.1	11.0	0.0	24.2
LnGrp Delay(d),s/veh	90.5	79.0	90.2	236.2	18.7	18.7	261.1	62.3	43.1	105.6	0.0	178.1
LnGrp LOS	F	F	F	F	B	B	F	E	D	F		F
Approach Vol, veh/h		1648			1275			794			599	
Approach Delay, s/veh		85.0			92.9			75.9			153.0	
Approach LOS		F			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	34.0	74.8	12.0	36.2	17.2	91.6	24.4	23.8
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2
Max Green Setting (Gmax), s	31.0	64.8	9.0	* 33	22.0	73.8	24.0	17.8
Max Q Clear Time (g_c+I1), s	32.0	72.6	10.0	34.0	14.1	24.2	21.3	22.6
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.1	6.5	0.1	0.0

Intersection Summary		
HCM 2010 Ctrl Delay		95.1
HCM 2010 LOS		F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	590	120	190	410	70	130	830	250	60	670	340
Future Volume (veh/h)	260	590	120	190	410	70	130	830	250	60	670	340
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	271	615	90	198	427	69	135	865	241	62	698	292
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	275	602	572	179	421	68	201	1291	359	214	846	895
Arrive On Green	0.13	0.32	0.31	0.07	0.27	0.27	0.05	0.47	0.47	0.03	0.45	0.44
Sat Flow, veh/h	1792	1881	1579	1792	1577	255	1792	2761	769	1792	1881	1560
Grp Volume(v), veh/h	271	615	90	198	0	496	135	560	546	62	698	292
Grp Sat Flow(s),veh/h/ln	1792	1881	1579	1792	0	1832	1792	1787	1743	1792	1881	1560
Q Serve(g_s), s	18.6	48.0	5.8	11.0	0.0	40.0	6.2	36.4	36.5	2.8	48.7	14.8
Cycle Q Clear(g_c), s	18.6	48.0	5.8	11.0	0.0	40.0	6.2	36.4	36.5	2.8	48.7	14.8
Prop In Lane	1.00		1.00	1.00		0.14	1.00		0.44	1.00		1.00
Lane Grp Cap(c), veh/h	275	602	572	179	0	488	201	836	815	214	846	895
V/C Ratio(X)	0.99	1.02	0.16	1.10	0.00	1.02	0.67	0.67	0.67	0.29	0.83	0.33
Avail Cap(c_a), veh/h	275	602	572	179	0	488	212	836	815	219	846	895
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	51.0	32.4	42.3	0.0	55.0	31.3	30.9	31.0	25.8	36.1	17.0
Incr Delay (d2), s/veh	50.0	42.3	0.1	97.7	0.0	44.6	5.8	4.2	4.4	0.3	9.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.0	32.0	2.5	6.9	0.0	26.3	3.3	18.9	18.4	1.4	27.3	6.6
LnGrp Delay(d),s/veh	97.8	93.3	32.5	140.0	0.0	99.7	37.1	35.2	35.3	26.1	45.1	18.0
LnGrp LOS	F	F	C	F		F	D	D	D	C	D	B
Approach Vol, veh/h		976			694			1241			1052	
Approach Delay, s/veh		88.9			111.2			35.5			36.5	
Approach LOS		F			F			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	52.0	11.2	71.8	23.0	44.0	8.5	74.5				
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3				
Max Green Setting (Gmax), s	12.0	48.1	9.0	* 67	20.0	40.1	6.0	69.7				
Max Q Clear Time (g_c+I1), s	13.0	50.0	8.2	50.7	20.6	42.0	4.8	38.5				
Green Ext Time (p_c), s	0.0	0.0	0.0	3.2	0.0	0.0	0.0	4.6				
Intersection Summary												
HCM 2010 Ctrl Delay			62.2									
HCM 2010 LOS			E									
Notes												

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	340	200	300	330	30	340	910	310	50	830	100
Future Volume (veh/h)	270	340	200	300	330	30	340	910	310	50	830	100
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1870	1900	1863	1863	1900	1881	1881	1863	1863	1881	1881
Adj Flow Rate, veh/h	281	354	139	312	344	26	354	948	130	52	865	26
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	2	2	2	2	2	1	1	2	2	1	1
Cap, veh/h	305	420	162	342	648	49	370	1563	692	67	974	436
Arrive On Green	0.17	0.17	0.17	0.19	0.19	0.19	0.21	0.44	0.44	0.04	0.27	0.27
Sat Flow, veh/h	1792	2506	969	1774	3337	251	1792	3574	1583	1774	3574	1599
Grp Volume(v), veh/h	281	249	244	312	182	188	354	948	130	52	865	26
Grp Sat Flow(s),veh/h/ln	1792	1776	1699	1774	1770	1818	1792	1787	1583	1774	1787	1599
Q Serve(g_s), s	18.1	15.9	16.4	20.2	10.8	10.9	22.9	23.8	5.9	3.4	27.2	1.4
Cycle Q Clear(g_c), s	18.1	15.9	16.4	20.2	10.8	10.9	22.9	23.8	5.9	3.4	27.2	1.4
Prop In Lane	1.00		0.57	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	305	298	285	342	344	353	370	1563	692	67	974	436
V/C Ratio(X)	0.92	0.84	0.86	0.91	0.53	0.53	0.96	0.61	0.19	0.78	0.89	0.06
Avail Cap(c_a), veh/h	351	354	339	401	400	411	413	1591	705	144	1073	480
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.9	47.3	47.4	46.4	42.4	42.5	46.0	25.3	20.2	55.9	40.9	31.5
Incr Delay (d2), s/veh	26.9	14.0	16.8	22.7	1.3	1.3	31.5	0.6	0.1	17.1	8.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.3	9.0	9.0	12.0	5.4	5.6	14.6	11.9	2.6	2.0	14.6	0.6
LnGrp Delay(d),s/veh	74.7	61.2	64.2	69.1	43.7	43.7	77.5	25.9	20.4	73.0	49.6	31.6
LnGrp LOS	E	E	E	E	D	D	E	C	C	E	D	C
Approach Vol, veh/h		774			682			1432			943	
Approach Delay, s/veh		67.1			55.3			38.2			50.4	
Approach LOS		E			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.1	24.1	28.2	37.8	24.0	27.3	8.9	57.1
Change Period (Y+Rc), s	4.5	* 4.5	3.0	5.8	3.6	4.5	4.5	5.8
Max Green Setting (Gmax), s	26.5	* 23	28.0	35.2	23.4	26.5	9.5	52.2
Max Q Clear Time (g_c+I1), s	22.2	18.4	24.9	29.2	20.1	12.9	5.4	25.8
Green Ext Time (p_c), s	0.4	1.3	0.3	2.7	0.3	1.8	0.0	7.2

Intersection Summary		
HCM 2010 Ctrl Delay		50.1
HCM 2010 LOS		D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	420	80	40	140	260	250	410	1400	230	250	1240	500
Future Volume (veh/h)	420	80	40	140	260	250	410	1400	230	250	1240	500
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	429	82	2	143	265	118	418	1429	149	255	1265	428
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	426	124	104	400	308	257	438	1409	613	557	1541	876
Arrive On Green	0.12	0.07	0.07	0.23	0.17	0.17	0.13	0.40	0.40	0.32	0.87	0.87
Sat Flow, veh/h	3442	1863	1562	1774	1863	1554	3442	3539	1538	3442	3539	1562
Grp Volume(v), veh/h	429	82	2	143	265	118	418	1429	149	255	1265	428
Grp Sat Flow(s),veh/h/ln	1721	1863	1562	1774	1863	1554	1721	1770	1538	1721	1770	1562
Q Serve(g_s), s	13.6	4.7	0.1	7.5	15.2	5.4	13.3	43.8	7.1	6.5	17.8	6.7
Cycle Q Clear(g_c), s	13.6	4.7	0.1	7.5	15.2	5.4	13.3	43.8	7.1	6.5	17.8	6.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	426	124	104	400	308	257	438	1409	613	557	1541	876
V/C Ratio(X)	1.01	0.66	0.02	0.36	0.86	0.46	0.95	1.01	0.24	0.46	0.82	0.49
Avail Cap(c_a), veh/h	426	535	449	400	464	387	438	1409	613	557	1541	876
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.09	0.09	0.09
Uniform Delay (d), s/veh	48.2	50.1	30.2	35.9	44.7	21.6	47.7	33.1	22.1	33.4	5.2	2.8
Incr Delay (d2), s/veh	45.7	5.9	0.1	0.2	10.1	1.3	31.5	27.5	0.9	0.1	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	2.6	0.0	3.7	8.7	2.4	8.2	26.7	3.1	3.0	7.8	2.5
LnGrp Delay(d),s/veh	93.9	56.1	30.3	36.1	54.8	22.8	79.2	60.6	23.0	33.4	5.6	3.0
LnGrp LOS	F	E	C	D	D	C	E	F	C	C	A	A
Approach Vol, veh/h		513			526			1996			1948	
Approach Delay, s/veh		87.6			42.5			61.7			8.7	
Approach LOS		F			D			E			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.8	11.3	18.0	51.9	17.6	22.5	22.1	47.8
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9
Max Green Setting (Gmax), s	9.5	32.0	14.4	39.1	13.7	* 28	9.6	* 44
Max Q Clear Time (g_c+I1), s	9.5	6.7	15.3	19.8	15.6	17.2	8.5	45.8
Green Ext Time (p_c), s	0.0	0.4	0.0	10.8	0.0	1.4	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	41.6
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	990	20	1140	20	20	30	620	1430	20	20	830	730
Future Volume (veh/h)	990	20	1140	20	20	30	620	1430	20	20	830	730
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.95	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	1024	0	1122	20	20	5	633	1459	19	20	847	702
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	1049	0	906	20	20	5	975	2733	36	24	903	860
Arrive On Green	0.29	0.00	0.29	0.03	0.02	0.03	0.56	1.00	1.00	0.01	0.25	0.25
Sat Flow, veh/h	3583	0	1562	797	797	199	3476	5222	68	1792	3574	1572
Grp Volume(v), veh/h	1024	0	1122	45	0	0	633	957	521	20	847	702
Grp Sat Flow(s),veh/h/ln	1792	0	1562	1793	0	0	1738	1712	1866	1792	1787	1572
Q Serve(g_s), s	31.1	0.0	32.2	2.7	0.0	0.0	13.8	0.0	0.0	1.2	25.5	27.4
Cycle Q Clear(g_c), s	31.1	0.0	32.2	2.7	0.0	0.0	13.8	0.0	0.0	1.2	25.5	27.4
Prop In Lane	1.00		1.00	0.44		0.11	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	1049	0	906	45	0	0	975	1792	977	24	903	860
V/C Ratio(X)	0.98	0.00	1.24	1.01	0.00	0.00	0.65	0.53	0.53	0.83	0.94	0.82
Avail Cap(c_a), veh/h	1049	0	906	65	0	0	975	1792	977	88	903	860
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.00	0.09	1.00	0.00	0.00	0.37	0.37	0.37	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.5	0.0	23.3	53.4	0.0	0.0	20.4	0.0	0.0	54.1	40.3	17.8
Incr Delay (d2), s/veh	4.3	0.0	108.2	90.8	0.0	0.0	0.6	0.4	0.8	22.1	18.2	8.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.0	0.0	40.7	2.5	0.0	0.0	6.6	0.1	0.2	0.8	14.9	23.3
LnGrp Delay(d),s/veh	42.9	0.0	131.5	144.2	0.0	0.0	21.0	0.4	0.8	76.2	58.4	26.3
LnGrp LOS	D		F	F			C	A	A	E	E	C
Approach Vol, veh/h		2146			45			2111			1569	
Approach Delay, s/veh		89.2			144.2			6.7			44.3	
Approach LOS		F			F			A			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		36.2	35.3	31.8		6.7	5.5	61.6				
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6				
Max Green Setting (Gmax), s		33.0	30.8	* 28		5.0	6.2	52.8				
Max Q Clear Time (g_c+I1), s		34.2	15.8	29.4		4.7	3.2	2.0				
Green Ext Time (p_c), s		0.0	2.1	0.0		0.0	0.0	14.4				
Intersection Summary												
HCM 2010 Ctrl Delay			47.9									
HCM 2010 LOS			D									
Notes												

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	1010	270	330	900	140	150	290	820	320	170	370
Future Volume (veh/h)	110	1010	270	330	900	140	150	290	820	320	170	370
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1676	1676	1676	1676	1676	1710
Adj Flow Rate, veh/h	120	1098	276	359	978	143	163	315	845	348	185	345
Adj No. of Lanes	1	2	0	1	2	0	1	1	2	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	129	1240	309	202	1496	219	106	338	853	192	133	248
Arrive On Green	0.08	0.49	0.49	0.13	0.54	0.54	0.07	0.20	0.21	0.12	0.25	0.26
Sat Flow, veh/h	1597	2527	631	1597	2790	408	1597	1676	2508	1597	525	979
Grp Volume(v), veh/h	120	689	685	359	558	563	163	315	845	348	0	530
Grp Sat Flow(s),veh/h/ln	1597	1593	1565	1597	1593	1605	1597	1676	1254	1597	0	1504
Q Serve(g_s), s	11.2	58.3	59.4	19.0	37.5	37.5	10.0	27.7	31.0	18.0	0.0	38.0
Cycle Q Clear(g_c), s	11.2	58.3	59.4	19.0	37.5	37.5	10.0	27.7	31.0	18.0	0.0	38.0
Prop In Lane	1.00		0.40	1.00		0.25	1.00		1.00	1.00		0.65
Lane Grp Cap(c), veh/h	129	781	768	202	854	861	106	338	853	192	0	381
V/C Ratio(X)	0.93	0.88	0.89	1.78	0.65	0.65	1.53	0.93	0.99	1.82	0.00	1.39
Avail Cap(c_a), veh/h	160	781	768	202	854	861	106	338	853	192	0	381
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.57	0.57	0.57	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	68.5	34.3	34.6	65.5	24.8	24.7	70.0	58.9	49.3	66.0	0.0	55.7
Incr Delay (d2), s/veh	42.3	13.7	14.8	360.0	2.2	2.2	280.6	31.8	28.5	387.2	0.0	191.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	28.4	28.8	28.6	17.0	17.1	12.7	15.8	20.7	28.5	0.0	36.0
LnGrp Delay(d),s/veh	110.7	48.0	49.4	425.5	27.0	27.0	350.6	90.7	77.7	453.2	0.0	247.2
LnGrp LOS	F	D	D	F	C	C	F	F	E	F		F
Approach Vol, veh/h		1494			1480			1323			878	
Approach Delay, s/veh		53.7			123.7			114.4			328.8	
Approach LOS		D			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.0	77.8	14.0	42.2	16.1	84.7	22.0	34.2
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2
Max Green Setting (Gmax), s	20.0	67.8	11.0	* 39	16.0	71.8	19.0	30.8
Max Q Clear Time (g_c+I1), s	21.0	61.4	12.0	40.0	13.2	39.5	20.0	33.0
Green Ext Time (p_c), s	0.0	5.1	0.0	0.0	0.0	9.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	135.9
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	250	60	210	520	80	150	980	240	40	545	210
Future Volume (veh/h)	170	250	60	210	520	80	150	980	240	40	545	210
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1845	1845	1900	1845	1845	1900	1845	1845	1845
Adj Flow Rate, veh/h	193	284	16	239	591	88	170	1114	257	45	619	173
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	165	509	511	378	491	73	273	1396	320	156	853	802
Arrive On Green	0.07	0.28	0.27	0.10	0.31	0.31	0.06	0.49	0.49	0.03	0.46	0.46
Sat Flow, veh/h	1757	1845	1561	1757	1566	233	1757	2831	649	1757	1845	1529
Grp Volume(v), veh/h	193	284	16	239	0	679	170	687	684	45	619	173
Grp Sat Flow(s),veh/h/ln	1757	1845	1561	1757	0	1799	1757	1752	1728	1757	1845	1529
Q Serve(g_s), s	10.0	19.8	1.0	14.5	0.0	47.0	7.6	49.0	49.9	2.0	40.7	9.1
Cycle Q Clear(g_c), s	10.0	19.8	1.0	14.5	0.0	47.0	7.6	49.0	49.9	2.0	40.7	9.1
Prop In Lane	1.00		1.00	1.00		0.13	1.00		0.38	1.00		1.00
Lane Grp Cap(c), veh/h	165	509	511	378	0	564	273	864	852	156	853	802
V/C Ratio(X)	1.17	0.56	0.03	0.63	0.00	1.20	0.62	0.79	0.80	0.29	0.73	0.22
Avail Cap(c_a), veh/h	165	509	511	429	0	564	278	864	852	167	853	802
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.7	46.5	34.3	34.6	0.0	51.5	26.7	31.7	31.9	28.3	32.6	19.2
Incr Delay (d2), s/veh	122.7	1.4	0.0	1.5	0.0	108.1	3.0	7.5	7.9	0.4	5.4	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	10.3	0.5	7.1	0.0	40.3	3.9	25.4	25.6	1.0	21.9	4.0
LnGrp Delay(d),s/veh	165.4	47.8	34.3	36.1	0.0	159.6	29.8	39.2	39.8	28.7	38.0	19.9
LnGrp LOS	F	D	C	D		F	C	D	D	C	D	B
Approach Vol, veh/h		493			918			1541			837	
Approach Delay, s/veh		93.4			127.5			38.4			33.8	
Approach LOS		F			F			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.6	45.4	12.6	73.7	14.0	51.0	8.1	78.3
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3
Max Green Setting (Gmax), s	21.0	37.1	10.0	* 68	11.0	47.1	6.0	71.7
Max Q Clear Time (g_c+I1), s	16.5	21.8	9.6	42.7	12.0	49.0	4.0	51.9
Green Ext Time (p_c), s	0.1	1.5	0.0	2.8	0.0	0.0	0.0	5.7

Intersection Summary	
HCM 2010 Ctrl Delay	66.1
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	60	251	230	290	140	398	1070	120	50	560	205
Future Volume (veh/h)	160	60	251	230	290	140	398	1070	120	50	560	205
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1848	1900	1863	1863	1900	1845	1845	1863	1863	1845	1845
Adj Flow Rate, veh/h	168	63	22	242	305	95	419	1126	52	53	589	42
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	2	2	2	2	2	3	3	2	2	3	3
Cap, veh/h	201	290	96	290	417	127	456	1516	685	78	783	345
Arrive On Green	0.11	0.11	0.11	0.16	0.16	0.16	0.26	0.43	0.43	0.04	0.22	0.22
Sat Flow, veh/h	1757	2589	862	1774	2671	817	1757	3505	1583	1774	3505	1544
Grp Volume(v), veh/h	168	42	43	242	200	200	419	1126	52	53	589	42
Grp Sat Flow(s),veh/h/ln	1757	1756	1696	1774	1770	1719	1757	1752	1583	1774	1752	1544
Q Serve(g_s), s	7.3	1.7	1.8	10.3	8.4	8.6	18.0	20.9	1.5	2.3	12.2	1.7
Cycle Q Clear(g_c), s	7.3	1.7	1.8	10.3	8.4	8.6	18.0	20.9	1.5	2.3	12.2	1.7
Prop In Lane	1.00		0.51	1.00		0.48	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	201	196	190	290	276	268	456	1516	685	78	783	345
V/C Ratio(X)	0.84	0.21	0.23	0.83	0.73	0.75	0.92	0.74	0.08	0.68	0.75	0.12
Avail Cap(c_a), veh/h	386	325	314	536	444	431	813	2456	1110	210	1271	560
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.7	31.4	31.5	31.5	31.2	31.3	28.0	18.4	12.9	36.6	28.2	24.1
Incr Delay (d2), s/veh	8.8	0.5	0.6	6.2	3.6	4.1	8.7	0.7	0.0	10.0	1.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.8	0.9	5.5	4.3	4.4	9.8	10.2	0.7	1.3	6.1	0.7
LnGrp Delay(d),s/veh	42.6	32.0	32.1	37.7	34.9	35.5	36.7	19.2	13.0	46.7	29.7	24.3
LnGrp LOS	D	C	C	D	C	D	D	B	B	D	C	C
Approach Vol, veh/h		253			642			1597			684	
Approach Delay, s/veh		39.0			36.1			23.6			30.7	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.2	13.2	24.2	23.2	13.8	16.6	7.9	39.4
Change Period (Y+Rc), s	4.5	* 4.5	3.0	5.8	4.5	4.5	4.5	5.8
Max Green Setting (Gmax), s	23.5	* 14	37.0	28.2	17.5	19.5	9.2	54.5
Max Q Clear Time (g_c+I1), s	12.3	3.8	20.0	14.2	9.3	10.6	4.3	22.9
Green Ext Time (p_c), s	0.5	0.2	1.2	3.2	0.3	1.5	0.0	9.1

Intersection Summary	
HCM 2010 Ctrl Delay	28.9
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	96	20	141	344	183	400	1030	173	402	630	450
Future Volume (veh/h)	250	96	20	141	344	183	400	1030	173	402	630	450
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810	1810
Adj Flow Rate, veh/h	278	107	0	157	382	63	444	1144	120	447	700	448
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	325	134	114	429	406	340	494	1300	572	635	1451	797
Arrive On Green	0.10	0.07	0.00	0.25	0.22	0.22	0.15	0.38	0.38	0.19	0.42	0.42
Sat Flow, veh/h	3343	1810	1538	1723	1810	1516	3343	3438	1512	3343	3438	1534
Grp Volume(v), veh/h	278	107	0	157	382	63	444	1144	120	447	700	448
Grp Sat Flow(s),veh/h/ln	1672	1810	1538	1723	1810	1516	1672	1719	1512	1672	1719	1534
Q Serve(g_s), s	12.3	8.7	0.0	11.3	31.1	3.5	19.6	46.5	8.0	18.8	22.2	29.8
Cycle Q Clear(g_c), s	12.3	8.7	0.0	11.3	31.1	3.5	19.6	46.5	8.0	18.8	22.2	29.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	325	134	114	429	406	340	494	1300	572	635	1451	797
V/C Ratio(X)	0.86	0.80	0.00	0.37	0.94	0.19	0.90	0.88	0.21	0.70	0.48	0.56
Avail Cap(c_a), veh/h	412	416	354	429	442	370	637	1300	572	635	1451	797
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.22	0.22	0.22
Uniform Delay (d), s/veh	66.7	68.3	0.0	46.5	57.2	22.3	62.8	43.5	31.5	56.8	31.4	24.5
Incr Delay (d2), s/veh	13.4	10.3	0.0	0.2	27.5	0.3	13.1	8.8	0.8	0.8	0.2	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	4.8	0.0	5.4	18.7	1.5	10.0	23.7	3.5	8.8	10.6	12.7
LnGrp Delay(d),s/veh	80.1	78.6	0.0	46.7	84.8	22.6	75.9	52.2	32.4	57.6	31.7	25.1
LnGrp LOS	F	E		D	F	C	E	D	C	E	C	C
Approach Vol, veh/h		385			602			1708			1595	
Approach Delay, s/veh		79.7			68.3			57.0			37.1	
Approach LOS		E			E			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.4	15.1	26.2	67.3	18.6	37.9	32.8	60.7
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9
Max Green Setting (Gmax), s	20.7	34.9	29.0	50.4	18.6	* 37	22.6	* 57
Max Q Clear Time (g_c+I1), s	13.3	10.7	21.6	31.8	14.3	33.1	20.8	48.5
Green Ext Time (p_c), s	0.1	0.5	1.0	6.3	0.4	0.9	0.3	4.9

Intersection Summary	
HCM 2010 Ctrl Delay	53.2
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	750	0	1021	20	20	20	533	930	0	20	441	630
Future Volume (veh/h)	750	0	1021	20	20	20	533	930	0	20	441	630
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1900	1810	1900	1810	1810	1900	1810	1810	1810
Adj Flow Rate, veh/h	806	0	1060	22	22	8	573	1000	0	22	474	572
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	847	0	984	21	21	8	1333	2947	0	26	722	687
Arrive On Green	0.25	0.00	0.25	0.04	0.03	0.04	0.40	0.60	0.00	0.01	0.21	0.21
Sat Flow, veh/h	3447	0	1510	726	726	264	3343	5103	0	1723	3438	1492
Grp Volume(v), veh/h	806	0	1060	52	0	0	573	1000	0	22	474	572
Grp Sat Flow(s),veh/h/ln	1723	0	1510	1716	0	0	1672	1647	0	1723	1719	1492
Q Serve(g_s), s	32.2	0.0	34.4	4.0	0.0	0.0	17.4	14.3	0.0	1.8	17.7	29.0
Cycle Q Clear(g_c), s	32.2	0.0	34.4	4.0	0.0	0.0	17.4	14.3	0.0	1.8	17.7	29.0
Prop In Lane	1.00		1.00	0.42		0.15	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	847	0	984	49	0	0	1333	2947	0	26	722	687
V/C Ratio(X)	0.95	0.00	1.08	1.06	0.00	0.00	0.43	0.34	0.00	0.86	0.66	0.83
Avail Cap(c_a), veh/h	847	0	984	49	0	0	1342	2947	0	75	722	687
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.00	0.09	1.00	0.00	0.00	0.57	0.57	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.0	0.0	24.7	67.7	0.0	0.0	30.6	14.3	0.0	68.8	50.7	28.9
Incr Delay (d2), s/veh	3.1	0.0	36.9	146.7	0.0	0.0	0.1	0.2	0.0	25.0	4.6	11.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.7	0.0	23.9	3.9	0.0	0.0	8.1	6.5	0.0	1.0	8.9	24.2
LnGrp Delay(d),s/veh	55.0	0.0	61.6	216.3	0.0	0.0	30.7	14.5	0.0	93.8	55.3	40.2
LnGrp LOS	E		F	F			C	B		F	E	D
Approach Vol, veh/h		1866			52			1573			1068	
Approach Delay, s/veh		58.8			216.3			20.4			48.0	
Approach LOS		E			F			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		38.4	60.2	33.4		8.0	6.1	87.5				
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6				
Max Green Setting (Gmax), s		35.2	57.0	* 30		5.0	6.9	79.9				
Max Q Clear Time (g_c+I1), s		36.4	19.4	31.0		6.0	3.8	16.3				
Green Ext Time (p_c), s		0.0	2.2	0.0		0.0	0.0	8.9				
Intersection Summary												
HCM 2010 Ctrl Delay			44.8									
HCM 2010 LOS			D									
Notes												

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	953	490	403	680	100	100	110	628	190	150	250
Future Volume (veh/h)	120	953	490	403	680	100	100	110	628	190	150	250
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1676	1676	1676	1676	1676	1710
Adj Flow Rate, veh/h	130	1036	485	438	739	101	109	120	586	207	163	229
Adj No. of Lanes	1	2	0	1	2	0	1	1	2	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	140	1001	457	319	1642	224	85	221	863	217	135	189
Arrive On Green	0.09	0.47	0.47	0.20	0.58	0.59	0.05	0.13	0.14	0.14	0.21	0.22
Sat Flow, veh/h	1597	2126	971	1597	2816	385	1597	1676	2508	1597	632	888
Grp Volume(v), veh/h	130	769	752	438	418	422	109	120	586	207	0	392
Grp Sat Flow(s),veh/h/ln	1597	1593	1505	1597	1593	1609	1597	1676	1254	1597	0	1520
Q Serve(g_s), s	12.1	70.6	70.6	30.0	22.2	22.2	8.0	10.0	20.6	19.3	0.0	32.0
Cycle Q Clear(g_c), s	12.1	70.6	70.6	30.0	22.2	22.2	8.0	10.0	20.6	19.3	0.0	32.0
Prop In Lane	1.00		0.65	1.00		0.24	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	140	750	708	319	928	938	85	221	863	217	0	324
V/C Ratio(X)	0.93	1.03	1.06	1.37	0.45	0.45	1.28	0.54	0.68	0.95	0.00	1.21
Avail Cap(c_a), veh/h	224	750	708	319	928	938	85	221	863	245	0	324
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	68.0	39.7	39.7	60.0	17.7	17.6	71.0	60.8	42.1	64.3	0.0	58.7
Incr Delay (d2), s/veh	22.5	39.8	51.1	180.2	1.1	1.1	190.1	1.5	1.8	41.2	0.0	119.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	39.3	39.4	29.2	10.0	10.1	8.0	4.8	10.6	11.0	0.0	24.2
LnGrp Delay(d),s/veh	90.5	79.5	90.8	240.2	18.7	18.7	261.1	62.3	43.9	105.6	0.0	178.1
LnGrp LOS	F	F	F	F	B	B	F	E	D	F		F
Approach Vol, veh/h		1651			1278			815			599	
Approach Delay, s/veh		85.5			94.6			75.7			153.0	
Approach LOS		F			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	34.0	74.8	12.0	36.2	17.2	91.6	24.4	23.8
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2
Max Green Setting (Gmax), s	31.0	64.8	9.0	* 33	22.0	73.8	24.0	17.8
Max Q Clear Time (g_c+I1), s	32.0	72.6	10.0	34.0	14.1	24.2	21.3	22.6
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.1	6.5	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	95.7
HCM 2010 LOS	F

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	470	13	4	889	7	1
Future Vol, veh/h	470	13	4	889	7	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	511	14	4	966	8	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	525	0	1009	263
Stage 1	-	-	-	-	518	-
Stage 2	-	-	-	-	491	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1038	-	237	735
Stage 1	-	-	-	-	563	-
Stage 2	-	-	-	-	581	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1038	-	235	735
Mov Cap-2 Maneuver	-	-	-	-	235	-
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	581	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	257	-	-	1038	-
HCM Lane V/C Ratio	0.034	-	-	0.004	-
HCM Control Delay (s)	19.5	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection						
Int Delay, s/veh	0.1					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	483	28	9	887	1	0
Future Vol, veh/h	483	28	9	887	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	525	30	10	964	1	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	555	0	1042	278
Stage 1	-	-	-	-	540	-
Stage 2	-	-	-	-	502	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1011	-	225	719
Stage 1	-	-	-	-	548	-
Stage 2	-	-	-	-	573	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1011	-	220	719
Mov Cap-2 Maneuver	-	-	-	-	220	-
Stage 1	-	-	-	-	536	-
Stage 2	-	-	-	-	573	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	21.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	220	-	-	1011	-
HCM Lane V/C Ratio	0.005	-	-	0.01	-
HCM Control Delay (s)	21.4	-	-	8.6	0.1
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	590	120	190	410	70	130	836	250	60	673	340
Future Volume (veh/h)	260	590	120	190	410	70	130	836	250	60	673	340
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	271	615	90	198	427	69	135	871	241	62	701	292
Adj No. of Lanes	1	1	1	1	1	0	1	2	0	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	275	602	572	179	421	68	200	1294	358	212	846	895
Arrive On Green	0.13	0.32	0.31	0.07	0.27	0.27	0.05	0.47	0.47	0.03	0.45	0.44
Sat Flow, veh/h	1792	1881	1579	1792	1577	255	1792	2766	765	1792	1881	1560
Grp Volume(v), veh/h	271	615	90	198	0	496	135	562	550	62	701	292
Grp Sat Flow(s),veh/h/ln	1792	1881	1579	1792	0	1832	1792	1787	1743	1792	1881	1560
Q Serve(g_s), s	18.6	48.0	5.8	11.0	0.0	40.0	6.2	36.7	36.8	2.8	49.0	14.8
Cycle Q Clear(g_c), s	18.6	48.0	5.8	11.0	0.0	40.0	6.2	36.7	36.8	2.8	49.0	14.8
Prop In Lane	1.00		1.00	1.00		0.14	1.00		0.44	1.00		1.00
Lane Grp Cap(c), veh/h	275	602	572	179	0	488	200	836	815	212	846	895
V/C Ratio(X)	0.99	1.02	0.16	1.10	0.00	1.02	0.67	0.67	0.67	0.29	0.83	0.33
Avail Cap(c_a), veh/h	275	602	572	179	0	488	210	836	815	218	846	895
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	51.0	32.4	42.3	0.0	55.0	31.4	31.0	31.0	25.9	36.2	17.0
Incr Delay (d2), s/veh	50.0	42.3	0.1	97.7	0.0	44.6	6.1	4.3	4.4	0.3	9.2	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.0	32.0	2.5	6.9	0.0	26.3	3.3	19.1	18.7	1.4	27.7	6.6
LnGrp Delay(d),s/veh	97.8	93.3	32.5	140.0	0.0	99.7	37.6	35.3	35.5	26.2	45.4	18.0
LnGrp LOS	F	F	C	F		F	D	D	D	C	D	B
Approach Vol, veh/h		976			694			1247			1055	
Approach Delay, s/veh		88.9			111.2			35.6			36.7	
Approach LOS		F			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	52.0	11.2	71.8	23.0	44.0	8.5	74.5
Change Period (Y+Rc), s	3.0	3.9	3.0	* 4.3	3.0	3.9	3.0	4.3
Max Green Setting (Gmax), s	12.0	48.1	9.0	* 67	20.0	40.1	6.0	69.7
Max Q Clear Time (g_c+I1), s	13.0	50.0	8.2	51.0	20.6	42.0	4.8	38.8
Green Ext Time (p_c), s	0.0	0.0	0.0	3.2	0.0	0.0	0.0	4.6

Intersection Summary	
HCM 2010 Ctrl Delay	62.2
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	276	340	207	300	330	30	343	910	310	50	830	103
Future Volume (veh/h)	276	340	207	300	330	30	343	910	310	50	830	103
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1870	1900	1863	1863	1900	1881	1881	1863	1863	1881	1881
Adj Flow Rate, veh/h	288	354	141	312	344	26	357	948	130	52	865	27
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	2	2	2	2	2	1	1	2	2	1	1
Cap, veh/h	311	419	164	342	637	48	373	1566	694	67	972	435
Arrive On Green	0.17	0.17	0.17	0.19	0.19	0.19	0.21	0.44	0.44	0.04	0.27	0.27
Sat Flow, veh/h	1792	2495	978	1774	3337	251	1792	3574	1583	1774	3574	1599
Grp Volume(v), veh/h	288	250	245	312	182	188	357	948	130	52	865	27
Grp Sat Flow(s),veh/h/ln	1792	1776	1697	1774	1770	1818	1792	1787	1583	1774	1787	1599
Q Serve(g_s), s	18.7	16.1	16.5	20.3	10.9	11.0	23.2	23.9	5.9	3.4	27.4	1.5
Cycle Q Clear(g_c), s	18.7	16.1	16.5	20.3	10.9	11.0	23.2	23.9	5.9	3.4	27.4	1.5
Prop In Lane	1.00		0.58	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	311	298	285	342	338	347	373	1566	694	67	972	435
V/C Ratio(X)	0.92	0.84	0.86	0.91	0.54	0.54	0.96	0.61	0.19	0.78	0.89	0.06
Avail Cap(c_a), veh/h	349	352	337	399	398	409	410	1582	701	143	1067	477
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.0	47.5	47.7	46.7	43.0	43.1	46.2	25.3	20.3	56.2	41.2	31.8
Incr Delay (d2), s/veh	28.1	14.4	17.3	23.0	1.3	1.3	32.2	0.7	0.1	17.1	8.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.6	9.1	9.1	12.2	5.5	5.7	14.8	11.9	2.6	2.0	14.8	0.7
LnGrp Delay(d),s/veh	76.1	61.9	65.0	69.7	44.4	44.4	78.3	26.0	20.4	73.4	50.1	31.8
LnGrp LOS	E	E	E	E	D	D	E	C	C	E	D	C
Approach Vol, veh/h		783			682			1435			944	
Approach Delay, s/veh		68.1			56.0			38.5			50.9	
Approach LOS		E			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.2	24.3	28.6	37.9	24.5	27.0	9.0	57.5
Change Period (Y+Rc), s	4.5	* 4.5	3.0	5.8	3.6	4.5	4.5	5.8
Max Green Setting (Gmax), s	26.5	* 23	28.0	35.2	23.4	26.5	9.5	52.2
Max Q Clear Time (g_c+I1), s	22.3	18.5	25.2	29.4	20.7	13.0	5.4	25.9
Green Ext Time (p_c), s	0.4	1.3	0.3	2.7	0.2	1.8	0.0	7.2

Intersection Summary	
HCM 2010 Ctrl Delay	50.7
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	420	90	40	141	276	269	410	1400	231	262	1240	500
Future Volume (veh/h)	420	90	40	141	276	269	410	1400	231	262	1240	500
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	429	92	2	144	282	138	418	1429	148	267	1265	434
Adj No. of Lanes	2	1	1	1	1	1	2	2	1	2	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	426	136	114	405	326	272	438	1409	613	525	1508	861
Arrive On Green	0.12	0.07	0.07	0.23	0.17	0.17	0.13	0.40	0.40	0.30	0.85	0.85
Sat Flow, veh/h	3442	1863	1564	1774	1863	1554	3442	3539	1538	3442	3539	1561
Grp Volume(v), veh/h	429	92	2	144	282	138	418	1429	148	267	1265	434
Grp Sat Flow(s),veh/h/ln	1721	1863	1564	1774	1863	1554	1721	1770	1538	1721	1770	1561
Q Serve(g_s), s	13.6	5.3	0.1	7.5	16.2	6.5	13.3	43.8	7.0	7.0	20.4	8.0
Cycle Q Clear(g_c), s	13.6	5.3	0.1	7.5	16.2	6.5	13.3	43.8	7.0	7.0	20.4	8.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	426	136	114	405	326	272	438	1409	613	525	1508	861
V/C Ratio(X)	1.01	0.68	0.02	0.36	0.87	0.51	0.95	1.01	0.24	0.51	0.84	0.50
Avail Cap(c_a), veh/h	426	535	449	405	464	387	438	1409	613	525	1508	861
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.09	0.09	0.09
Uniform Delay (d), s/veh	48.2	49.7	29.7	35.6	44.1	21.9	47.7	33.1	22.0	34.8	6.2	3.3
Incr Delay (d2), s/veh	45.7	5.8	0.1	0.2	11.5	1.5	31.5	27.5	0.9	0.1	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	3.0	0.0	3.7	9.3	2.9	8.2	26.7	3.1	3.3	9.2	3.0
LnGrp Delay(d),s/veh	93.9	55.6	29.8	35.8	55.7	23.3	79.2	60.6	23.0	34.9	6.7	3.5
LnGrp LOS	F	E	C	D	E	C	E	F	C	C	A	A
Approach Vol, veh/h		523			564			1995			1966	
Approach Delay, s/veh		86.9			42.7			61.7			9.8	
Approach LOS		F			D			E			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	29.1	12.0	18.0	50.9	17.6	23.5	21.1	47.8
Change Period (Y+Rc), s	3.9	3.6	3.6	3.9	3.9	* 3.9	3.9	* 3.9
Max Green Setting (Gmax), s	9.5	32.0	14.4	39.1	13.7	* 28	9.6	* 44
Max Q Clear Time (g_c+I1), s	9.5	7.3	15.3	22.4	15.6	18.2	9.0	45.8
Green Ext Time (p_c), s	0.0	0.4	0.0	9.9	0.0	1.4	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	42.0
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	990	20	1151	20	20	30	638	1431	20	20	831	730
Future Volume (veh/h)	990	20	1151	20	20	30	638	1431	20	20	831	730
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.95	1.00		0.96	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1900	1881	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	1024	0	1133	20	20	5	651	1460	19	20	848	703
Adj No. of Lanes	2	0	1	0	1	0	2	3	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	1049	0	906	20	20	5	975	2733	36	24	903	860
Arrive On Green	0.29	0.00	0.29	0.03	0.02	0.03	0.56	1.00	1.00	0.01	0.25	0.25
Sat Flow, veh/h	3583	0	1562	797	797	199	3476	5222	68	1792	3574	1572
Grp Volume(v), veh/h	1024	0	1133	45	0	0	651	957	522	20	848	703
Grp Sat Flow(s),veh/h/ln	1792	0	1562	1793	0	0	1738	1712	1866	1792	1787	1572
Q Serve(g_s), s	31.1	0.0	32.2	2.7	0.0	0.0	14.5	0.0	0.0	1.2	25.6	27.4
Cycle Q Clear(g_c), s	31.1	0.0	32.2	2.7	0.0	0.0	14.5	0.0	0.0	1.2	25.6	27.4
Prop In Lane	1.00		1.00	0.44		0.11	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	1049	0	906	45	0	0	975	1792	977	24	903	860
V/C Ratio(X)	0.98	0.00	1.25	1.01	0.00	0.00	0.67	0.53	0.53	0.83	0.94	0.82
Avail Cap(c_a), veh/h	1049	0	906	65	0	0	975	1792	977	88	903	860
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.00	0.09	1.00	0.00	0.00	0.35	0.35	0.35	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.5	0.0	23.3	53.4	0.0	0.0	20.5	0.0	0.0	54.1	40.3	17.8
Incr Delay (d2), s/veh	4.3	0.0	113.7	90.8	0.0	0.0	0.6	0.4	0.7	22.1	18.3	8.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.0	0.0	42.0	2.5	0.0	0.0	6.9	0.1	0.2	0.8	14.9	23.3
LnGrp Delay(d),s/veh	42.9	0.0	136.9	144.2	0.0	0.0	21.1	0.4	0.7	76.2	58.6	26.3
LnGrp LOS	D		F	F			C	A	A	E	E	C
Approach Vol, veh/h		2157			45			2130			1571	
Approach Delay, s/veh		92.3			144.2			6.8			44.4	
Approach LOS		F			F			A			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		36.2	35.3	31.8		6.7	5.5	61.6
Change Period (Y+Rc), s		3.2	3.6	* 3.6		3.0	3.2	3.6
Max Green Setting (Gmax), s		33.0	30.8	* 28		5.0	6.2	52.8
Max Q Clear Time (g_c+I1), s		34.2	16.5	29.4		4.7	3.2	2.0
Green Ext Time (p_c), s		0.0	2.2	0.0		0.0	0.0	14.5

Intersection Summary	
HCM 2010 Ctrl Delay	49.1
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	1011	270	346	902	140	150	290	830	320	170	370
Future Volume (veh/h)	110	1011	270	346	902	140	150	290	830	320	170	370
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1676	1676	1676	1676	1676	1710
Adj Flow Rate, veh/h	120	1099	276	376	980	143	163	315	856	348	185	345
Adj No. of Lanes	1	2	0	1	2	0	1	1	2	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	129	1240	309	202	1497	218	106	338	853	192	133	248
Arrive On Green	0.08	0.49	0.49	0.13	0.54	0.54	0.07	0.20	0.21	0.12	0.25	0.26
Sat Flow, veh/h	1597	2528	630	1597	2790	407	1597	1676	2508	1597	525	979
Grp Volume(v), veh/h	120	690	685	376	559	564	163	315	856	348	0	530
Grp Sat Flow(s),veh/h/ln	1597	1593	1565	1597	1593	1605	1597	1676	1254	1597	0	1504
Q Serve(g_s), s	11.2	58.3	59.5	19.0	37.6	37.6	10.0	27.7	31.0	18.0	0.0	38.0
Cycle Q Clear(g_c), s	11.2	58.3	59.5	19.0	37.6	37.6	10.0	27.7	31.0	18.0	0.0	38.0
Prop In Lane	1.00		0.40	1.00		0.25	1.00		1.00	1.00		0.65
Lane Grp Cap(c), veh/h	129	781	768	202	854	861	106	338	853	192	0	381
V/C Ratio(X)	0.93	0.88	0.89	1.86	0.65	0.66	1.53	0.93	1.00	1.82	0.00	1.39
Avail Cap(c_a), veh/h	160	781	768	202	854	861	106	338	853	192	0	381
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.55	0.55	0.55	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	68.5	34.3	34.6	65.5	24.8	24.8	70.0	58.9	49.5	66.0	0.0	55.7
Incr Delay (d2), s/veh	42.3	13.7	14.9	397.0	2.2	2.2	280.6	31.8	31.8	387.2	0.0	191.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	28.5	28.9	30.7	17.0	17.1	12.7	15.8	21.4	28.5	0.0	36.0
LnGrp Delay(d),s/veh	110.7	48.0	49.5	462.5	27.0	26.9	350.6	90.7	81.3	453.2	0.0	247.2
LnGrp LOS	F	D	D	F	C	C	F	F	F	F		F
Approach Vol, veh/h		1495			1499			1334			878	
Approach Delay, s/veh		53.7			136.2			116.4			328.8	
Approach LOS		D			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.0	77.8	14.0	42.2	16.1	84.7	22.0	34.2
Change Period (Y+Rc), s	3.0	3.2	3.0	* 3.2	3.0	3.2	3.0	3.2
Max Green Setting (Gmax), s	20.0	67.8	11.0	* 39	16.0	71.8	19.0	30.8
Max Q Clear Time (g_c+I1), s	21.0	61.5	12.0	40.0	13.2	39.6	20.0	33.0
Green Ext Time (p_c), s	0.0	5.0	0.0	0.0	0.0	9.3	0.0	0.0

Intersection Summary		
HCM 2010 Ctrl Delay		139.9
HCM 2010 LOS		F

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	811	8	2	774	32	12
Future Vol, veh/h	811	8	2	774	32	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	882	9	2	841	35	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	891	0	1312	446
Stage 1	-	-	-	-	887	-
Stage 2	-	-	-	-	425	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	757	-	150	560
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	627	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	757	-	149	560
Mov Cap-2 Maneuver	-	-	-	-	149	-
Stage 1	-	-	-	-	361	-
Stage 2	-	-	-	-	627	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	30.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	186	-	-	757	-
HCM Lane V/C Ratio	0.257	-	-	0.003	-
HCM Control Delay (s)	30.9	-	-	9.8	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	818	15	4	802	4	1
Future Vol, veh/h	818	15	4	802	4	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	889	16	4	872	4	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	905	0	1341	453
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	444	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	747	-	144	554
Stage 1	-	-	-	-	358	-
Stage 2	-	-	-	-	614	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	747	-	143	554
Mov Cap-2 Maneuver	-	-	-	-	143	-
Stage 1	-	-	-	-	354	-
Stage 2	-	-	-	-	614	-

Approach	EB		WB		NB
HCM Control Delay, s	0		0		27.1
HCM LOS					D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	168	-	-	747	-
HCM Lane V/C Ratio	0.032	-	-	0.006	-
HCM Control Delay (s)	27.1	-	-	9.8	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX C: APPROVED/PENDING PROJECTS TRIP GENERATION

APPENDIX C: APPROVED/PENDING PROJECTS TRIP GENERATION

Project	Project Size	Project Type	AM Peak Hour[1]			PM Peak Hour[1]		
			In	Out	Total	In	Out	Total
Kawana Springs Apartments[2]	120 dwelling units	ITE Land Use Code 220 Multifamily Housing (Low-Rise)	12	49	61	48	26	74
Modified Kawana Meadows Project[2]	62 dwelling units	ITE Land Use Code 210 Single-Family Detached Housing	12	35	47	39	23	62
Residences at Taylor Mountain[2]	99 dwelling units	ITE Land Use Code 220 Multifamily Housing (Low-Rise)	10	40	50	40	21	61
Taylor Mountain Estate[2]	7 dwelling units	ITE Land Use Code 210 Single-Family Detached Housing	1	4	5	3	4	7
Holly Hock Subdivision Plan 2 The Vistas at Kawana Springs	16 dwelling units 101 dwelling units	ITE Land Use Code 210 Single-Family Detached Housing[3]	22	65	87	73	43	116
Penstemon Place	59 dwelling units	ITE Land Use Code 210 Single-Family Detached Housing	11	33	44	37	22	59
The Farmstead	20 dwelling units	ITE Land Use Code 220 Multifamily Housing (Low-Rise)	2	8	10	8	4	12
Green Trove Wellness	24,000 square feet	ITE Land Use Code 140 Manufacturing	12	3	15	5	12	17

Notes:
1. Trip generation estimates prepared using data from the ITE *Trip Generation Manual, 10th Edition* or the approved transportation impact analysis for the project (where available).
2. Trip generation estimates based on approved transportation impact analysis for the project
3. Due to the close proximity of these projects, as well as their location relative to the 800 Yolanda Avenue project site, these two projects were combined into one project for approved trip analysis purposes.
Fehr & Peers, February 2019

MEMORANDUM

Date: August 7, 2019

To: Danny Abdelmalak, 800 Yolanda LLC

From: Ian Barnes, Fehr & Peers

Subject: Parking Analysis for the 800 Yolanda Avenue Project in Southeastern Santa Rosa, California

WC18-3529

This memorandum presents the results of a parking analysis for the proposed Santa Rosa Farm Group indoor cannabis cultivation facility located at 800 Yolanda Avenue in southeastern Santa Rosa, California. The proposed project includes construction of approximately 120,000 square feet of uses on site, to be served by 85 parking spaces.

The proposed project is anticipated to be a 24-hour operation, staffed by a total of 105 employees over four shifts. The shifts are anticipated to occur as follows[1]:

- Primary Day Shift: 45 employees arriving during the AM peak hour and departing during the PM peak hour
- Early Night Shift: 25 employees arriving during the PM peak hour and departing during the off-peak early morning period
- Night Shift: 10 employees arriving after the PM peak hour and departing during the off-peak early morning period
- Early Morning Shift: 25 employees arriving before the AM peak hour and departing in the period between the AM peak hour and PM peak hour; a limited number of AM peak hour lunch break trips are assumed for this employee shift.

[1] Description of peak/off-peak times noted in shift descriptions relate to peak hours of adjacent street traffic, as noted in the *800 Yolanda Avenue Transportation Impact Analysis Report* (Fehr & Peers, July 2019).

The remainder of this memorandum outlines the City requirements for off-street parking for development projects and an assessment of the proposed parking supply relative to estimated peak parking demand after project occupancy.

City Zoning Code Requirements

Off-street parking supply requirements for projects in the City of Santa Rosa are governed, in part, by policies listed in the City Zoning Code. Table 3-4 in City Zoning Code §20-36.040 notes the number of off-site parking spaces required for various project types. For cannabis cultivation facilities, the required off-street vehicle parking spaces required is noted as *1 space per 1,000 square feet or as determined by Conditional Use Permit*.

Assuming that all 120,000 square feet of proposed uses would be subject to the Zoning Code requirements, the project would be required to provide 120 parking spaces. This value exceeds the proposed parking supply of 85 spaces. It is noted, however, that the assumed parking demand inherent in the Zoning Code parking requirements may not reflect the anticipated level of peak parking demand associated with any given project. A more precise analysis of parking demand and supply may result in a finding that the proposed parking supply is in fact adequate to accommodate projected peak parking demands.

Parking Demand Analysis

As noted earlier in this memorandum, the proposed project is anticipated to be occupied by employees over the course of four shifts on a 24-hour basis. In addition to accommodating employee vehicles, product delivery trips and other business-related activities (US Mail, UPS, FedEx, etc.) are anticipated to occur throughout the day.

The worst case scenario for peak parking demand would occur during the shift change between the Primary Day Shift (45 employees) and the Early Night Shift (25 employees), combined with visitor trips, delivery trips or US Mail/UPS/FedEx trips. Assuming that the total of the delivery trips, visitor trips and/or US Mail trips would amount to five vehicles during the shift change, this would result in total peak parking demand of 75 vehicles.

The total proposed parking supply is 85 spaces, indicating that the supply would be able to accommodate the estimated peak parking demand of 75 vehicles. Ten parking spaces would be left unoccupied in this scenario, providing additional capacity and reducing the time needed for an arriving motorist to find an open space. Based on expected operations, it is unlikely that these additional ten spaces would be needed to accommodate the demand.

Conclusions

The results of the parking analysis indicate that the proposed parking supply of 85 spaces would be adequate to accommodate the estimated peak parking demand for the project (75 spaces). The City Zone Code notes that the parking supply requirement of 120 spaces (per the code) could be modified through a Conditional Use Permit for the project.

This concludes our assessment of the adequacy of the parking supply for the 800 Yolanda Avenue project. Please contact Ian Barnes at (925) 930-7100 if you have any questions.

APPENDIX I
MITIGATION MONITORING PLAN AND REPORTING PROGRAM CHECKLIST

Mitigation Measures	Implementation Procedure	Monitoring Responsibility	Monitoring/Reporting Action & Schedule	Non-Compliance Sanction/Activity	MMRP Record Name/Date
AQ-1: Odor Control Plan Prior to final certificate of occupancy, the Project sponsor shall prepare an Odor Control Plan and submit it to the City for review and approval. Implementation of the Plan shall ensure that Project operations will not expose neighboring properties to objectionable cannabis odors. At a minimum, the Plan shall include the following requirements: • A schedule for implementation of the Plan including startup of selected carbon filtration and adsorption systems prior to the start of cultivation activities. • The Project shall incorporate hydroxyl generators to deodorize, oxidize, and deactivate airborne microbials and odors. • The Project shall incorporate a carbon filtration and absorption system to control odors. • The Project operator shall implement a protocol to continuously sample representative effluent air following the carbon absorption system during grow periods. If the carbon filtration system alone is not adequate in obtaining the control efficiency determined under the Plan, then odor control must be enhanced through additional means. These may include, but not be limited to, mist eliminators via spray application, oxidation using hydrogen peroxide or ozone and/or other neutralizing agents. All additional controls and their guaranteed efficiency must be backed by vendor suppliers. • The Project shall post a publicly visible sign with the telephone number and operations contact for odor complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.	Prepare Odor Control Plan with required elements.	City of Santa Rosa	Review and approval of Odor Control Plan by City prior to issuance of final certificate of occupancy.	Deny issuance of final certificate of occupancy.	
BIO-1: Perform Pre-construction Survey for Nesting Birds The Project sponsor shall retain a qualified biologist to perform a pre-construction survey for nesting birds within 14 days prior to ground breaking at the Project site if construction activities will take place between February 1 and August 31. If nesting birds are found, the qualified biologist shall establish suitable buffers prior to ground-breaking activities. To prevent encroachment, the established buffer(s) shall be clearly marked by highly visibility material. The established buffer(s) shall remain in effect until the young have fledged or the nest has been abandoned as confirmed by the qualified biologist.	Incorporate timing into project construction plans. Conduct preconstruction survey On-site observation	Planning Division and Project Sponsor/Contractor	Prior to issuance of grading permit. Project sponsor shall provide the preconstruction survey to the Planning Division.	Stop work and establish appropriate buffer zone.	
BIO-2: Avoid Roosting Bats The Project sponsor shall implement the following measures to avoid roosting bats: • The Project sponsor shall retain a qualified biologist to supervise any tree trimming or removal of suitable roosting trees; • Tree removal shall only be conducted during seasonal periods of bat activity (August 31 through October 15, when young would be self-sufficiently volant and prior to hibernation and March 1 through April 15 to avoid hibernating bats and prior to formation of maternity colonies); • Trees shall be trimmed and/or removed in a two-phased removal system conducted over two consecutive days. The first day (in the afternoon), limbs and branches shall be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices or deep bark fissures shall be avoided, and only branches or limbs without those features shall be removed. On the second day, the entire tree shall be removed; and • The Project sponsor shall include the foregoing measures in the contracts with the biologist and any contractors for tree trimming or removal.	Incorporate timing into project construction plans. On-site observation	Planning Division and Project Sponsor/Contractor	Prior to and during tree trimming and removal.	Stop work.	

Mitigation Measures	Implementation Procedure	Monitoring Responsibility	Monitoring/Reporting Action & Schedule	Non-Compliance Sanction/Activity	MMRP Record Name/Date
CUL-1: If any potentially historic (older than 50 years old) subsurface remains are uncovered during grading or construction, all work shall be halted within 100 feet of the find, and the Project sponsor shall retain a qualified cultural resources consultant approved by the City to identify and investigate any subsurface historic remains, and define their physical extent and the nature of any built features or artifact-bearing deposits. Significant historic cultural materials may include finds from the late 19th and early 20th centuries including structural remains, trash pits, isolated artifacts, etc. The City's Community Development Department shall also be notified concurrently with notification of the cultural resources consultant. The investigation shall proceed into formal evaluation to determine the eligibility of the find for the California Register of Historical Resources. This shall include additional exposure of the feature(s), photo documentation and recordation, and analysis of the artifact assemblage(s). If the evaluation determines that the features and artifacts do not have sufficient data potential to be eligible for the California Register, additional work shall not be required. However, if data potential exists – e.g., there is an intact feature with a large and varied artifact assemblage – further mitigation will be required. If avoidance is determined to be infeasible, pursuant to CEQA Guidelines Section 15126.4(b)(3)(C), a data recovery plan, which makes provisions for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken. Such studies shall be deposited with the California Historical Resources Regional Information Center. Archeological sites known to contain human remains shall be treated in accordance with the provisions of Section 7050.5 Health and Safety Code. If an artifact must be removed during Project excavation or testing, curation may be appropriate. The language of this mitigation measure shall be included on any future grading plans, utility plans and/or other plans that involve soil disturbance on the Project site subject to approval by the City.	Incorporate into project design and construction documents; onsite observation (by disturbance coordinator)	Building Division and Project Sponsor/Contractor	During ground disturbance activities	Stop work.	
CUL-2: If any prehistoric artifacts or other indications of archaeological resources are found during grading and construction activities, all work within 100 feet of the find shall cease and the Project sponsor shall retain an archaeologist approved by the City to evaluate the find(s). The City's Community Development Department and any relevant Native American tribe shall also be notified concurrently with notification of the archaeologist. The investigation shall proceed into formal evaluation to determine the eligibility of the find for the California Register of Historical Resources. This shall include additional exposure of the feature(s), photo documentation and recordation, and analysis of the artifact assemblage(s). If the evaluation determines that the features and artifacts do not have sufficient data potential to be eligible for the California Register, additional work shall not be required. However, if data potential exists – e.g., there is an intact feature with a large and varied artifact assemblage – further mitigation will be required. If avoidance is determined to be infeasible, pursuant to CEQA Guidelines Section 15126.4(b)(3)(C), a data recovery plan, which makes provisions for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken. Such studies shall be deposited with the California Historical Resources Regional Information Center. Archeological sites known to contain human remains shall be treated in accordance with the provisions of Section 7050.5 Health and Safety Code. If an artifact must be removed during Project excavation or testing, curation may be appropriate. The language of this mitigation measure shall be included on any future grading plans, utility plans and/or other plans that involve soil disturbance on the Project site subject to approval by the City.	Incorporate into project design and construction documents; onsite observation (by disturbance coordinator)	Building Division and Project Sponsor/Contractor	During ground disturbance activities	Stop work.	
CUL-3: Procedures of conduct following the discovery of human remains are mandated by HSC Section 7050.5, Public Resources Code Section 5097.98 and CCR Section 15064.5(e) (CEQA). According to the provisions in CEQA, if human remains are encountered at the site, all work in the immediate vicinity of the discovery shall cease and necessary steps to ensure the integrity of the immediate area shall be taken. The Sonoma County Coroner shall be notified immediately. The Coroner shall then determine whether the remains are Native American. If the Coroner determines the remains are Native American, the Coroner shall notify the Native American Heritage Commission (NAHC) within 24 hours, who will, in turn, notify the person the NAHC identifies as the Most Likely Descendant (MLD) of any human remains. The landowner shall engage in consultations with the MLD. The MLD will make recommendations concerning the treatment of the remains within 48 hours, as provided in Public Resources Code 5097.98. If the MLD does not make recommendations within 48 hours, the owner shall, with appropriate dignity, reinter the remains in an area of the property secure from further disturbance. Alternatively, if the owner does not accept the MLD's recommendations, the owner or the descendent may request mediation by the NAHC.	Incorporate into project design and construction documents; onsite observation (by disturbance coordinator)	Building Division and Project Sponsor/Contractor	During ground disturbance activities	Stop work.	

Mitigation Measures	Implementation Procedure	Monitoring Responsibility	Monitoring/Reporting Action & Schedule	Non-Compliance Sanction/Activity	MMRP Record Name/Date
GEO-1: Prepare a Site-specific Geotechnical Investigation and Design Report The Project sponsor shall retain a geotechnical engineer licensed in the State of California to prepare a site-specific Geotechnical Investigation and Design Report, which will include, at minimum, the following elements: • Analysis of expected ground motions at the Project site from known active faults. • Requirements for structural design that can accommodate ground accelerations expected from known active faults, in accordance with City ordinances and policies and consistent with the CBC. • Identify and implement site specific engineering and construction methods for potential expansive and liquefiable soils in compliance with CGS Geology Guidelines specific to building designs. • Determine final design parameters for the walls, foundations, foundation slabs, and surrounding related improvements (utilities, roadways, parking lots and sidewalks). The Project sponsor shall retain a qualified civil engineer licensed in the State of California to prepare design specifications including, but not limited to grading, excavation, foundations systems, and compaction specification, based on recommendations provided in the Geotechnical Investigation and Design Report. Issuance of building and grading permits by the City Engineer shall be contingent on incorporation of all recommendations set forth in the Geotechnical Investigation and Design Report in final grading plan, construction plans, and building plans.	Incorporate into project design and construction documents.	Building Division and Project Geotechnical Engineer	Verification of incorporation into design and construction documents prior to issuance of grading and building permit.	Deny issuance of grading and building permit.	
GEO-2: If paleontological resources, including individual fossils or assemblages of fossils, or unique geological features are encountered during grading or construction activities, all work within 100 feet of the find shall cease and the Project sponsor shall retain a paleontologist approved by the City to evaluate the find(s) and make treatment recommendations, which the Project sponsor shall implement.	Incorporate into project design and construction documents; onsite observation (by disturbance coordinator)	Building Division and Project Sponsor/Contractor	During ground disturbance activities	Stop work.	
HAZ-1: Handling and Disposal of Hazardous Building Materials Prior to issuance of grading and demolition permits, the Project sponsor shall retain a registered environmental assessor or a professional engineer to perform a hazardous building materials survey, and shall submit the survey to the City for review and approval. The survey shall be designed to identify ACMs, LBP, electrical equipment containing PCBs, fluorescent lights containing mercury, or fluorescent light ballasts containing PCBs or DEHP. If any ACMs, lead-containing materials, or other hazardous components of building materials are identified, the Project sponsor shall be required to implement adequate abatement practices, such as containment and/or removal, in accordance with applicable regulations for the handling and removal of these materials, prior to demolition. Any PCB-containing equipment or fluorescent lights containing mercury vapors shall also be removed and disposed of in accordance with applicable regulations. A written plan or notification of intent to demolish buildings shall be provided to the BAAQMD at least ten working days prior to commencement of demolition, even if no ACMs were identified during the hazardous building materials survey. If ACMs are identified, the demolition and removal of asbestos-containing building materials shall be subject to applicable California Occupational Safety and Health Administration (Cal/OSHA) and BAAQMD regulations (Regulation 11, Rule 2). If LBP is identified, then federal and state construction worker health and safety regulations shall be followed during demolition activities, including Title 17 of the CCR, Sections 35001 through 36000. If loose or peeling LBP is identified, it shall be removed by a qualified lead abatement contractor and disposed of in accordance with existing hazardous waste regulations.	Submittal of Hazardous Building Materials Survey to Building Department for approval.	Building Department	Prior to issuance of building permit.	Deny issuance of building permit.	
HAZ-2: Prepare and Maintain Vegetation Maintenance Program Prior to issuance of construction permits, the Project sponsor shall prepare and submit to the City for review and approval a site-specific vegetation maintenance program. The vegetation maintenance program shall include the following elements: • an onsite fire hazard assessment consultation with a representative of the Santa Rosa Fire Department or similar; • identification of defensible space zone boundaries, the maintenance measures to be taken within each zone (e.g., removal of dead material, maintaining “fuel breaks” such as the eastern driveway), and the frequency at which the maintenance measures will be performed (i.e., annually or less); • and performance of the maintenance measures at applicable frequencies.	Submittal of Vegetation Maintenance Program to Building Department for approval.	Building Department	Prior to issuance of grading and demolition permits	Deny issuance of building permit.	

Mitigation Measures	Implementation Procedure	Monitoring Responsibility	Monitoring/Reporting Action & Schedule	Non-Compliance Sanction/Activity	MMRP Record Name/Date
HYD-1: Compliance with City's LID Requirements Prior to issuance of the City Building Permit, the Project sponsor shall submit documentation for the City Engineer's review and approval, demonstrating the Project's compliance with the City of Santa Rosa LID stormwater BMP system design requirements. The Project sponsor's documentation shall include a technical demonstration showing how the proposed Project drainage BMPs satisfy the City's program technical design and sizing requirements. Without limitation, the Project sponsor shall demonstrate compliance with the following key LID requirements: • Achievement of a retention requirement (hydromodification control) of 100% Volume Capture: The project must capture (through infiltration and/or reuse) 100% of the volume of runoff generated by a one-inch 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. • Achievement of a Treatment Requirement of 100% of the flow calculated using the modified Rational Method and a known intensity of 0.20 inch per hour.	Submittal of documentation demonstrating compliance with LID to Building Department for approval.	Building Department	Prior to issuance of building permit.	Deny issuance of building permit.	

ATTACHMENT 1
WATER, WASTEWATER, AND STORMWATER CALCULATIONS

Water System Sizing Estimate

Estimated Water Use			
Operations	**Quantity**	**gpd/plant**	**gpd**
Flowering plants	10,075	0.6	6,045
Veg/Nursery plants	7,232	0.4	2,893
		subtotal	8,938

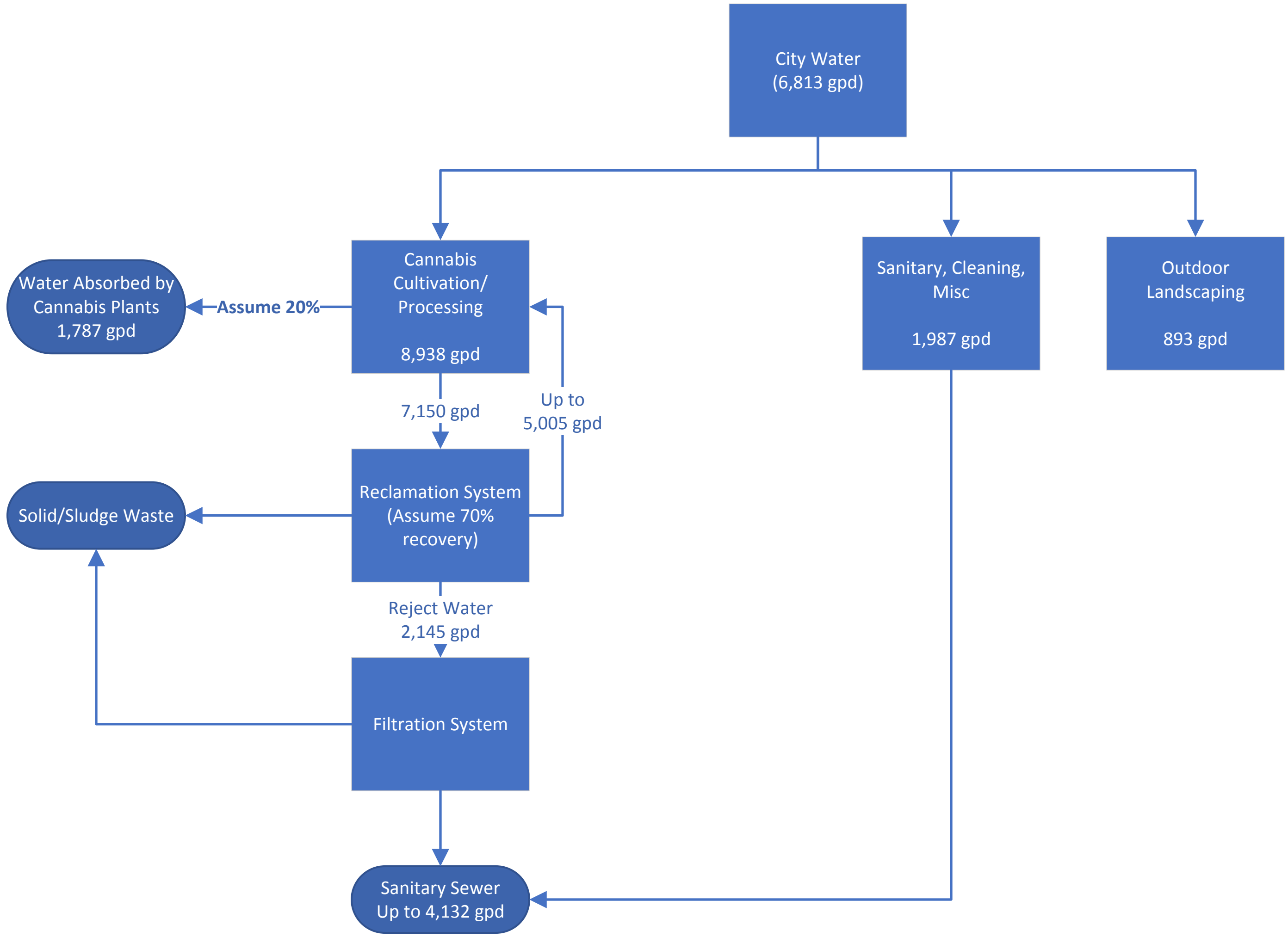
Domestic Water	Quantity	gallons/use	uses/day	gpd
Toilets	20	1.28	12	307.2
Lavoratories	20	0.5	240	720
Urinals	6	0.125	240	180
Kitchen Sink	2	2	100	400
Drinking fountain	3	0.125	240	90
Mop Sink	3	5	6	90
			subtotal	1,787

Miscellaneous	Quantity	gpm	minutes	gpd
Spills	3	5	5	75
Washdowns	5	5	5	125
			subtotal	200

Notes:
gpd - gallons per day
gpm - gallons per minute

Water Use Process Flow

Terraphase Engineering Inc.



Terraphase Engineering Inc.

Wastewater Estimates Based on Water Use Process Flow

Type	Description	Qty	Units	Rationale	Source
use	Flowering plants	10,075	each	operations	Axiom Water System Sizing Estimate
use	Nursery plants	7,232	each	operations	Axiom Water System Sizing Estimate
use/reclaim	Cannabis cultivation	8,938	gpd	0.6 gpd/flowering plant and 0.4 gpd/plant for nursery plants	Axiom Water System Sizing Estimate
use	Sanitary, cleaning, misc.	1,987	gpd	# employees, etc.	Axiom Water System Sizing Estimate
use	Outdoor landscaping	893	gpd	landscaped design	Axiom Water System Sizing Estimate
supply	City water supply	5,383	gpd	cultivation + sanitary + outdoor landscaping - reclamation system effluent	calculated
% use	Percent water absorbed by plants	20%	%	similar projects	Online sources/general industry knowledge
use	Water absorbed by plants	1,788	gpd	percent water absorbed * cannabis cultivation	calculated
wip	Reclamation System influent	7,150	gpd	cannabis cultivation - water absorbed	calculated
wip	Reclamation System % recovery	90%	%	% recovery	System parameters
supply	Reclamation System effluent / return to cultivation	6,435	gpd	influent * recovery rate	calculated
wip	Filtration system throughput	715	gpd	not reclaimed	calculated
discharge	Sanitary system discharge	2,702	gpd	not reclaimed + sanitary, cleaning, misc	calculated

Wastewater Estimates Based on % Recovery		
% Reclaim	Supply (gpd)	Wastewater Discharge (gpd)
70%	6,813	4,132
75%	6,455	3,775
80%	6,098	3,417
85%	5,740	3,060
90%	5,383	2,702

Color Key:
green = given or assumed
white = calculated
yellow = variable
blue font = supply or discharge

Notes:

wip - work in progress

gpd - gallons per day

800 Yolanda LLC Project Site: Pre- and Post Development Runoff Calculations

References:

1. Sonoma County Water Agency. *Flood Control Design Criteria* manual. November 1966 (Revised April 1973 and August 1983).
2. BC Engineering Group. Hydrology drawings (Sheets PRE and POST). April 25, 2017.

Assumptions and inputs:

Reoccurence interval (yr):	Calculated runoff for 10, 25, and 100-year events to be conservative	Reference 1
Time of concentration (min):	15	Reference 1
Tributary watershed area (ac):	3.23	Reference 2
Pre-development average ground slope for tributary watershed area (%)	≤5	Reference 2
Post development average ground slope for tributary watershed area (%)	≤5	Reference 2
Project location:	800 Yolanda Ave, Santa Rosa, CA	Reference 2
Mean seasonal precipitation (in:)	30	Reference 1

Design Discharge (Q) calculations:

	Runoff Coefficient, C (From "Reference 1 - Plate No. B-1" sheet and Reference 2)	Intensity of Rainfall, I, in/hr (From "Reference 1 - Plate No. B-2" sheet)	Tributary Watershed Area, A, ac (From Reference 2)	K Factor (From "Reference 1 - Plate No. B-3" and "Reference 1 - Plate No. B-4" sheets and Reference 2)	Q, ft/sec
			Pre-Development Conditions		
10-year	0.4	1.72	3.23	1	2.22
25-year	0.4	2	3.23	1	2.58
100-year	0.4	2.41	3.23	1	3.11
			Post Development Conditions		
10-year	0.9	1.72	3.23	1	5.00
25-year	0.9	2	3.23	1	5.81
100-year	0.9	2.41	3.23	1	7.01

Where Q = CIAK (Reference 1, page 11)

Changes going from pre- to post development conditions:

	Change in Q (ft/sec)	Percent Change in Q, %	
10-year	2.78	125	125% increase
25-year	3.23	125	125% increase
100-year	3.89	125	125% increase

Pre-Development

	Area (ac)	Area (sq ft)	%	
Impervious	2.70	117,612	84	
Pervious	0.53	23,087	16	<20%, no need to use weighted C
Total	3.23	140,699	100	

Post Development

	Area (ac)	Area (sq ft)	%	
Impervious	2.77	120,837	86	
Pervious	0.46	19,862	14	<20%, no need to use weighted C
Total	3.23	140,699	100	

ATTACHMENT 2
CORRESPONDENCE WITH THE CITY OF SANTA ROSA
AND UTILITY PROVIDERS

May 16th, 2019

Danny Abdelmalak
9030 National Blvd
Los Angeles, CA 90034
Attn: Danny Abdelmalak

Re: **800 Yolanda Ave**
Santa Rosa, CA 95404

Danny Abdelmalak,

Gas and Electric service is available to **800 Yolanda Ave. Santa Rosa, CA 95404**.

Extensions of these facilities will be made in accordance with our gas and electric rules and regulations on file with the State of California Public Utilities Commission at the time the applicant applies for gas and electric service.

Please refer any inquiries to me at **415-726-1674**.

Sincerely,

Eric Cookman
Industrial Power Engineer
3965 Occidental Rd.
Santa Rosa, Ca 95401
External: (415) 726-1674

December 19, 2017

Santa Rosa Water Operations/Customer Service
35 Stony Point Road
Santa Rosa, CA 95401

Laguna Treatment Plant
430 Llano Road
Santa Rosa, CA 95407

Subject: Request for Will Serve Letter for Wastewater Treatment for the Proposed Santa Rosa Farms Project Located at 800 Yolanda Road in Santa Rosa, California

To Whom It May Concern:

800 Yolanda LLC is in the planning and design phase of the proposed Santa Rosa Farms project. The proposed Project includes redevelop an industrially-zoned parcel with an approximately 120,000-square-foot cannabis cultivation facility. The proposed Project would include cannabis support uses, including manufacturing, distribution, and laboratory testing. The project site is located at the southwest corner of Yolanda Avenue and Petaluma Hill Road. The eastern half of the parcel is undeveloped, with the exception of an access route from Petaluma Hill Road. The western half of the parcel includes the developed residence and ancillary buildings, as well as approximately three acres of gravel cover.

Wastewater generation from both cultivation operations and sanitary purposes is estimated to be between 2,300 and 11,820 gallons per day (gpd), depending on the daily operations. The wastewater would be discharged to the existing sanitary sewer lines connections for the site.

We request that the City confirm the following: (1) Diameter of existing sanitary sewer service line from the site, (2) confirmation the capacity of the existing sanitary sewer service line (gallons per minute), and (3) confirm that the treatment/recycling facilities can accommodate up to 11,820 gpd of wastewater from the proposed Project.

If you have any question or comments regarding this submittal, please contact Alice Hale Price at 510-645-1850x57.

Sincerely,

AHale

Alice Hale Price, PE
Associate

City of Santa Rosa
WATER

January 17, 2018

Alice Hale Price
Terraphase Engineering Inc.
1404 Franklin St, Suite 600
Oakland, CA 94612

Re: Will Serve Letter- 800 Yolanda Avenue

Dear Ms. Hale Price ,

The City of Santa Rosa currently does not provide project- specific 'will serve' letters for water and sewer utility services. Currently, water and sewer utility services are available for new development.

Please give me a call at 543-3959 if you have any further questions about our utility services or policies.

Sincerely,

Caryn Lozada
Acting Development Review Coordinator

CORRESPONDENCE LOG

To:
Ms. Caryn Lozada
Acting Development Review Coordinator
City of Santa Rosa Water Department

From:
Alice Hale Price, PE
Associate Engineer
Terraphase Engineering Inc.

Date:
January 29, 2018

Project Number:
0223.001.002

Subject: Sewer and Water Service at 800 Yolanda Avenue in Santa Rosa, California

---

On January 29, 2018 at approximately 2pm, Alice Hale Price called Ms. Caryn Lozada, Acting Development Review Coordinator, of the City of Santa Rosa Water Department to follow up on Ms. Lozada's Will Serve Letter dated January 17, 2018. Ms. Hale Price requested sizing information on the sewer and water mains and laterals associated with the 800 Yolanda Avenue property in Santa Rosa, California ("the Site"). Ms. Lozada indicated that there is a 6-inch diameter sewer line and 12-inch diameter water line in Yolanda Avenue, adjacent to the Site.

Ms. Lozada indicated that flow data is not available for the water line, but it can be requested ($135 processing fee). Ms. Lozada stated that the Water Department does not have data regarding the diameter of the existing laterals associated with the Site, however, given that the current use is a single-family residence, the laterals are likely 4-inches in diameter. Ms. Lozada noted that if the existing laterals are 4-inches for residential service, the laterals would need to be removed and reinstalled for a commercial operation.

Lastly, Ms. Lozada stated that the Water Department will serve projects consistent with the General Plan. Projects that are not consistent with the General Plan would require additional evaluation.

From:	Danny Abdelmalak
To:	James Pugh; Michele Briening
Subject:	Fwd: Fire Department Comments PRJ17-068 – 800 Yolanda Ave
Date:	Monday, August 26, 2019 4:36:19 PM

---------- Forwarded message ---------
From: **Hardage, Ian** <ihardage@srcity.org>
Date: Tue, Apr 9, 2019 at 3:07 PM
Subject: Re: Fire Department Comments PRJ17-068 – 800 Yolanda Ave
To: Danny Abdelmalak <danny@srfarms.org>
Cc: Ursu, Emmanuel <eursu@srcity.org>, Emmanuel Ursu <EUrsu@m-group.us>, Frank Glynn <fglynn@sagarchitecture.com>, James Stafford <jgstaf@gmail.com>

These look good to be submitted

Sincerely,

Ian Hardage
Assistant Fire Marshal
Santa Rosa Fire Department
(707) 543-3541

On Apr 9, 2019, at 12:03 PM, Danny Abdelmalak <danny@srfarms.org> wrote:

> Dear Mr. Hardage,
>
> We received your comments(attached) from Emmanuel our city planner. Please see our updated site plan(also attached) and approve or comment. Once approved, I've been advised to submit hard copies to the city and I will do so.
>
> My architect made the below revisions:
>
> A) The Fire Tender staging area is the length of the south wall of the building.
> B) Moved the west entry gate 80' to the west. This should satisfy the separation requirement.
>
> --
> Kind Regards,
>
> **Danny Abdelmalak**
> 800 Yolanda LLC

<Fire Dept Comments.docx>

<Site Plan - 09APR19.pdf>

--
Kind Regards,

Danny Abdelmalak
800 Yolanda LLC