SCREENCHECK DRAFT

INITIAL STUDY
MITIGATED NEGATIVE DECLARATION

FOR

VANDEN COVE SUBDIVISION

December 9, 2022

Lead Agency

City of Vacaville
650 Merchant Street
Vacaville, CA 95688
(707) 449-5140

Consultant

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LIST OF ABBREVIATIONS AND ACRONYMS

2017 Ozone Plan	2017 Sacramento Regional 2008 8-Hour Ozone and Further Reasonable Progress Plan
AB	Assembly Bill
ABAG	Association of Bay Area Governments
APN	Assessor's Parcel Number
ATCM	Airborne Toxic Control Measure
bgs	below ground surface
BMPs	Best Management Practices
BSA	Biological Study Area
CAL FIRE	California Department of Forestry and Fire Protection
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGreen Code	California Green Building Standards Code
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CASQA	California Stormwater Quality Association
CBC	California Building Code
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CGP	Construction General Permit

CH_4	methane
City	City of Vacaville
CIWMB	California Integrated Waste Management Board
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
County	Solano County
CPT	Cone Penetration Test
CRHR	California Register of Historical Resources
CWA	Clean Water Act
dB	decibel(s)
dBA	A-weighted decibel(s)
DMA	Drainage Management Area
DOC	California Department of Conservation
DOE	United States Department of Energy
DPM	diesel particulate matter
DU	dwelling unit
DWR	California Department of Water Resources
ECAS	Energy and Conservation Action Strategy
EIR	Environmental Impact Report
EMFAC	Emissions Factor 2021 Model
EO	Executive Order
ESA	Environmental Site Assessment

EV	electric vehicle
EVA	Emergency Vehicular Access
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FIRM	Federal Insurance Rate Map
FTA	Federal Transit Administration
GHG	greenhouse gas
GSA	Groundwater Sustainability Agency
GWh	gigawatt hours
GWP	global warming potential
H_2S	hydrogen sulfide
HCP	Habitat Conservation Plan
HFCs	hydrofluorocarbons
HQT	Habitat Quantification Tool
HVAC	heating ventilation and air conditioning
I-80	Interstate 80
I-505	Interstate 505
inch/sec	inch(es) per second
IS/MND	Initial Study/Mitigated Negative Declaration
kWh	kilowatt hours
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
LID	Low Impact Development

LOS	level of service
LSA	LSA Associates, Inc.
MBTA	Migratory Bird Treaty Act
MLD	Most Likely Descendant
MM	Mitigation Measure
MMBtu	metric million British Thermal Unit
MS4	Municipal Separate Storm Sewer System
MTC	Metropolitan Transportation Commission
MWh	megawatt hour
N_2O	nitrous oxide
NAHC	Native American Heritage Commission
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetlands Inventory
NWIC	Northwest Information Center
O_3	ozone
OPR	(California) Governor's Office of Planning and Research
PFCs	perfluorocarbon
PG&E	Pacific Gas & Electric Company
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter

$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
Police Department	City of Vacaville Police Department
PPV	peak particle velocity
PRC	California Public Resources Code
PRD	Permit Registration Documents
project	Vanden Cove Subdivision Project
PT	post-tensioned
RL	Residential Low Density
RL-6	Residential Low Density Six Dwelling Units/Acre
ROG	reactive organic gases
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCOA	Standard Condition of Approval
SCS	Sustainable Communities Strategy
SCWA	Solano County Water Agency
SDMP	Storm Drainage Master Plan
SF_6	sulfur hexafluoride
SGMA	Sustainable Groundwater Management Act
SMARTS	Stormwater Multiple Application and Report Tracking System
SO_2	sulfur dioxide
SRA	Source Receptor Area
SVAB	Sacramento Valley Air Basin
SWMP	Stormwater Management Plan

SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminants
TAZ	traffic analysis zone
TIA	Traffic Impact Analysis
TUSD	Travis Unified School District
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
VMT	vehicle miles traveled
WDID	Waste Discharge Identification Number
WDR	Waste Discharge Requirement
WQMP	Water Quality Management Plan
YSAQMD	Yolo-Solano Air Quality Management District

1.0 PROJECT INFORMATION

1. **Project Title:**

   Vanden Cove Subdivision Project

2. **Lead Agency Name and Address:**

   City of Vacaville
   Community Development Department
   650 Merchant Street
   Vacaville, California 95688

3. **Contact Person and Phone Number:**

   Albert Enault, (707) 449-5364
   Albert.Enault@cityofvacaville.com

4. **Project Location:**

   5742, 5750, and 7038 Vanden Road, Vacaville, California 95687
   Assessor's Parcel Numbers 0137-010-050, 0137-010-060 and 0137-010-070

5. **Project Sponsor's Name and Address:**

   Discovery Builders, Inc.
   4061 Port Chicago Highway
   Concord, CA 94520

6. **General Plan Designation:**

   Residential Low Density (RL)

7. **Zoning:**

   Agriculture (AG)

8. **Description of Project:**

   The proposed project involves the demolition of the existing residential structures and associated outbuildings on the project site and the construction of 114 new single-family residential units and associated improvements. This project has been submitted under a preliminary application as provided by the Housing Crisis Act of 2019 (HCA) (Senate Bill 330 (SB330)), which amended the Housing Accountability Act (HAA) (Government Code 65589.5). See Chapter 2.0, Project Description, of this Initial Study, for a full project description.

9. **Surrounding Land Uses and Setting:**

   The project site is located in a developed area of the City of Vacaville (City) and is surrounded by residential uses and vacant lands zoned for residential use. The site is bounded by vacant land that will be developed under the approved Vandengate residential subdivision project to the north; by the Alamo Place residential subdivision to the east; by the New Alamo Creek flood

control engineered channel and a wide maintenance access road for Alamo Creek that is owned by Solano County Water Agency to the south; and by Vanden Road (2-lane collector street) to the west.

10. Other Public Agencies Whose Approval is Required (e.g., permits, financial approval, or participation agreements):

City of Vacaville Fire Department, Solano County Water Agency (SCWA), City of Vacaville Building Division, Solano Irrigation District, and City of Vacaville Public Works Department.

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resource 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.?

Native American consultation was conducted in compliance with Assembly Bill (AB) 52. On February 18, 2022, AB 52 consultation letters were sent to all Native American contacts that have formally requested notification. On March 4, 2022, the regionally affiliated tribe (Yocha Dehe Wintun Nation) responded by letter indicated they have a cultural interest and would like to schedule a site visit. On April 5, 2022, a site visit was conducted with the Applicant, City staff, and YDWN staff. On May 6, 2022, the City received a response letter from YDWN to conclude consultation. YDWN stated no cultural monitor was needed for the project but recommended cultural sensitivity training for any pre-project personnel.

2.0 PROJECT DESCRIPTION

The following describes the proposed Vanden Cove Subdivision Project (project) that is the subject of this Initial Study/Mitigated Negative Declaration (IS/MND) prepared pursuant to the California Environmental Quality Act (CEQA). The proposed project would result in the construction of 114 new single-family homes on the project site as described in more detail below. The City of Vacaville (City) is the lead agency for review of the proposed project under CEQA.

2.1 PROJECT SITE

The following section describes the project location, existing conditions, surrounding land uses, and the regulatory setting.

2.1.1 Project Location

The approximately 26.7-acre project site consists of three parcels located at 5742, 5750, and 7038 Vanden Road in the City of Vacaville, Solano County (Assessor's Parcel Numbers [APN] 0137-010-050, 0137-010-060, and 0137-010-070). The project site is located in southeastern Vacaville in an area consisting primarily of residential uses. The project site is bounded by vacant property that will be developed with the Vandengate residential subdivision to the north, the Alamo Place residential subdivision to the east, Alamo Creek flood control channel to the south, and Vanden Road to the west.

Regional vehicular access to the project site is provided by Interstate 80 (I-80), located approximately 2.5 miles northwest of the project site, and Jepson Parkway (Leisure Town Road) to the east. The closest on- and off-ramps to the project site are located along Allison Drive, approximately 2.5 miles to the northwest. Bus stops along Vanden Road and Alamo Drive (4-lane undivided arterial) provide transit service to the project site. The Vacaville/Fairfield Amtrak train station is located approximately 4 miles to the southwest, just outside Vacaville city limits. Figure 2-1 shows the regional and local context of the project site. Figure 2-2 depicts an aerial photograph of the project site and surrounding land uses (see Section 2.1.3).

2.1.2 Existing Conditions

The project site is relatively flat with site elevations ranging from approximately 90 to 100 feet above mean sea level. The project site is primarily vacant grassland but is occupied by two existing residential structures and associated outbuildings on the western portions of APNs 0137-010-050 and 0137-010-060. Water is provided to the two existing residences via two on-site groundwater wells, and sewage is treated via two on-site septic systems. There is also one additional abandoned well. On-site vegetation primarily consists of annual grassland with trees and shrubs along some of the parcel boundaries and surrounding the residential structures. There are 15 existing mature trees on the project site.

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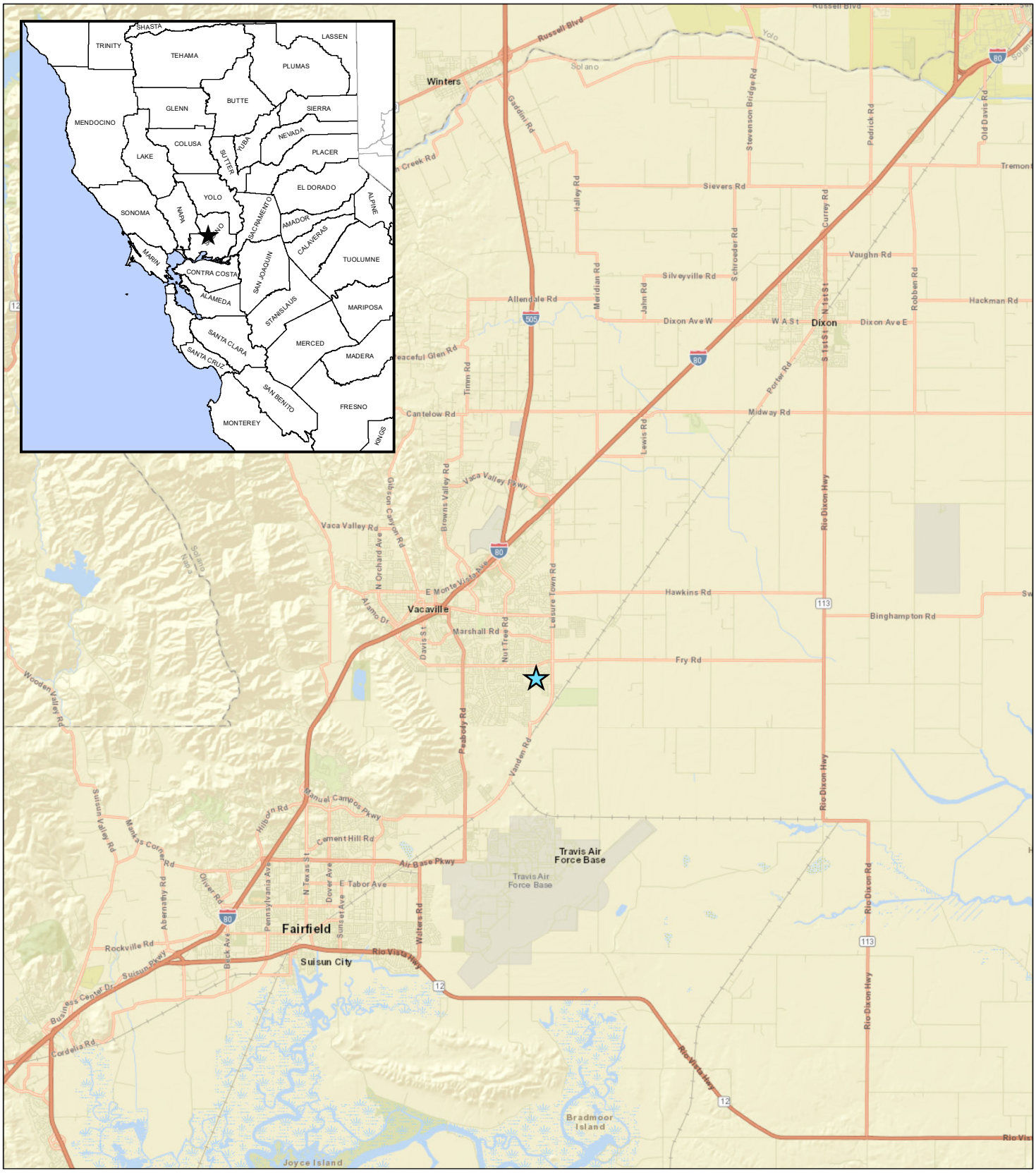

LEGEND

Project Location

FIGURE 2-1

N

0 1.5 3

MILES

SOURCE: ESRI World Street Map (2022)

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Vanden Cove Residential Project

Regional Location

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LEGEND

Project Site - (26.7 ac)

FIGURE 2-2

0 500 1000

FEET

SOURCE: Maxar Aerial Imagery (11/2019)

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Vanden Cove Residential Project

Project Site

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There are existing easements on the project site which generally run along the southern border of the site. Specifically, a 24-inch sanitary sewer line runs through the southern portion of the project site within a 15-foot-wide easement. Additionally, Solano County Water Agency (SCWA) has both a perpetual and a temporary easement that runs along the southern border of the project site along Alamo Creek.

2.1.3 Surrounding Land Uses

As shown in Figure 2-2, the project site is generally surrounded by residential uses and vacant land zoned for residential use. To the north, the project site is bounded by vacant land that will be developed by the approved Vandengate residential subdivision project. The Vandengate subdivision project was entitled in 2017 and later modified in 2022 to consist of 43 single-family one- to two-story residential units that are anticipated to be developed simultaneously with the proposed project. The project is bordered immediately to the east by the Alamo Place subdivision, which consists of a single-family residential neighborhood with one- to two-story homes. Further east are a variety of agricultural operations and the Cypress Lakes Golf Course located just outside of Vacaville city limits. The project site is bordered immediately to the south by the New Alamo Creek flood control engineered channel and a wide maintenance access road for Alamo Creek that is owned by Solano County Water Agency. Further south is a single-family one- to two-story residential neighborhood in the Casa Dei Venti and Southtown subdivisions, undeveloped vacant land zoned for residential development under the project name Southtown Phase 3, partially completed Magnolia Park, and Vacaville Fire Station 75. The project site is bordered immediately to the west by Vanden Road. Further west are vacant residentially zoned properties, developed neighborhoods with single-family one- to two-story residential units, and the Cambridge Elementary School, operated by the Travis Unified School District.

2.1.4 Circulation and Access

Existing access to the site includes two driveways off of Vanden Road, one which is gravel surfaced and one which is paved. The driveways extend approximately 200 to 300 feet east of Vanden Road. No interior vehicular access is available; however, Vanden Road provides access to the entire western edge of the project site. Access is also provided at the southeast corner of the site via an existing, paved emergency vehicle access road within the Alamo Place subdivision.

2.1.5 Regulatory Setting

The City of Vacaville General Plan Land Use Map[1] designates the project site as Residential Low Density (RL). This land use is intended to provide for single-family residential uses in neighborhoods on lot sizes ranging from 5,000 to 10,000 square feet. The base density is 3.1 units per gross acre, and the maximum potential density is 5 units per gross acre. The City of Vacaville Zoning Map identifies the project site as Agriculture (AG), which is an interim placeholder zoning district until

[1] City of Vacaville. 2020. *Vacaville Zoning and General Plan Map as of January 2020.* January. Website: https://www.ci.vacaville.ca.us/government/community-development/citywide-general-plan-zoning-maps?locale=en (accessed September 21, 2022).

such a time when development is proposed at the site. The AG zoning district allows for agricultural uses and allows for secondary uses that support the economic viability of agriculture.

Senate Bill (SB) 330, also known as the Housing Crisis Act of 2019, was signed by the Governor on October 9, 2019, and prohibits local jurisdictions from enacting new laws that would have the effect of reducing the legal limit on new housing within their borders or delay new housing via administrative or other regulatory barriers. As stated previously, this project was submitted under a SB330 preliminary application within the HAA. Under GC 65589.5(j)(4), "…a proposed housing development project is not inconsistent with the applicable zoning standards and criteria, and shall not require a rezoning, if the housing development project is consistent with the objective general plan standards and criteria but the zoning for the project site is inconsistent with the general plan…" This project is consistent with the general plan land use designation of RL, cannot be determined to be inconsistent with zoning, and cannot be required to process a rezone. Separately and independently from this project, the City may process a rezone to meet its obligation to ensure vertical consistency under GC 65860(a).

2.2 PROPOSED PROJECT

The proposed project involves the demolition of the existing residential structures and associated outbuildings on the project site and the construction of 114 new single-family residential units and associated improvements. Individual components of the proposed project are discussed below.

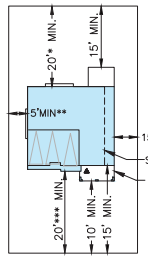
2.2.1 Land Use Entitlement

As previously discussed, the proposed project would result in the subdivision of the project site to allow construction of a total of 114 single-family residential units, each of which would be one or two stories and include a two- or three-car garage. All of the residential units would front to internal streets within the project site. The single-family residential units would consist of four models that would range in size from approximately 2,056 square feet to 3,357 square feet and would be located on individual lots that would range from 6,000 square feet to approximately 10,000 square feet. Each of the four floor plans would have three different architectural styles: Tuscan, French Cottage, or Craftsman. The layout and size of each residence would vary based on the plan type but would range from four bedrooms and three bathrooms in the smallest plan type and five bedrooms and four bathrooms in the largest. The proposed project would have an overall density of 4.3 dwelling units per acre.

Figure 2-3 shows the conceptual site plan for the proposed project. Typical building elevations representing the residential units are shown in Figure 2-4.

DISTRIBUTION TABLE

PLAN#	1 SINGLE STORY	2 TWO STORY	3 TWO STORY	4 SINGLE STORY	
COUNT	24	32	25	33	GRAND TOTAL HOMES: 114
PERCENT	21%	28%	22%	29%	TOTAL PERCENT: 100.0%



* NOTE: 5' ENCROACHMENT ALLOWED FOR UNENCLOSED OUTDOOR PATIOS LESS THAN 150SF
** NOTE: 5FT & 5FT SIDE YARDS FOR SINGLE STORY, 5FT & 10FT SIDE YARDS FOR TWO STORY
*** NOTE: 15FT TO SIDE LOAD GARAGE

TYPICAL MINIMUM LOT SETBACKS

N.T.S.

LSA

FIGURE 2-3

NOT TO SCALE

SOURCE: Discovery Design Group, December 2021

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Vanden Cove Subdivision Project
Conceptual Site Plan

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Elevation A - Scheme #3
'Tuscan'

Elevation B - Scheme #4
'French Cottage'

Elevation C - Scheme #8
'Craftsman'

LSA

FIGURE 2-4A

NOT TO SCALE

Vanden Cove Subdivision Project
Conceptual Building Elevations - Plan 1

SOURCE: Discovery Design Group, December 2021

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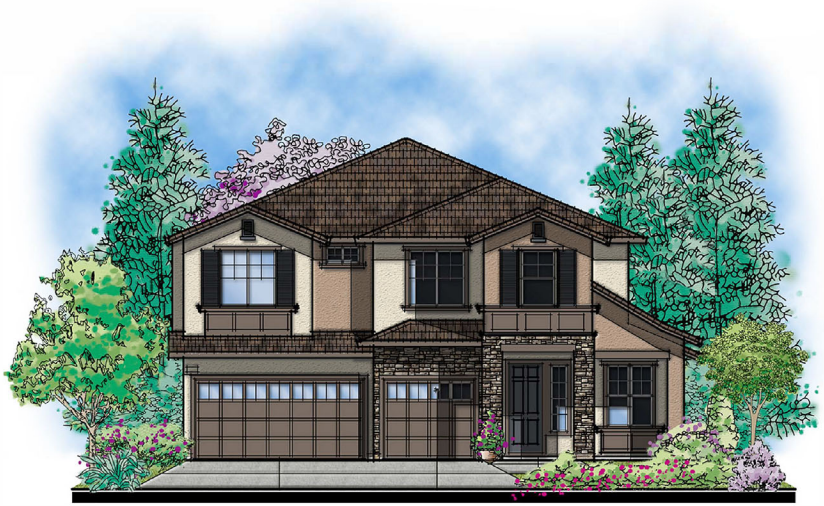
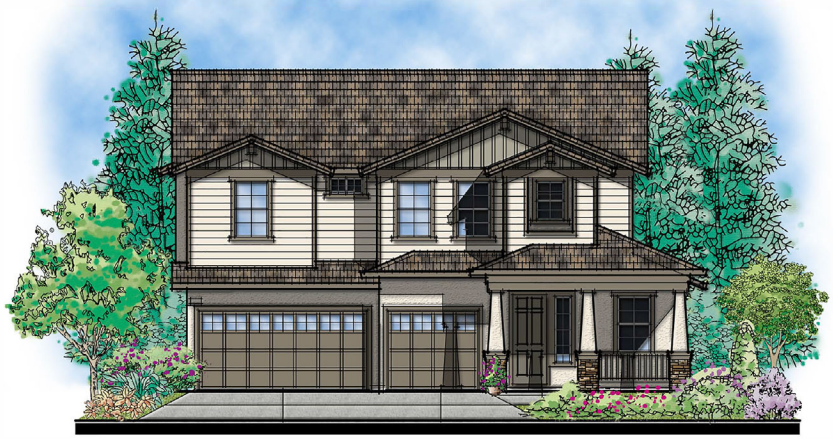
Elevation A - Scheme #1
'Tuscan'



Elevation B - Scheme #6
'French Cottage'



Elevation C - Scheme #9
'Craftsman'

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FIGURE 2-4B

NOT TO SCALE

SOURCE: Discovery Design Group, December 2021

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Vanden Cove Subdivision Project
Conceptual Building Elevations - Plan 2

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Elevation A - Scheme #2
'Tuscan'

Elevation B - Scheme #5
'French Cottage'

Elevation C - Scheme #7
'Craftsman'

LSA

FIGURE 2-4C

NOT TO SCALE

SOURCE: Discovery Design Group, December 2021

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Vanden Cove Subdivision Project
Conceptual Building Elevations - Plan 3

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2.2.2 Open Space and Landscaping

Each of the residential lots on the project site would include private backyards that would be a minimum of 1,200 square feet in size. In total, the proposed project would provide 150,000 square feet of private rear yard open space.

The proposed project would also include an approximate 4,800-square-foot landscaped area and focal point at the southern entrance of the project along Vanden Road. The focal point includes an entry monument sign with pedestrian benches and landscaping. The project would provide an Emergency Vehicular Access (EVA) and pedestrian connection point at the southeast corner of the project that would connect to the existing residential development to the east. An approximate total of 1.2 acres of the site would be improved with public landscaping, including the focal point, and a 10-foot-wide meandering pathway that would run along the project frontage within a 25-foot-wide landscape setback along Vanden Road. A total of 243 trees would be planted as part of the proposed project. Additionally, the proposed project would include two landscaped detention basins, which would be a total of approximately 28,324 square feet.

2.2.3 Access, Circulation, and Parking

As shown in Figure 2-3, vehicular access to the project site would be provided at four entry points, two of which would be located along Vanden Road on the west side of the site, one at Maverick Drive on the north side of the site, and the other at Purple Martin Drive, which consists of an emergency vehicle access on the east side of the site. Interior streets would provide vehicular access to each of the residential units. As noted above, each of the residential units would include either a two- or three-car attached garage, for a total of 313 garage parking spaces, and 228 driveway parking spaces. An additional 160 street parking spaces would be provided on the internal streets, for a total capacity of 701 parking spaces on the project site.

Vanden Road will be expanded along the project frontage in order to allow for an ultimate 52-foot curb-to-curb width and ultimate 87-foot right-of-way width, which matches the existing condition to the north and south of the project. In addition, a 25-foot-wide landscape strip with 10-foot-wide meandering sidewalk will be provided along the entire project frontage which is consistent with existing development to the north and south of the project.

2.2.4 Utilities and Infrastructure

The project site is located in an urban area that is currently served by existing utilities, including water, sanitary sewer, storm drainage, electricity, gas, and telecommunications infrastructure. Existing and proposed utility connections are discussed below.

2.2.4.1 Water

Under existing conditions, water is provided from two existing on-site production groundwater wells. Water service for the proposed project would be provided by the City of Vacaville. The proposed project would include the installation of new 8-inch water lines on the site that would connect to the existing 12-inch mains located within Vanden Drive and Purple Martin Drive.

2.2.4.2 Wastewater

Under existing conditions, wastewater is treated using two existing on-site septic systems. However, the City maintains existing sanitary sewer lines within the vicinity of the project site, including a 24-inch line within the existing portion of Vanden Road to the west of the project site that runs through the southern portion of the project site eastward to Purple Martin Drive. The project would include new 8-inch lines that would connect to the 24-inch line.

2.2.4.3 Stormwater

The existing residential structures, paving, concrete, and other impervious surfaces account for approximately 2.5 acres (9 percent) of the 26.7-acre site. The remaining 24.2 acres on the project site are covered by pervious surface consisting primarily of grassland. There is no existing stormwater infrastructure on the project site; however, surface flows on the project site, if any, would generally flow in an eastward direction into the City of Vacaville's 30-inch stormwater drain located on Purple Martin Drive, which ties into the 48-inch mains on Leisure Town Road.

Upon construction of the proposed project, approximately 13 acres (48 percent) of the project site would be covered by impervious surfaces and approximately 13.7 acres (52 percent) would be covered by pervious surfaces, consisting of landscaped areas with lawns, shrubs, and trees. The proposed project would include approximately 28,324 square feet of detention space on the eastern portion of the project site that would be used for stormwater control. The proposed project would include the construction of 15 to 30-inch storm drains with associated catch basins and manholes throughout the project area that would connect to the dual-purpose detention basins and existing stormwater facilities on Purple Martin Drive. Surface flows would also be directed eastward towards the detention basins and existing stormwater facilities.

2.2.4.4 Electricity and Gas

Electricity and gas service is provided to the project site by Pacific Gas & Electric Company (PG&E). The proposed project would include connections to the existing electricity and natural gas lines that run adjacent to the project site on Vanden Road.

2.2.5 Demolition and Construction

The proposed project would result in the demolition of the existing buildings and all surface pavements on the project site. The proposed residences would be constructed on post-tensioned (PT) mat slab foundations. Generally, only minor grading would be required for site preparation and ground disturbance associated with individual house foundations would likely not exceed a depth of excavation of 4 feet below ground surface. However, the southeast corner of the site would require moderate grading with cuts of up to approximately 10 feet at the stormwater detention basin. Approximate depth of excavation for proposed joint utilities is expected to range between 4 to 12 feet beneath the present ground surface. All 26.7 acres of soil would be disturbed during site grading.

It is anticipated that a total of 6,000 cubic yards of soil would be cut and 6,000 cubic yards would be used for fill, and therefore no fill would be imported to the site with zero truck trips. Construction of

the proposed project is anticipated to begin in April 2023 and would occur over an approximately 6-month period.

2.3 PROJECT APPROVALS

While the City is the CEQA Lead Agency for the proposed project, other agencies also have discretionary authority related to the project and approvals or serve as a responsible and/or trustee agency in connection to the proposed project. A list of these agencies and potential permits and approvals that may be required is provided in Table 2.A.

Table 2.A: Potential Permits and Approvals

Responsible Agency/Entity	Permits/Approvals
City of Vacaville	● Adoption of the IS/MND for the Vanden Cove Project ● Planned Development ● Vesting Tentative Map Approval
Other Agencies	
City of Vacaville Fire Department	● Review/Approve fire truck access and site fire flow design
Solano Irrigation District	● Preservation of existing easements, recordation of new easements.
City of Vacaville Building Division	● Issuance of Building Permits for new home construction
City of Vacaville Public Works Dept.	● Issuance of Final Map
Pacific Gas & Electric (PG&E)	● Reconnection of electricity/natural gas service
Solano County Water Agency	● Preservation of existing easements, construction of new fencing adjoining property.

Source: LSA (2022).

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3.0 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 in Chapter 3.0.

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

3.1 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 proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

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

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

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

Signature

December 9, 2022

Date

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4.0 CEQA ENVIRONMENTAL CHECKLIST

4.1 AESTHETICS

	Potentially Significant Impact	Less Than Significant 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 a 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?	☐	☐	☒	☐

a. Would the project have a substantial effect on a scenic vista? ***(Less Than Significant Impact)***

The City of Vacaville (City) General Plan does not designate any official scenic vistas; however, westward views to the Vaca Mountains, and views of the Inner Coast Range hillsides are considered scenic views in the City.[2] Uninterrupted views in the City are primarily in agricultural areas, low density developed hillsides, and other undeveloped areas. Although the project site is located on parcels that are largely undeveloped, the neighborhoods surrounding the project site are primarily built out and densely developed with one- and two-story residential uses which are similar to the proposed project. Therefore, the proposed project would not obscure any views of scenic vistas from surrounding public vantage points. In addition, the project site is not located in an area considered to be within view of a scenic vista. Therefore, the proposed project would not result in a substantial adverse effect on a scenic vista, and this impact would 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? ***(No Impact)***

The project site is not located within the vicinity of any State scenic highways. There are no roadways in Vacaville that are designated as a Scenic Highway.[3] The nearest Eligible State Scenic Highways are State Route 221 in Napa and State Route 128 in Winters, located approximately 18 miles west of the project site and 12 miles north of the project site, respectively. Given this distance,

2 City of Vacaville. 2021. *Vacaville General Plan and Energy and Conservation Action Strategy (ECAS) EIR*.

3 California Department of Transportation (Caltrans). 2018. California State Scenic Highway System Map, Website: https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=465dfd3d807c46cc8e8057116f1aacaa (accessed July 1, 2022)

the proposed project would not be visible from these scenic roadways. The County of Solano (County) General Plan designates Interstate 80 (I-80), Interstate 505 (I-505), and Pleasants Valley Road as "scenic roadways"[4]. I-80 is the nearest County-designated scenic roadway, located approximately 2.5 miles northwest of the project site; however, the project site is not visible from the roadway. As such, the proposed project would have no impact on scenic resources located within view of a State scenic highway.

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

The project site is located within an urbanized area that is primarily developed with residential uses. As noted in Chapter 2.0, Project Description, the project site is located within the Agriculture (AG) zoning district, which is an interim placeholder zoning district until such a time when development is proposed at the site. Pursuant to the Housing Accountability Act, the project does not require a zone change. However, development would be subject to compliance with the zoning district standards compatible with the proposed lot sizes. In this case, the project would be subject to compliance with the Residential Low Density District (RL-6). Single-family residential units are a permitted use within the RL-6 district, which allows a density of 3.1 to 5.0 units per gross acre and a maximum height for principal buildings of 35 feet. The proposed project would have a density of 4.3 dwelling units per gross acre, and a maximum building height of approximately 28 feet.

Additionally, a Planned Development Permit would be required for the proposed project, the proposed project would undergo Design Review consistent with Chapter 14.09.113 of the Vacaville Municipal Code, and the proposed project would be subject to the Residential Districts Development Standards in Chapter 14.09.074 of the Vacaville Municipal Code. These existing requirements would include review of the physical improvements to the project site, including the overall building scale, massing, and design to ensure compatibility and compliance with City requirements governing scenic quality.

As previously discussed, the proposed project is considered a "housing development project" that is subject to SB 330. Therefore, the City is obligated to process a zone change request separately to accommodate the proposed project. This would result in a rezone of the project site from AG to RL-6, which is the compatible underlying zoning for the proposed residential use. Additionally, the Vacaville Municipal Code would require site-specific review of the proposed buildings. Therefore, the proposed project would not conflict with applicable zoning or other regulations governing scenic quality, and this impact would be less than significant.

[4] Solano County, 2008. *General Plan, Chapter 4 – Resources*.

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 project site is located in an urban area with a variety of existing light sources including streetlights, interior and exterior building lighting, and light associated with traffic on nearby roadways. Development of the proposed project would incrementally increase the amount of nighttime lighting in the surrounding area due to new interior and exterior lighting at the individual residential units and lighting associated with additional vehicular traffic to and from the project site. Section 14.09.127 of the Vacaville Land Use and Development Code establishes standards for any land use approval which authorizes a new building or facility. Section 14.09.127.110, Lighting and Glare, sets forth the following standard that is applicable to the proposed project:

- Lighting shall be shielded and directed so as not to create a hazard or nuisance to other properties or impact traffic on adjacent streets.

Additionally, the proposed project would be required to comply with the following Standard Conditions of Approval (SCOAs) required for all design permits, use permits, and planned developments that address potential light and glare impacts:

> ***SCOA 208:*** Plans submitted for Building, Grading, or Underground Permits shall indicate the exact location and design of all exterior lighting fixtures and shall include a photometric plan. All lighting shall be shielded or placed such that it does not shine directly on any adjoining properties or impact traffic on adjacent streets. Lighting shall be subject to the approval of the Director of Community Development.
>
> ***SCOA 209:*** A photometric plan shall be required for the proposed lighting. Minimum lighting of one (1) foot candle and a maximum six (6) foot candles shall be provided on the site.

With implementation of the required SCOAs applicable to all development projects in the City, the proposed project would not generate substantial light or glare nor adversely affect day or nighttime views in the area; therefore, impacts would be less than significant.

4.2 AGRICULTURE AND FORESTRY RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California 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 the forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☐	☐	☒

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 primarily vacant grassland but is occupied by two existing residential structures and associated outbuildings. The project site is classified as "Grazing Land" and "Other Land" by the State Department of Conservation and is largely surrounded by lands classified as "Urban and Built-Up Land."[5] Therefore, the proposed project would not result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to another use, and no impact would occur.

[5] California Department of Conservation (DOC). 2018. Division of Land Use Resource Protection. California Important Farmland Finder. Website: maps.conservation.ca.gov/dlrp/ciff (accessed July 1, 2022).

b. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract? ***(Less Than Significant Impact)***

As noted in Chapter 2.0, Project Description, the project site is located within the Agriculture (AG) zoning district, which is an interim placeholder zoning district until such a time when development is proposed at the site. The site is largely undeveloped but is currently used for residential purposes. The site is not actively farmed and lacks connectivity to surrounding farming infrastructure. Surrounding uses are primarily residential; therefore, development of the project as single-family detached housing would improve conformity and continuity with nearby uses. The project site is not under a Williamson Act contract.[6] Therefore, development of the proposed project would not conflict with existing zoning for agricultural use or a Williamson Act contract, and impacts would be less than significant.

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 primarily vacant grassland but is occupied by two existing residential structures and associated outbuildings. As previously discussed, the project site is currently zoned Agriculture (AG), and is therefore not zoned for forest or timberland uses or timberland production. The proposed project would not conflict with existing zoning for, or cause rezoning of, forest land or timberland, nor would it result in the loss of forest land or conversion of forest land to non-forest uses. As such, no impact to forest land or timberland would occur.

d. Would the project result in the loss of forest land or conversion of forestland to non-forest use? ***(No Impact)***

Please refer to Section 4.2.c. The proposed project would not result in the loss of forest land or conversion of forest land to non-forest uses. Therefore, no impact would occur.

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)***

Please refer to Sections 4.2.a. and 4.2.c. The project site is located in an urban environment and would not involve other changes in the existing environment which, due to their location or nature, could result in the conversion of farmland to non-agricultural use or conversion of forest land to non-forest use. Therefore, no impact would occur.

6 City of Vacaville. 2021. *Vacaville General Plan and ECAS EIR,* Figure 4.2-2 Williamson Act Lands.

4.3 AIR QUALITY

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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 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 following section is based on the *Air Quality, Greenhouse Gas, and Energy Technical Report for the Vanden Estates Project.*[7] This report is included as Appendix A.

The project site is located in the City of Vacaville, which is within the Sacramento Valley Air Basin (SVAB). Mountains surrounding the SVAB create a barrier to air flow, which can trap air pollutants under certain meteorological conditions. These stagnant conditions generally occur with the highest frequency during autumn and early winter. Air quality in a majority of the City, including the area in and in the vicinity of the project site, is monitored and managed by the Yolo-Solano Air Quality Management District (YSAQMD). The YSAQMD is responsible for establishing programs, plans, and regulations enforcing air pollution controls in order to attain all State and federal ambient air quality standards.

Air pollutants of concern in the City include ozone (O_3), carbon monoxide (CO), nitrogen oxides (NO_2 and NO_x), sulfur dioxide (SO_2), and particulate matter ($PM_{2.5}/_{10}$). Vehicle use is the primary source of pollutants in the City, which contributes both directly and indirectly to air pollution. Additional sources of air pollutants include wood smoke from residential fireplaces, construction activities, consumer productions, architectural coatings, fertilizers, asphalt paving, and agriculture operations.

a. Would the project conflict with or obstruct implementation of the applicable air quality plan? ***(Less Than Significant Impact)***

The applicable air quality plan is the 2017 Sacramento Regional 2008 8-Hour Ozone and Further Reasonable Progress Plan (2017 Ozone Plan). Consistency with the 2017 Ozone Plan can be determined if the proposed project supports the goals of the plan, includes applicable control

[7] Ramboll, 2022. *Air Quality, Greenhouse Gas, and Energy Technical Report for the Vanden Estates Project*. July.

measures from the plan, and would not disrupt or hinder implementation of any control measures from the plan. Consistency with the 2017 Ozone Plan is the basis for determining whether the proposed project would conflict with or obstruct implementation of an applicable air quality plan.

In compliance with the *State CEQA Guidelines*, the analysis below evaluates whether implementation of the proposed project would conflict with or otherwise obstruct implementation of regional air quality plans. For air quality planning purposes, the 2017 Ozone Plan contains emissions inventories based on existing and foreseeable future land uses within its jurisdiction. If a new project is consistent with the planned land use designation that was considered in the development of an air quality management plan, the proposed project would not conflict and would not obstruct implementation of the applicable air quality management plan. Generally, a project's conformance with a local general plan that was considered in the preparation of an air quality management plan would demonstrate that the project would not conflict with or obstruct implementation of the air quality management plan.

Based the estimated population identified in the California Emissions Estimator Model (CalEEMod) associated with 114 single-family residences, the proposed project would add approximately 326 residents (per CalEEMod default assumptions) to the City of Vacaville at full buildout, which has been assumed to occur by the year 2025. This level of growth is well within the County of Solano's projections in the 2021 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), also known as Plan Bay Area 2050, that 35,000 households (30,000 households in North Solano County, including the City of Vacaville) will be added countywide between 2015 and 2050. Therefore, the proposed project would be consistent with the 2021 RTP/SCS and the population growth assumptions in the 2017 Ozone Plan. In addition, as discussed in Chapter 2.0, Project Description, the City of Vacaville General Plan Land Use Map designates the project site as Residential Low Density (RL); therefore, the proposed project would comply with the General Plan. As such, the project would not conflict with or obstruct implementation of the applicable air quality plan, and this impact would be less than significant.

b. Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard? ***(Less Than Significant with Mitigation Incorporated)***

The YSAQMD is currently designated as a non-attainment area for State and national $PM_{2.5}$ and O_3 standards. The YSAQMD non-attainment status is attributed to the region's development history. Past, present, and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, result in non-attainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's impact on air quality would be considered significant.

In developing thresholds of significance for air pollutants, the YSAQMD 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. The

following analysis assesses the potential construction- and operation-related air quality impacts and CO impacts of the proposed project.

Construction Emissions. During construction, short-term degradation of air quality may occur due to the release of particulate matter emissions (i.e., fugitive dust) generated by demolition, grading, hauling, and other activities. Emissions from construction equipment are also anticipated and would include CO, nitrogen oxide (NO_x), reactive organic gases (ROG), directly-emitted particulate matter ($PM_{2.5}$ and PM_{10}), and toxic air contaminants (TACs) such as diesel exhaust particulate matter.

Site preparation and project construction would involve demolition, grading, paving, and other activities. Construction-related effects on air quality from the proposed project would be greatest during the site preparation phase due to the disturbance of soils. If not properly controlled, these activities would temporarily generate particulate emissions. Sources of fugitive dust would include disturbed soils at the construction site. Unless properly controlled, vehicles leaving the site would deposit dirt and mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of operating equipment. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Water or other soil stabilizers can be used to control dust, resulting in emission reductions of 50 percent or more. In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, sulfur dioxide (SO_2), NO_x, ROG, and some soot particulate ($PM_{2.5}$ and PM_{10}) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Construction emissions were estimated for the project using CalEEMod, consistent with YSAQMD recommendations. The CalEEMod analysis assumes that the project construction contractors would use off-road construction equipment engines that meet Tier 4 Final emission factors. In addition, the volume of demolished material was estimated and included in CalEEMod to estimate the number of truck trips needed to haul debris and fugitive dust emissions. During the demolition and grading subphases, approximately 57 and 62 total one-way trips per phase are expected, respectively. Additionally, material/vendor trips are assumed to occur during the building construction subphase based on CalEEMod default activity assumptions for a total of 12 one-way material/vendor trips per day. Other construction details are not yet known; therefore, default assumptions were used. Construction-related emissions are presented in Table 4.3.A, below.

Table 4.3.A: Project Construction Emissions

Year	Maximum Daily Emissions (lbs/day)				
	ROG	NO_x	CO	$PM_{2.5}$	PM_{10}
2023	3.4	34.7	28.5	11.3	21.0
2024	1.6	14.0	17.2	0.7	0.7
2025	47.5	14.2	19.0	19.0	0.6
Maximum	**47.5**	**34.7**	**28.5**	**11.3**	**21.0**
Significance Threshold	**N/A**	**N/A**	**N/A**	**N/A**	**80**
Above Threshold?	**N/A**	**N/A**	**N/A**	**N/A**	**No**
Year	**Annual Emissions (tons/yr)**				
	ROG	**NO_x**	**CO**	**$PM_{2.5}$**	**PM_{10}**
2023	0.17	1.66	1.49	0.25	0.49
2024	0.21	1.84	2.25	0.09	0.12
2025	0.93	1.10	1.45	0.05	0.07
Maximum	**0.93**	**1.84**	**2.25**	**0.25**	**0.49**
Significance Threshold	**10**	**10**	**N/A**	**N/A**	**N/A**
Above Threshold?	**No**	**No**	**N/A**	**N/A**	**N/A**

Source: Ramboll (July 2022).
Note: Construction emissions for each phase were estimated using CalEEMod and activity assumptions from the project applicant.
CalEEMod = California Emissions Estimator Model
CO = carbon monoxide
lbs/day = pounds per day
N/A = not applicable
NO_x = nitrogen oxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROG = reactive organic gases
tons/yr = tons per year

As shown in Table 4.3.A, maximum daily emissions from project construction would be 21 pounds/day for PM_{10}, which is below the threshold of 80 pounds/day for PM_{10}. Additionally, as shown in Table 4.3.A, the maximum annual emissions from project construction would be 0.9 tons/year for ROG and 1.8 tons/year for NO_x, which is below the threshold of 10 tons/year for ROG and NO_x. The YSAQMD also requires the implementation of best management practices to reduce construction fugitive dust impacts to a less than significant level as follows:

Mitigation Measure AIR-1: **Air Quality Dust Control Measures.** The following construction dust control measures shall be implemented by the project applicant, or their designee, during construction activities:

- Water all active construction sites at least twice daily. Frequency should be based on the type of operation, soil, and wind exposure.
- Haul trucks shall maintain at least 2 feet of freeboard.
- Cover all trucks hauling dirt, sand, or loose materials.

- Appy non-toxic binders (e.g., latex acrylic copolymer) to exposed areas after cut and fill operations and hydroseed area.
- Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days).
- Plant tree windbreaks on the windward perimeter of construction projects if adjacent to open land.
- Plant vegetative ground dover in disturbed areas as soon as possible.
- Cover inactive storage piles.
- Sweep streets if visible soil material is carried out from the construction site.
- Treat site accesses to a distance of 100 feet from the paved road with 6 to 12-inch layer of wood chips or mulch.
- Treat site accesses to a distance of 100 feet from the paved road with 6-inch layer of gravel.

As shown in Table 4.3.A, construction emissions associated with the proposed project would be below established thresholds. In addition, consistent with YSAQMD requirements, **Mitigation Measure AIR-1** requires implementation of best management practices during construction to control fugitive dust emissions. Therefore, with implementation of this measure, construction of the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard, and impacts would be less than significant with mitigation incorporated.

Operational Emissions. Long-term air pollutant emission impacts are those associated with mobile sources (e.g., vehicle trips), energy sources (e.g., electricity and natural gas), and area sources (e.g., architectural coatings and the use of landscape maintenance equipment) related to the proposed project.

PM_{10} emissions result from running exhaust, tire and brake wear, and the entrainment of dust into the atmosphere from vehicles traveling on paved roadways. Entrainment of PM_{10} occurs when vehicle tires pulverize small rocks and pavement and the vehicle wakes generate airborne dust. The contribution of tire and brake wear is small compared to the other particulate matter (PM) emission processes. Gasoline-powered engines have small rates of PM emissions compared with diesel-powered vehicles.

Energy source emissions result from activities in buildings for which electricity and natural gas are used. The quantity of emissions is the product of usage intensity (i.e., the amount of electricity or natural gas) and the emission factor of the fuel source. Typically, area source emissions consist of direct sources of air emissions located at the project site, including architectural coatings and the use of landscape maintenance equipment. Area source emissions associated with the project would include emissions from the use of landscaping equipment.

Emissions estimates for operation of the project were calculated using CalEEMod. Consistent with YSAQMD wood-burning device regulations, this analysis assumed that no woodstoves or wood-burning fireplaces would be installed in the residences. In addition, the proposed project's ROG emission factor for consumer products was derived using an updated ROG inventory for 2020 from the California Air Resources Board (CARB), and 2020 population estimates based on the U.S. Census Bureau's QuickFacts for Solano County were used. On-road vehicle emission factors were also updated based on the Emissions Factor 2021 Model (EMFAC2021) for operational year 2025. Model results are shown in Table 4.3.B.

Table 4.3.B: Project Operational Emissions for Buildout Year 2025

Year	Maximum Daily Emissions (lbs/day)				
	ROG	**NO_x**	**CO**	**$PM_{2.5}$**	**PM_{10}**
Area Sources	4.81	1.39	9.94	0.16	0.16
Building Energy Sources	0.09	0.77	0.33	0.06	0.06
Mobile Sources	2.65	5.31	23.62	1.11	4.21
Total Daily Emissions (lbs/day)	**7.55**	**7.47**	**33.89**	**1.32**	**4.43**
Daily Significance Threshold (lbs/day)	**N/A**	**N/A**	**N/A**	**N/A**	**80**
Above Threshold?	**N/A**	**N/A**	**N/A**	**N/A**	**No**
Year	**Annual Emissions (tons/yr)**				
	ROG	**NO_x**	**CO**	**$PM_{2.5}$**	**PM_{10}**
Area Sources	0.83	0.06	0.09	0.01	0.01
Building Energy Sources	0.02	0.14	0.06	0.01	0.01
Mobile Sources	0.43	0.89	3.81	0.20	0.72
Total Daily Emissions (lbs/day)	**1.28**	**1.09**	**4.73**	**0.21**	**0.74**
Annual Significance Threshold (tons/yr)	**10**	**10**	**N/A**	**N/A**	**N/A**
Above Threshold?	**No**	**No**	**N/A**	**N/A**	**N/A**

Source: Ramboll (July 2022).
Note: Construction emissions for each phase were estimated using CalEEMod and activity assumptions from the project applicant.
CalEEMod = California Emissions Estimator Model
CO = carbon monoxide
lbs/day = pounds per day
N/A = not applicable
NO_x = nitrogen oxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROG = reactive organic gases
tons/yr = tons per year

As shown in Table 4.3.B, emissions are well below the respective YSAQMD's significance thresholds of 80 pounds/day for PM_{10} and 10 tons/year for ROG and NO_x. Therefore, operation of the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for

which the project region is non-attainment under an applicable federal or State ambient air quality standards. Impacts would be less than significant.

Localized CO Impacts. CO concentration is a direct function of motor vehicle activity (particularly during peak commuting hours) and meteorological conditions. Under specific meteorological conditions combined with high motor vehicle activity, CO concentrations may reach unhealthy levels for local sensitive land uses, such as residential areas and daycare centers. As a result, the YSAQMD recommends analysis of CO emissions at a local rather than a regional level.

As part of its CEQA Air Quality Guidelines, the YSAQMD provides a screening methodology based on peak hourly traffic volumes to evaluate potential impacts of CO emissions from mobile sources. The proposed project would result in a less than significant impact for local CO if the following criteria are met:

- A traffic study for the project indicates that the peak-hour level of service (LOS) on one or more streets in the project vicinity would be reduced to an unacceptable LOS (typically LOS E or F).

- A traffic study indicates that the project would substantially worsen an already existing peak-hour LOS F on one or more streets (delay would increase by 10 seconds or more when project-generated traffic is included).

While a LOS analysis was not completed for the project, the proposed project would only add an additional 1,088 trips per day, which would not be expected to substantially change the LOS at any given intersection. Furthermore, the City of Vacaville's 2021 General Plan and Energy and Conservation Action Strategy (ECAS) Draft EIR demonstrated that peak CO concentrations in 2035 would be substantially less than the State and federal ambient air quality standards at all analyzed intersections and regional growth would not impede continued attainment of the CO standards.[8] Therefore, the proposed project would have a less than significant impact on CO hotspots.

c. Would the project expose sensitive receptors to substantial pollutant concentrations? ***(Less Than Significant Impact)***

Sensitive receptors are defined as residential uses, schools, daycare centers, nursing homes, and medical centers. Individuals particularly vulnerable to diesel particulate matter (DPM) are children, whose lung tissue is still developing, and the elderly, who may have serious health problems that can be aggravated by exposure to diesel particulate matter. Exposure from diesel exhaust associated with construction activity contributes to both cancer and chronic non-cancer health risks.

Construction activities, such as site preparation, grading, building construction, paving, and architectural coating, would affect localized air quality during the construction phases of the proposed project. Short-term emissions from construction equipment during these site preparation activities would include directly emitted PM ($PM_{2.5}$ and PM_{10}) and TACs such as DPM. Generation of

[8] City of Vacaville, Vacaville General Plan and Energy and Conservation Action Strategy (ECAS) Draft EIR, Chapter 4.3, Air Quality. Website: https://www.ci.vacaville.ca.us/home/showpublisheddocument/5508/636234161698230000 (accessed September 2022).

these short-term emissions could potentially expose sensitive receptors to substantial pollutant concentrations of TACs, resulting in a localized health risk. The construction period (approximately 30 months) would be short compared to the 30-year exposure period for carcinogenic risk. Additionally, because of the size of the construction project, DPM emissions would be spread over a large area. Therefore, impacts to sensitive receptors from project construction would be less than significant.

Additionally, long-term emissions associated with operation of the proposed project such as mobile sources, would include $PM_{2.5}$ and TACs, such as DPM and ROG. The proposed project does not include stationary sources that would emit air pollutants or TACs, such as large boilers, emergency generators, or manufacturing facilities or result in a substantial increase in diesel vehicles (i.e., delivery trucks). As such, project operations would not result in TAC generation from on-site sources during long-term operations and would not result in the creation of a significant health risk at nearby sensitive receptors. Therefore, this impact would continue to be less than significant.

d. Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people? ***(Less Than Significant Impact)***

The occurrence and severity of potential odor impacts depends on numerous factors. The nature, frequency, and intensity of the source, the wind speeds and direction, and the sensitivity of the receiving location each contribute to the intensity of the impact. While offensive odors rarely cause any physical harm, they can be unpleasant and cause distress among the public and generate citizen complaints.

During construction, diesel exhaust from construction equipment would generate some odors. However, construction-related odors would be temporary and would not persist upon construction completion. Once operational, odor sources of concern would include wastewater treatment facilities, chemical manufacturing, sanitary landfills, fiberglass manufacturing, transfer stations, painting/coating operations, composing facilities, food processing facilities, petroleum refineries, feed lots/dairies, asphalt batch plants, and rendering plants. None of these source types are proposed as part of the proposed project; therefore, operation of the proposed project would not generate any odor impacts. The proposed project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. Therefore, odor impacts from construction and operation would be less than significant.

4.4 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, regulations or by the California Department of Fish and Wildlife or U.S. 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?	☐	☒	☐	☐
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?	☐	☒	☐	☐

The following section is based on the *Biological Resources Assessment for the Vanden Estates Project* (Biological Technical Report).[9] This report is included as Appendix B.

The project site lies within the Draft Solano Multispecies Habitat Conservation (HCP) Plan Area.[10] The Solano HCP has been developed to support the issuance of a Section 10(a)1(B) incidental take permit under the federal Endangered Species Act of 1973 (as amended). The Solano HCP has expanded the scope of the Biological Opinion and includes additional voluntary applicants and additional species for incidental take coverage. These additional species include federally listed fish species under the jurisdiction of the National Marine Fisheries Service (NMFS) and species listed as threatened or endangered under the State's Endangered Species Act. The proposed project must also comply with Policy COS-P1.12 of the City of Vacaville's General Plan, which states that until the Solano HCP is adopted, projects must comply with applicable HCP avoidance, minimization, and

[9] Swaim Biological Inc. 2022. *Biological Resources Assessment for the Vanden Estates Project*. July.

[10] LSA. 2012. *Solano Multispecies Habitat Conservation Plan*. October.

mitigation measures in the Draft Solano HCP.-Therefore, measures from the HCP would be used to mitigate impacts to covered species.

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)***

The project site is currently primarily undeveloped and vacant but is occupied by two existing residential structures and associated outbuildings on the western portion of the site. As noted above, the project site is located within the Solano HCP Plan Area and is mapped as irrigated agriculture within the planned future development areas. Within the three parcels on the project site, most of the land cover is annual grassland with wild oats (*Avena* sp.), non-native fennel (*Foeniculum vulgare*), perennial pepperweed (*Lepidium latifolium*), and Bermuda grass (*Cynodon dactylon*) dispersed throughout. The project site is regularly disced and mowed.

A general biological field survey was conducted by Swaim Biological, Inc. on October 14, 2021, to assess the biological condition of the project site for the presence of various special-status biological resources, including plants, wildlife, and habitat suitability for special-status species. The disturbed condition of the project site is generally not suitable to support most special-status species, and no known candidate, sensitive, or special-status species were observed inhabiting the project site during the general survey.

Based on the database review and professional knowledge of species that may occur in the region, 51 special-status plant and wildlife occurrences were identified that could potentially occur within the project site and vicinity. Of the 51 special-status species identified, only the following 4 wildlife species have suitable habitat present in the project area and are discussed in further detail below. No special status plant species were identified on the project site.

Burrowing Owl. According to the Biological Technical Report, the project site supports suitable habitat for burrowing owl, which includes annual and perennial grasslands with sparse or nonexistent tree or shrub cover and areas of short vegetation. Burrowing owl is a California State Species of Concern and a Solano HCP covered species, and the project site is located within the Solano HCP Burrowing Owl Irrigated Agriculture Conservation Area. No suitable burrows to support the species were observed on the project site or adjacent lands during the 2021 field survey. Culverts and concrete debris are present that could potentially be utilized for roosting. No observations of burrowing owls occurred on the project site during the field survey; however, the site serves as suitable foraging habitat and owls could roost if they found suitable burrows or burrow-like structures to utilize. The Solano HCP requires the implementation of best management practices (BMPs) to reduce burrowing owl impacts as follows:

Mitigation Measure BIO-1: **Burrowing Owl Pre-Construction Surveys.** Between February 1 and August 31, a Solano HCP approved Biologist shall conduct preconstruction surveys in known and suitable habitat areas to identify and subsequently avoid nesting areas for burrowing owls, including within 500 feet of planned work activities, access roads,

and staging areas. Surveys shall be conducted within 14 days of the anticipated start of construction and shall follow standard Solano HCP protocols. An additional survey is required 24 hours before construction work will start. If a lapse in project-related construction work of 14 days or longer occurs during the nesting season, additional pre-construction surveys shall be required before project work may be reinitiated.

Mitigation Measure BIO-2: **Burrowing Owl Construction Buffers and Exclusion.** The following measures shall be implemented for new construction activities if preconstruction surveys find burrowing owls to be present in the project site:

1. During the non-breeding season (September 1 through January 31), a circular exclusion zone with a radius of 250 feet shall be established around occupied burrows by the Contractor.

2. If an adequate exclusion zone cannot be established during the non-breeding season (except as provided below for buffer modifications), burrowing owls may be evicted from the entire construction area using passive relocation techniques and vegetation management provided suitable alternative burrows are located within 330 feet of the occupied burrows and can be protected during project construction or until such time that burrowing owls can be actively relocated (see **Mitigation measure BIO-3**). When possible a qualified biologist should try to identify resident and migrant owls during the preconstruction surveys. The Contractor shall prepare an Exclusion Plan for review and approval by the Solano County Water Agency (SCWA), the California Department of Fish and Wildlife (CDFW), and the United States Fish and Wildlife Service (USFWS). The Exclusion Plan shall address the following minimum requirements:

    a. An assessment of available suitable burrows within 330 feet of the edge of the construction area and the extent of suitable contiguous foraging habitat remaining.

    b. Provisions to install artificial burrows if suitable donor burrows are not present.

    c. A maintenance and monitoring program that includes a minimum of 2 years following completion of the project that resulted in impacts. The maintenance program shall include provisions to maintain artificial burrows, if required,

in usable condition and maintain vegetation height at 6 inches or less within 50 feet of the burrows.

d. Protocols to confirm that the burrow(s) is unoccupied by burrowing owls and other species prior to destruction. Protocols shall include:

   1) Properly functioning one-way doors shall be installed in all suitable burrows and in place for a minimum of 48 hours prior to burrow excavation;

   2) Twice daily monitoring to confirm evidence that owls have been excluded from the burrow; and

   3) Scoping of the burrows to confirm absence.

e. Procedures for how the burrow(s) will be excavated. Excavation using hand tools with refilling to prevent reoccupation is preferable whenever possible (may include using piping to stabilize the burrow to prevent collapsing until the entire burrow has been excavated and it can be determined that no owls reside inside the burrow).

f. Removal of other potential owl burrow surrogates or refugia on site.

g. Monitoring of the site to evaluate success and, if needed, to implement remedial measures to prevent subsequent owl use to avoid take.

h. Measures to make the site inhospitable to burrowing owls and fossorial mammals (e.g., by allowing vegetation to grow tall, heavy disking, or immediate and continuous grading) until activity is complete.

i. Reports describing the exclusion activities shall be submitted to SCWA.

3. During the breeding season (February 1st through August 31st), a Solano HCP approved Biologist shall establish a circular exclusion zone with a radius of 450 feet around each occupied burrow. No construction-related activity (e.g., site grading, staking, surveying, or use of any construction equipment) shall occur in the exclusion zone during the breeding season. Once the breeding season is over (e.g., the young have fledged and are no longer dependent on the adults), passive relocation may

proceed as described under **Mitigation Measure BIO-2** Section 2 and **Mitigation Measure BIO-3** Section 1.

4. Construction buffer widths may be reduced from the 450-foot-wide breeding season buffers and 250-foot-wide non-breeding season buffers in accordance with the following requirements:

   a. A site-specific analysis prepared by a Solano HCP approved Biologist indicates that the nesting pair(s) or wintering owl(s) would not be adversely affected by construction activities. SCWA, in consultation with the HCP Technical Review Committee, must approve this analysis in writing before construction can proceed.

   b. Monitoring by a Solano HCP approved Biologist is conducted for sufficient time (during all construction activities for a minimum of 10 consecutive days following the initiation of construction), the burrowing owls do not exhibit adverse reactions to construction activities (e.g., changes in behavioral patterns, reactions to noise), and the burrows are not in danger of collapse due to equipment traffic.

   c. Monitoring by a Solano HCP approved Biologist is continued at least once a week through the nesting/wintering cycle at that site, and no change in behavior by the owls is observed. This longer-term monitoring may be reduced to a minimum of 2 hours in the morning and 2 hours in the afternoon during construction activities; however, additional and more frequent monitoring may be required if any adverse reactions are noted.

   d. Monitoring reports from a Solano HCP approved Biologist are submitted to SCWA.

   If adverse effects are identified, construction activities shall cease immediately, and construction shall not resume until the Approved Biologist, in consultation with SCWA, CDFW, and USFWS, has determined that construction may continue under modified restrictions or that nesting activity is complete.

Mitigation Measure BIO-3: **Burrowing Owl Nest Relocation or Translocation.** Covered projects compliant with Solano HCP measures may not cause the disturbance, destruction, or conversion of active burrowing owl nests. In order to prevent disturbance to active nests, applicants shall either: (a) passively relocate resident burrowing owls prior to

the nesting season onto suitable conserved lands; or (b) cooperate with and provide funding to SCWA to implement an Active Burrowing Owl Translocation Study to relocate the owls (amount to be determined based on cost of owl relocation). Determinations of the appropriate approach will be based on the best likely outcome for owls considering: (a) any conserved habitat availability near the affected nest site, and (b) the best available science.

1. **Passive Relocation.** Project applicants may propose to passively relocate resident burrowing owls per **Mitigation Measure BIO-2** above. Passive relocation may be permitted at the discretion of SCWA, CDFW, and USFWS based on potential protected and managed habitat near the affected nest site and the best available science under the following conditions:

    a. Sufficient and suitable burrows on conserved lands consistent with the criteria identified in **Mitigation Measure BIO-5** below are present within 330 feet of the nest site.

    b. A passive relocation assessment shall be prepared to determine if passive relocation is preferable to active relocation. In this case, a passive relocation plan following CDFW's 2012 Staff Report on Burrowing Owl Mitigation (CDFW 2012 or as updated) shall be submitted to SCWA, CDFW, and USFWS. If approved, the plan shall be implemented and the passive relocation shall include but not be limited to monitoring of the passively relocated owls for a minimum of two years.

2. **Active Translocation**. If resident burrowing owls are not passively relocated onto conserved land, the City of Vacaville in collaboration with SCWA shall develop and implement a scientific study to actively relocate the affected owls to suitable habitat, upon CDFW and USFWS approval. The Active Burrowing Owl Translocation Study shall evaluate the translocation of burrowing owls from active nests affected by the project to a release site on reserves within the Solano HCP Plan Area. A protocol for capture, acclimatization aviaries, holding period, feeding and other methods shall be developed by the City of Vacaville in collaboration with SCWA based on best available science. Active translocation shall be managed by the City of Vacaville and SCWA as applicable upon CDFW and USFWS approval. If owls are actively translocated, habitat enhancement shall include the relocation site. CDFW and USFWS review and approval of the Active Burrowing Owl Relocation Study is required unless CDFW or USFWS provides documentation that it

lacks the resources to complete the review. If that is the case, the City of Vacaville in collaboration with SCWA shall instead obtain the review and written acceptance from a qualified burrowing owl expert with demonstrated successful burrowing owl relocation experience and authorship of scientific literature on burrowing owl, or another combination of burrowing owl experience approved by CDFW and USFWS.

Mitigation Measure BIO-4: **Mitigation for Direct, Indirect, and Temporary Effects to Foraging Burrowing Owl Habitat.** Mitigation measures for effects to burrowing owl are applicable to all covered activities in the Solano HCP Plan Area (e.g., construction) that would affect known and suitable burrowing owl habitat. All or portions of the mitigation for loss of breeding, foraging, and overwintering owl habitat may be addressed concurrently with habitat preservation and management requirements specified for other Natural Communities under the Solano HCP.

1. **Direct Effects**: Mitigation for the direct disturbance, destruction, or conversion of burrowing owl foraging habitat resulting from covered activities shall be provided as specified for applicable Natural Communities and/or Covered Species (i.e., Swainson's hawk with similar foraging habitat). Mitigation lands used to satisfy mitigation measures for other Natural Communities and/or covered species can be used to satisfy burrowing owl conservation if the reserve area meets the basic burrowing owl reserve standards from Chapter 7.0 and criteria specified in Chapter 5.0 of the Solano HCP. All burrowing owl foraging habitat affected directly by the project will be subject to the compensation requirement.

2. **Indirect Effects**: Indirect effects to burrowing owl foraging habitat from development in irrigated agriculture lands shall be mitigated through the preservation and management of irrigated agriculture foraging habitat at a ratio of 0.5:1 mitigation-to-effect in accordance with Chapter 6.0 mitigation requirements in the Solano HCP.

3. **Temporary Effects**: All temporarily disturbed burrowing owl habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio according to Solano HCP mitigation details.

Mitigation Measure BIO-5: **Mitigation for Loss of Known Nest Sites.** Applicants proposing to implement covered activities (e.g., construction) resulting in the disturbance, destruction, or conversion of a burrowing owl known nest site (i.e., nest site that has been active for breeding within 5

years) shall preserve two known nest sites in the Solano HCP Plan Area.

Mitigation for effects to known nest sites must include sufficient foraging habitat to support the nesting burrowing owls. The required amount of suitable foraging habitat the applicant must protect or enhance under priorities 2, 3, and 4 of this mitigation measure shall be equal to the amount of owl foraging habitat directly affected by the project. As described below, at a minimum, the area of protected or enhanced suitable owl foraging habitat shall be based on available foraging habitat at the affected nest site within 1,968 feet (600 meters) (CDFW 2012) of the nest or center of the nesting territory, whichever is greater. Since each project footprint and location is different, this owl foraging habitat mitigation requirement will be determined on a case-by-case basis in collaboration with SCWA, CDFW, and USFWS as applicable.

Priorities for permanent nest site preservation (in descending order) are as follows:

1. Purchase of occupied nest credits from an HCP-certified mitigation bank, which CDFW and USFWS have verified to be in good standing at the time of purchase, before project construction begins.

2. Establishment of a new Solano HCP reserve that (a) permanently protects a known burrowing owl nest site and associated foraging habitat (requirement described above) within the Solano HCP Plan Area by placing a conservation easement; and (b) implementing and funding in perpetuity a Long-Term Management Plan before project construction begins. Permanent preservation of known nest sites and associated foraging habitat must occur within the Solano HCP Plan Area and is subject to the requirements and approvals specified in Chapter 10.0 of the HCP. Each nest site shall include a minimum of three suitable burrows with sufficient foraging habitat. Nest sites, the Long-term Management Plan, and implementation funding must be reviewed and approved by SCWA, USFWS, and CDFW prior to project construction.

3. Purchase of known burrowing owl nest sites on lands preserved in the Solano HCP Reserve System which are not already committed as burrowing owl mitigation for other projects under the following conditions:

a. A Burrowing Owl Habitat Enhancement Plan shall be prepared for the conserved lands following guidelines developed by SCWA, CDFW, and USFWS. The Habitat Enhancement Plan shall include, but is not limited to:

   1) Installation of artificial burrows following a design approved by SCWA, CDFW, and USFWS unless sufficient natural burrows are available.

   2) Incorporation of conspecific cues to attract burrowing owls such as acoustic playback of owl calls and imitation of whitewash.

   3) A California ground squirrel assessment and plan to increase populations if necessary.

   4) Predator control provisions including an assessment of feral cats and other potential burrowing owl predators, and reducing these threats by, for example, humanely removing feral cats or avian predators' hunting perches.

   5) Vegetation height and thatch reduction through mowing or grazing.

   6) An assessment of burrowing owl prey availability and plan to increase prey if necessary.

   7) An adaptive management plan to address burrowing owl occupancy of protected lands.

   8) Sufficient owl foraging habitat protection/enhancement requirement described above based on the project's size and direct effects to owl foraging habitat.

b. Funding is provided for implementation of the Burrowing Owl Habitat Enhancement Plan and for the in-perpetuity implementation of a long-term management plan (Chapter 10.0 of Solano HCP); and

c. The preserved lands are part of the Solano HCP Reserve System.

4. If implementing priorities 1, 2, or 3 for known nest site protection is not feasible, applicants shall fund a Burrowing Owl Habitat Enhancement Plan following the requirements described under priority 3. The enhancement plan must be

submitted to and approved by SCWA, CDFW, and USFWS. The enhancement plan will be implemented either on the new Solano HCP reserve established as mitigation for the project that resulted in effects to the known nest site (consistent with all habitat and funding requirements in priority 2 including the foraging habitat protection/enhancement requirement) or expand burrowing owl habitat on an existing suitable Solano HCP reserve. Implementation of the Burrowing Owl Habitat Enhancement Plan will improve conditions for burrowing owl in order to encourage the establishment and/or expansion of burrowing owl nesting populations consistent with applicable burrowing owl goals and objectives in Chapter 5.0 of the Solano HCP, including providing sufficient habitat acreage and burrows to effectively support the number of nesting burrowing owls required by the Solano HCP.

Mitigation Measure BIO-6: **Habitat Enhancement.** All applicants planning to conduct covered activities that affect burrowing owl known and suitable habitat in the Solano HCP Plan Area shall pay a Burrowing Owl Protection Fee prior to project construction to fund habitat expansion and enhancement for burrowing owl nesting and overwintering sites (see Chapter 11.0 of HCP). Project applicants that implement and fully mitigate effects under **Mitigation Measure BIO-5** priority 2 above or are otherwise exempt are not required to pay into the Burrowing Owl Protection Fee.

Mitigation Measure BIO-7: **Mitigation for Temporary Effects**. If construction activities result in the loss of occupied nesting or wintering burrows (e.g., closure, collapse due to ground disturbance, or disturbance in the construction buffer zones) within the temporarily disturbed area, mitigation shall be provided according to the following criteria at all times of the year:

1. **Alternative Burrow Plan**: Applicants shall provide an Alternative Burrow Plan for review and approval by SCWA, USFWS, and CDFW. The Alternative Burrow Plan shall include, but is not limited to, the following:

    a. An assessment of available suitable burrows within 330 feet of the edge of the construction area if suitable contiguous habitat remains.

    b. Provisions to install artificial burrows if suitable donor burrows are not present.

c. A maintenance and monitoring program that includes a minimum of 2 years following completion of the project that resulted in the temporary effect. The maintenance program shall include provisions to maintain artificial burrows, if required, in usable condition and maintain vegetation height at 6 inches or less within 50 feet of the burrows.

d. Compliance with this Mitigation Measure does not allow for the destruction or disturbance of an active burrow containing burrowing owls, including eggs and/or dependent young. Methods described in **Mitigation Measure BIO-2** and Chapter 6.0 of the Solano HCP will be used to confirm the burrow is vacant prior to temporary disturbance.

2. **Temporary Effects**: All temporarily disturbed burrowing owl habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio.

3. **Alternative:** If the Alternative Burrow Plan measure cannot be implemented because sufficient habitat is not present in surrounding, contiguous lands to support burrowing owls or if temporary effects cannot be restored at a 1:1 ratio within 1-year, temporary effects shall be mitigated per the requirements of **Mitigation Measure BIO-4** and **Mitigation Measure BIO-5**.

Implementation of **Mitigation Measure BIO-1** would be required to determine whether burrowing owls may be present during construction activities while they are nesting (February 1 through August 31). If preconstruction surveys under **Mitigation Measure BIO-1** determine that burrowing owls are present in the project site, exclusion zones shall be established around occupied burrows by implementing **Mitigation Measure BIO-2**. If those exclusion zones cannot be established successfully, burrowing owls may be passively relocated from the site in accordance with **Mitigation Measure BIO-2, Mitigation Measure BIO-3** Section 1, established CDFW and USFWS protocols, and in consultation with the Solano HCP Technical Review Committee, as needed in accordance with non-breeding and breeding season requirements.

Should active relocation of burrowing owls be required, **Mitigation Measure BIO-3** Section 2 would be implemented, which would include documentation, funding, monitoring, and management of relocated burrowing owls and conservation lands according to established protocols and in coordination with the Solano HCP Technical Review Committee, as necessary. Implementation of **Mitigation Measure BIO-1 through Mitigation Measure BIO-7** would reduce potential construction-related impacts, both temporary and permanent in nature, on burrowing owl to a less than significant level with mitigation incorporated. **Mitigation Measure BIO-5** would only be required if

project activities would result in the disturbance, destruction, or conversion of a burrowing owl known nest site that has been active for breeding within 5 years.

Swainson's Hawk. According to the Biological Technical Report, the project site supports suitable habitat for Swainson's hawk, which includes grassland and scrubland habitats associated with riparian areas, or in urban/suburban and agricultural areas that either support populations of prey species or are near areas that do. Swainson's hawk is a California State Species of Concern and a Solano HCP covered species, and the project site is located within the Solano HCP Swainson's Hawk Irrigated Agriculture Conservation Area. No active nests were observed on the project site or adjacent lands during the 2021 field survey. However, trees on the site could provide suitable nest sites and known nest sites are within the vicinity. Swainson's hawks were not observed during surveys; however, the site serves as suitable foraging habitat and hawks could nest in the trees on the site. The Solano HCP requires the implementation of best management practices to reduce Swainson's hawk impacts to a less than significant level as follows:

Mitigation Measure BIO-8: **Swainson's Hawk Nest Tree Preservation.** Known, active, or potential nest trees shall be avoided to the maximum extent practicable. Applicants proposing to remove an otherwise healthy known, active or potential nest tree shall provide written justification for the tree removal to SCWA. Sufficient rationale for known, active or potential tree removal shall be primarily based on declining or poor suitability of the tree as a nesting site for Swainson's hawk and/or to meet public safety needs. The justification letter shall provide a clear analysis of the biological value of the tree to Swainson's hawk under pre-project conditions and post-project conditions (if the tree were to be avoided), and will consider the presence of alternate nest sites in the vicinity of the project site. Known, active or potential nest trees shall only be removed if there is a biological basis that the use of the tree is unlikely under post-project conditions. SCWA, in consultation with the HCP Technical Review Committee, will be responsible for approval of the requests to remove healthy nest trees and for ensuring adequate mitigation (**Mitigation Measure BIO-14)** provides mitigation requirements of nest tree removal).

Mitigation Measure BIO-9: **Swainson's Hawk Pre-construction Nest Surveys.** Between March 1 and August 31, a Solano HCP approved Biologist shall conduct pre-construction surveys to identify and subsequently avoid effects to nesting areas for Swainson's hawk. Surveys shall follow approved Solano HCP protocols and be of sufficient intensity (typically 2 to 3 surveys) to document nesting within a 0.25 mile (1,320 feet) buffer around planned work activities. A final survey shall be conducted no more than 15 days prior to the anticipated start of construction. If a lapse in project-related construction work of 15 days or longer occurs, additional preconstruction surveys shall be required before

project work may be reinitiated. Note: Swainson's hawk in the region is typically incubating during late April to early June and active nests can be difficult to find.[11] As such, surveys during the late April to early June period may not be acceptable for determining the absence of Swainson's hawk nests.

Mitigation Measure BIO-10: **Swainson's Hawk Active Nest Buffers.** Construction work (including grading, earthmoving, surveying, and any operation of construction equipment) shall not occur within a 0.25-mile buffer zone around an active, occupied Swainson's hawk nest with eggs or young except as provided below. Construction work may commence in the buffer zone when a Solano HCP approved Biologist has confirmed that nesting activity is complete (e.g., Swainson's hawk young have fully fledged and are capable of flight and have left the nest, or the adults have abandoned the nest for a minimum of 7 days and there is no evidence of re-nesting activity). Nest trees may be removed between September 16 and February 1 when nests are unoccupied.

The size of nest site buffer zones may be reduced only under the following conditions:

1. A site-specific analysis prepared by a Solano HCP approved Biologist indicates that the nesting pair under consideration are not likely to be adversely affected by construction activities (e.g., the nest is located in an area where the hawks are habituated to human activity and noise levels comparable to anticipated construction work). SWCA, CDFW, and USFWS must approve this analysis before construction may begin within 0.25 mile of a nest.

2. Monitoring by a Solano HCP approved Biologist is conducted for a sufficient time (during all construction activities for a minimum of 10 consecutive days following the initiation of construction), and the nesting pair does not exhibit adverse reactions to construction activities (e.g., changes in behavioral patterns, reactions to construction noise).

3. Monitoring by a Solano HCP approved Biologist is continued at least once a week through the nesting cycle at that nest. This longer-term monitoring may be reduced to a minimum of 2 hours in the morning and 2 hours in the afternoon during

[11] Swainson's Hawk Technical Advisory Committee. 2000. *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley.* May 31. Website: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83990 (accessed September 21, 2022).

construction activities; however, additional and more frequent monitoring may be required if any adverse reactions are noted.

4. Weekly monitoring reports from a Solano HCP approved Biologist shall be submitted to SCWA, CDFW, and USFWS during construction and monitoring activities.

If adverse effects are identified, construction activities shall cease immediately and construction shall not resume until the Solano HCP approved Biologist, in consultation with SCWA, has determined that construction may continue under modified restrictions or that nesting activity is complete.

Mitigation Measure BIO-11: **Post-Construction Occupied Nest Avoidance**. If a nest tree becomes occupied by Swainson's hawk during ongoing construction activities, construction activities shall not occur within 500 feet of the nest, except where monitoring consistent with the criteria in **Mitigation Measure BIO-10** documents that adverse effects will not occur.

Mitigation Measure BIO-12: **Irrigated Agriculture Foraging Habitat Conservation.**

1. All mitigation shall be provided in the Irrigated Agriculture Potential Reserve Area, which is a designated portion of the Swainson's Hawk Irrigated Agriculture Conservation Area within the Solano HCP Plan Area.

2. **Direct Effects:** Direct effects to Swainson's hawk foraging habitat in the Irrigated Agriculture Conservation Area shall be mitigated through the preservation and management of high quality foraging habitat, with a site foraging score of at least 50, according to the Habitat Quantification Tool (HQT) Habitat Quality Score (see Chapter 5.0 and Appendix F of Solano HCP). Unsuitable parcels (i.e., site score is less than 50) are ineligible for becoming a Swainson's hawk reserve. The Plan requires the following ratios of affected (in acres) to reserve acreage depending on the HQT habitat quality category of the reserve site:

    - Suitable habitat (site scores between 50 and 64) requires a mitigation ratio of 1.2:1 (mitigated-to-affected).

    - Premium habitat (site score of 65 or higher) requires a mitigation ratio of 1:1 (mitigated-to-affected).

3. **Indirect Effects:** Indirect effects to Swainson's hawk foraging habitat within 250 feet of development shall be mitigated

through the preservation and management of foraging habitats at the following ratios:

- Suitable habitat (site scores between 50 and 64) requires a mitigation ratio of 0.6:1 (mitigated-to-affected).
- Premium habitat (site score of 65 or higher) requires a mitigation ratio of 0.5:1 (mitigated-to-affected).

4. **Temporary Effects:** Temporary effects to Swainson's hawk foraging habitat shall not require direct compensation provided activities comply with **Mitigation Measure BIO-10**, and all temporarily disturbed habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio.

5. **Irrigated Agriculture Habitat Enhancement Program:** All applicants with development projects which convert irrigated or intensively cultivated farmland to non-farm uses shall pay a Farmland Conversion Fee to provide funding for the Habitat Enhancement Fund program as described in Chapters 5.0 and 11.0 of the Solano HCP. Compliance with this measure by applicants will be used to implement a perpetual funding program for crop incentives and other habitat enhancement in the Irrigated Agriculture Potential Reserve Area to benefit Swainson's hawk. Costs shall be based on a per-acre basis of converted farmland.

Mitigation Measure BIO-13: **Swainson's Hawk Objectives.** The following measure is designed to meet Solano HCP Swainson's Hawk Objectives in Chapter 5.0 by providing sufficient nesting habitat in proximity to suitable foraging habitat to support the current Swainson's hawk population in the Solano HCP Plan Area. All applicants must (a) avoid destruction of active Swainson's hawk nests occupied by eggs or dependent young, (b) avoid take of Swainson's hawks in compliance with the California Fish and Game Code Sections 3503 and 3503.5, and (c) meet the requirements specified in **Mitigation Measures BIO-9, BIO-10, and BIO-11,** and **Mitigation Measure BIO-14**.

Mitigation Measure BIO-14: **Swainson's Hawk Known Nest Trees.** Covered Activities resulting in the loss of a Swainson's hawk known nest tree (tree that contained an active nest within 5 years) shall preserve either (a) a known nest tree or (b) an active nest (i.e., currently occupied by hawks, eggs, and/or dependent young). If known or occupied nests are unavailable on a Solano HCP reserve and preserving a known or occupied nest is not practicable, applicants will pay a Nest Protection Fee to provide funding to the HCP's Swainson's Hawk

Nest Protection Program (see Chapters 5.0 and 11.0 of the Solano HCP).

Under the Solano HCP removal of an active Swainson's hawk nest is not authorized; see Chapter 6.0 for details. Nest trees may only be removed when the nest site is no longer active. For the purposes of this **Mitigation Measure BIO-14**, loss of a known nest tree will occur if either of the following conditions is met:

1. The covered activity directly removes the nest tree or involves soil compaction or grading (excavation or fill) within more than 25 percent of the root zone of the nest tree. The root zone shall be determined by a qualified arborist but shall, at a minimum, be the greater of the horizontal distance from the tree at least equal to the tree's height or the outer edge of the tree canopy.

2. The covered activity results in direct effects within 250 feet of an active nest or known nest tree. If this occurs, that would be considered loss of a nest site because it would reduce the suitability of the nest site even if the tree itself is not removed.

3. Covered Activities affecting Swainson's hawk nests under conditions 1 or 2 shall:

    a. Directly comply with this **Mitigation Measure BIO-14**'s nest preservation requirements (e.g., purchase of occupied nest credits from an HCP-certified mitigation bank or preserve a known nest tree (Chapter 10.0 of Solano HCP); or

    b. Upon approval from SCWA and the applicable Resource Agencies, the applicant will pay the current Nest Protection Fee described in Chapter 11.0 of the Solano HCP; or

    c. Demonstrate to and receive concurrence from SCWA, CDFW, and USFWS that the Covered Activity will not substantially increase disturbance to the active nest or known nest tree.

    Note: Indirect effects to Swainson's hawk known nest trees may occur from covered activities. If such activities cannot be conducted in compliance with **Mitigation Measure BIO-11**, then the above requirements will apply.

Implementation of **Mitigation Measure BIO-9** would be required to determine whether Swainson's hawk may be present during construction activities while they are nesting (March 1 through August 31) and set an appropriate buffer zone. Should construction work need to occur within the buffer

zone, implementation of **Mitigation Measure BIO-10**, would require the following: a site-specific analysis; monitoring by an approved biologist at least once a week through the nesting/wintering cycle at that nest; and monitoring reports submitted to SCWA, CDFW, and USFWS. Implementation of **Mitigation Measures BIO-8 through Mitigation Measure BIO-14** would reduce potential construction-related impacts, both temporary and permanent in nature, on Swainson's hawk to a less than significant level with mitigation incorporated.

Pallid Bat and Western Red Bat. According to the Biological Technical Report, the project site supports suitable foraging and roosting habitat for common bat species and individual special-status bat species, such as the pallid bat (*Antrozous pallidus*) or western red bat (*Lasiurus blossevillii*). Open grassland habitat that is adjacent to the aquatic habitat within Alamo Creek is suitable for foraging bats. Dense foliage, cracks, and fissures of trees on-site as well as cracks and fissures on structures are suitable for roosting bats. Neither bats nor bat sign were observed during surveys; however, the site serves as suitable foraging habitat and bats could roost in the trees and structures on the site. The following BMPs will reduce Pallid bat and Western red bat impacts to a less than significant level as follows:

Mitigation Measure BIO-15: **Special-status Bat Avoidance.** To avoid and minimize impacts on roosting bats the following measures shall be implemented:

Focused Habitat Assessment: Prior to tree and structure removal, a focused habitat assessment shall be conducted by a qualified bat biologist to determine if the subject trees and structures to be removed have potential habitat and if any signs of use by bats is observed. If suitable and/or occupied habitat or if signs of recent previous occupation is determined as part of the habitat assessment for special-status bats, a tree removal and demolition plan will be developed. The qualified biologist will develop the appropriate plan for eviction, exclusion and compensatory mitigation, if necessary, in coordination with the CDFW.

Preconstruction Surveys: If suitable habitat is determined as part of the habitat assessment for special-status bats but occupied habitat is not observed, a preconstruction survey shall be conducted by a qualified biologist immediately prior to tree and structure removal to evaluate whether the site conditions have changed. Preconstruction surveys are used to determine what avoidance and minimization requirements are triggered before construction and whether construction monitoring is necessary.

Avoidance and Minimization: If the species is discovered or if evidence of recent prior occupation is established, tree and structure removal shall be scheduled by the project applicant, or designee, such that it minimizes impacts on special-status bats. Hibernation sites with evidence of prior occupation shall be sealed before the hibernation season (November–March), and nursery

sites shall be sealed before the nursery season (April–August). If the site is occupied, then the action shall occur either prior to or after the hibernation season for hibernacula and after August 15 for nursery colonies. Tree and structure removal shall not take place as long as the site is occupied.

Implementation of **Mitigation Measure BIO-15** would require a focused habitat assessment, preconstruction survey, tree and structure removal (as needed), and measures for bat exclusion (as needed). Implementation of **Mitigation Measure BIO-15** would reduce potential construction-related impacts, both permanent and temporary in nature, on special-status bats to a less than significant level with mitigation incorporated.

In addition to these species-specific measures, general avoidance measures from Chapter 6.0 of the Solano HCP shall be implemented prior to and during construction as follows:

Mitigation Measure BIO-16: **Vehicular/Equipment Operation and Maintenance.** To avoid and minimize impacts from construction activities, operation, and maintenance of equipment to habitats for special-status species, the following measures shall be implemented:

1. When working in or adjacent to any aquatic habitat, the number of new temporary access routes or use of existing access routes, number and size of staging areas, and the total areas of the activity shall be limited to the minimum necessary to achieve the project goal. The boundaries of all new and existing access routes shall be clearly marked or flagged. These areas shall be outside of preserved aquatic habitat and other sensitive areas.

2. All fueling and maintenance of vehicles and other mechanized equipment shall be conducted in designated areas located at least 100 feet away from any aquatic habitat. Each designated fueling/maintenance area shall be protected by a containment barrier designed to prevent any spilled or leaked fuel or other contaminants from running into an aquatic habitat. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

3. All vehicles and other mechanized equipment used during construction shall be checked for oil, fuel, and coolant leaks prior to initiating work. Any equipment found to be leaking fluids shall not be used in or around aquatic habitat features.

4. The potential for wildfires shall be reduced by parking vehicles away from vegetation and by the use of shields, protective mats, and other fire prevention methods when welding, grinding, or conducting other activities that are likely to create a

fire hazard. All construction sites shall have adequate sources of water, shovels, and fire extinguishers available for immediate use. All vehicles and heavy equipment used on construction sites shall have on-board fire extinguishers.

5. During the dry season, vehicles shall never be parked or idled so that the undercarriage is in contact with vegetation.

6. In order to reduce the risk of spreading harmful pathogens into natural areas, vehicles, personal gear, sampling gear, work crew equipment, and other equipment that have been off-road in natural areas shall by sanitized (by manual scrubbing down or cleaning with a pressure washer) before the vehicle/equipment is allowed to be used in other natural areas. If the vehicle or equipment was operated in a creek, stream, or wetland, the equipment and/or tires shall also be decontaminated by the following procedures:

   a. Provide crews with sanitation kits. Sanitation kits should contain the following: Chlorine bleach (10/90 mixture bleach to water) or Clorox Clean-up®, scrub-brush, metal scraper, boot brush, and plastic gloves.

   b. Sanitize shoes, pruning gear, and other equipment before working in a natural area.

   c. Pressure wash or manually scrub tires and tracks for vehicles and equipment. Allow tires to completely dry (for at least 24 hours) before being allowed use or entry in or near the vicinity of another creek or stream.

   d. Sanitize equipment with a 10 percent bleach solution or 99 percent copper sulfate pentahydrate solution (3/4 teaspoon per gallon of water).

      Vehicular cleaning work shall be conducted in self-contained work areas at least 100 feet from any aquatic habitat; wash water shall not be disposed of in any natural areas.

Mitigation Measure BIO-17: **Work Area Maintenance/Hazardous Materials.** To avoid and minimize impacts from hazardous materials and work area waste, the following measures shall be implemented:

1. Food, trash, and other solid wastes shall be disposed of in properly contained, covered refuse containers and regularly

removed from the various structures and facilities. Following construction, all trash and construction debris shall be removed from the work area.

2. Building material storage areas containing hazardous or potentially toxic materials shall have an impermeable membrane between the ground and the hazardous material and shall be bermed to prevent the discharge of pollutants to groundwater and storm water runoff.

3. Materials deleterious or toxic to fish and wildlife including, but not limited to, asphalt, tires, concrete, construction materials, treated wood, and creosote-containing materials must be stockpiled in bermed containment areas that are lined with an impermeable membrane and designed to hold 125 percent of the total capacity of stored materials. All such materials may not be stored within 100 feet from the edge of any water body for more than 48 hours. Contaminant absorbent materials shall be stored in each containment area. Water collected in containment areas shall be disposed of according to federal, State, and local regulations.

4. An emergency response and cleanup plan shall be prepared prior to beginning work at the site. The plan shall detail the methods to be used to contain and clean up spills of petroleum products or other hazardous materials in the work area.

5. Containers for storage, transportation, and disposal of contaminated absorbent materials shall be provided on the project site. Petroleum products and contaminated soils shall be disposed of according to federal, State, and local regulations.

Mitigation Measure BIO-18: **Water Quality Management.** To avoid and minimize impacts to water quality, the following measures shall be implemented:

1. A Storm Water Pollution Prevention Plan (SWPPP), prepared in accordance with the State Water Resources Control Board (SWRCB), National Pollutant Discharge Elimination System (NPDES) Construction General Permit, shall be implemented for all construction activities where required under SWRCB regulations (see **Mitigation Measure WQ-1**). The SWPPP shall include BMPs for controlling sediment, turbidity, and the release of other pollutants into aquatic habitats during construction. The SWPPP shall be subject to the approval of the Regional Water Quality Control Board (RWQCB) prior to the start of work.

2. No substances toxic to aquatic life shall be discharged or allowed to leach into an aquatic habitat. Every reasonable precaution to protect aquatic habitats from pollution with fuels, oils, bitumens, calcium chloride, dust suppressants, and other harmful materials shall be implemented.

Mitigation Measure BIO-19: **Worker Training and Notification Procedures.** To avoid and minimize impacts to special-status species, the following measures shall be implemented:

1. All operations, maintenance, and construction personnel shall receive annual training about covered species potentially occurring in the project area for covered activities.

2. All construction personnel shall receive pre-project training from a Solano HCP approved Biologist about the sensitive nature of natural communities, covered species, and special management species potentially occurring in the vicinity of the construction site.

3. Training shall include the following: (a) descriptions of the sensitive natural communities, covered species, and special management species potentially occurring with work areas; (b) all routine measures required to protect the species/natural community during work and the possible penalties for not complying with these requirements; and (c) the requirement to stop all work and notify a supervisor or the project biologist if a covered species or special management species is observed in the project site.

Operations, maintenance, and construction personnel shall report to their supervisor any observed incident of death or injury to a covered species or special management species or damage to habitat. The supervisor shall immediately notify SCWA.

The City of Vacaville shall report to the USFWS, National Marine Fisheries Service (NMFS), and/or CDFW, as appropriate, the following: (a) any incidence of observed or suspected take (harm, harassment, pursuit, hunting, shooting, wounding, killing, trapping, capture, collection, or any attempt to conduct these activities) of a listed animal species; (b) any other report of take or suspected take of a listed animal species not authorized under the Solano HCP; and (c) any observed destruction or damage to a plant covered species population or its suitable habitat. The report shall be made to the appropriate agencies within 24 hours of the incident and shall

include pertinent information such as the date, time, location, species or habitat, and possible cause of the incident (if known).

Mitigation Measure BIO-20: **General Site Disturbance and Erosion Control Measures.** To avoid and minimize impacts to water quality habitats and special-status species, the following measures shall be implemented:

1. Ground-disturbing activities shall be confined to the smallest area needed to complete the work. Project vehicles, especially heavy equipment, shall be limited to existing roadways whenever possible, especially when soils are moist.

2. After the construction work is completed, temporarily disturbed areas shall be restored to their original pre-project condition, including topography and vegetation. If seeding is necessary when restoring to previous condition, local, native, noninvasive species seed mixes shall be used.

3. Disposal sites for dredged materials and debris shall be located in upland locations in a manner that prevents the disposed materials and debris from draining directly into an aquatic habitat. Standard construction BMPs and erosion control methods shall be used to ensure the material is contained over both the short and long term.

4. Erosion control and sediment detention devices (e.g., well-anchored sandbag cofferdams, certified weed-free straw bales, or silt fences) shall be in place during construction and following construction, as necessary to minimize fine sedimentation and siltation, and to detain sediment-laden water on site. These devices shall be placed at all locations where sediment input is likely to occur. A supply of erosion control materials shall be readily available to cover small sites that may become bare and to respond to sediment emergencies. Plastic monofilament mesh covering for straw wattles, erosion control blankets, or erosion control materials are prohibited for erosion control.

5. Sediment shall be removed from sediment controls once the sediment has reached one-third of the exposed height of the control. The project applicant shall dispose of sediment collected in these devices at approved disposal sites away from the collection area. Collection devices shall be inspected at least once a day to ensure they are functioning properly. If a control measure does not function effectively, it shall be immediately repaired or replaced. Additional controls shall be installed as necessary.

6. All disturbed soils shall undergo erosion control treatment, including temporary native seeding and sterile straw mulch, prior to October 15 and following completion of construction work. Erosion control blankets shall be installed over disturbed soils on all gradients of over 30 percent.

7. Any stockpiles of soil used for fill material during construction shall be covered with a tarp or erosion control blanket, and silt fences shall be installed to prevent soils from moving into area waterways. If a greater than 40 percent chance of rain is forecast within 24 hours, the project site shall be "rain proofed" with erosion control measures to ensure that no sediment or turbidity enters an aquatic habitat.

Mitigation Measure BIO-21: **Vegetation Management Measures.** To avoid and minimize impacts to habitats for special-status species, the following measures shall be implemented:

1. Mechanical control methods such as mowing shall be used as an alternative to the application of herbicides whenever practicable in or near sensitive habitats and areas known to or likely to support covered species or special management species, including riparian and marsh areas, creeks, ponds, vernal pools, etc.

2. Mass application of herbicides shall be avoided to the maximum extent practicable. Spot spraying or more localized applications shall be used instead. Note: There are some limitations of pesticides and herbicides under the Solano HCP described in Chapter 2.0.

3. Herbicide mixing shall be limited to areas not prone to runoff such as concrete mixing/loading pads, disked soil in flat terrain, or graveled mixing pads.

4. The use of all herbicides shall comply with the requirements specified on the pesticide product labeling and Solano County Department of Pesticide Regulation regulations.

Mitigation Measure BIO-22: **Exclusion Fencing.** To avoid and minimize impacts to habitats for special-status species, the following measures shall be implemented:

Exclusion fencing, when required, shall be installed and maintained between project work areas and adjacent preserved habitat during all work activities. Exclusion fencing will consist of silt fabric,

plywood, aluminum, or other SCWA-approved material at least 3 feet in height. The base of the fence will be buried a minimum of 3 to 5 inches in the ground to prevent animals from crawling under. The remainder of the fence will be left above ground to serve as a barrier for animals moving on the ground surface. The fence will be pulled taut at each support to prevent folds or snags. Support poles will be located on the inside of the exclusion area. Construction personnel will also install an orange plastic-mesh construction fence 1 foot on the development side of the exclusion fence to increase visibility unless the exclusion fence is composed of high visibility materials. Exclusion fencing shall be inspected weekly and repaired immediately when damage is observed during construction work.

Implementation of **Mitigation Measure BIO-16** pertains to vehicular equipment and maintenance. Implementation of **Mitigation Measure BIO-17** requires proper disposal of food, trash, and other soil wastes and proper storage of building materials and other materials which may be hazardous or potentially toxic. Implementation of **Mitigation Measure BIO-18** requires a SWPPP be prepared and limits toxic substance use near aquatic habitats. Implementation of **Mitigation Measure BIO-19** requires personnel training and notification procedures. Implementation of **Mitigation Measure BIO-20** limits the amount of ground-disturbing. Implementation of **Mitigation Measure BIO-21** requires mechanical control methods such as mowing be utilized as an alternative to the application of herbicides for vegetation management. Implementation of **Mitigation Measure BIO-22** requires exclusion fencing be installed and maintained between project work areas and adjacent preserved habitat. **Mitigation Measure WQ-1** shall ensure preparation of a SWPPP and NPDES compliance. Implementation of **Mitigation Measure BIO-16 through Mitigation Measure BIO-22 and Mitigation Measure WQ-1** would further reduce potential construction-related impacts, both permanent and temporary in nature, to special-status species to a less than significant level with mitigation incorporated.

Overall, implementation of **Mitigation Measure BIO-1 through Mitigation Measure BIO-22 and Mitigation Measure WQ-1** would reduce potential construction-related impacts, both temporary and permanent in nature, on species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, to a less than significant level with mitigation incorporated. Once constructed, the project would have no operational impacts.

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, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? ***(No Impact)***

The CDFW tracks the occurrences of natural plant communities that are of limited distribution Statewide or within a county or region and are often vulnerable to environmental effects of projects. In the CDFW's Natural Communities List,[12] vegetation alliances with State rarity rankings of S1–S3 are considered "highly imperiled" and project impacts to "high-quality occurrences" of these

[12] California Department of Fish and Wildlife, 2018. California Natural Communities List. Website: nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153398&inline (accessed August 26, 2022).

alliances could be considered significant under CEQA. Most types of wetlands and riparian communities are also considered special-status natural communities due to their limited distribution in California. According to the Biological Technical Report, the project site does not support riparian habitat or any other sensitive natural communities. Therefore, the proposed project would not have a substantial adverse effect on any riparian habitat or other sensitive natural community, and no impact would occur.

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? ***(Less Than Significant with Mitigation Incorporated)***

The National Wetlands Inventory[13] (NWI) does not show any features within the project site However, the NWI shows Alamo Creek within vicinity of the project site.

There are two potential aquatic features (one on the west side and one on the east side of the project site) that were observed during the field visit. However, the western ditch does not exhibit an ordinary high-water mark or any of the U.S. Army Corps of Engineers (USACE) indicators for wetlands. Therefore, it was determined that the western ditch is not an aquatic feature and is not discussed further. However, the eastern ditch may be jurisdictional to the USACE given the connectivity of the feature to Alamo Creek.

Construction of the proposed project would not affect Alamo Creek since it is just south of the project site; however, the project would affect the eastern irrigation ditch that crosses the project site. In order to avoid potential impacts to federally protected aquatic resources, the following mitigation measures shall be implemented:

Mitigation Measure BIO-23: **Aquatic Resources Delineation.** A formal jurisdictional waters delineation in accordance with the USACE Routine Approach for small areas (i.e., equal to or less than 5 acres) shall be conducted. The survey will include collection of data on soils, hydrology, and vegetation, where necessary, to determine the extent of potential waters of the U.S. in the project area. In addition, the delineation shall be conducted in accordance with the USACE Arid West Regional Supplement to the Wetland Delineation Manual (September 2008).

Mitigation Measure BIO-24: **Regulatory Permits.** The project applicant, or designee, shall apply for and obtain permits from the USACE (USACE, Clean Water Act [CWA] Section 404 permit) and Regional Water Quality Control Board (RWQCB, CWA Section 401 water quality certification) prior to the commencement of ground disturbing activities.

[13] U.S. Fish and Wildlife Service (USFWS), 2021. National Wetland Inventory (NWI). Online GIS database. Available at https://www.fws.gov/wetlands/ (Accessed on August 26, 2022).

If the project would result in the loss of wetland and/or non-wetland waters, mitigation shall be accomplished in accordance with permits issued by resource agencies of jurisdiction (USACE, CDFW, RWQCB, etc.) which permits may include on-site or off-site measures, credit purchase, in-lieu fees, etc.

The connectivity of the eastern drainage ditch to Alamo Creek, which is a traditional navigable waterway, would require further evaluation and consultation. A preliminary jurisdictional wetland delineation evaluating the eastern ditch would need to be conducted prior to the submittal of the permit applications, as required by **Mitigation Measure BIO-23**. Due to the potential alterations to a jurisdictional feature, the project applicant, or designee, would be required to obtain required permits from the USACE and State Regional Water Quality Control Board (RWQCB) and implement the measures specified by the permits, as required by **Mitigation Measure BIO-24**. Implementation of **Mitigation Measure BIO-23 and Mitigation Measure BIO-24** would reduce potential construction-related impacts, both temporary and permanent in nature, to less than significant level with mitigation incorporated. Once constructed, the project would have no operational impacts.

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? ***(Less Than Significant with Mitigation Incorporated)***

Migratory Birds. Disturbance of other migratory birds during their nesting season (February 1 through August 31) could result in "take", which is prohibited under the Migratory Bird Treaty Act (MBTA) and Section 3513 of the California Fish and Game Code. California Fish and Game Code (Section 3503) also prohibits take or destruction of bird nests or eggs. The Solano HCP requires the implementation of BMPs to reduce migratory bird impacts to a less than significant level as follows:

Mitigation Measure BIO-25: **Nesting and Migratory Bird Avoidance.** To avoid and minimize impacts on nesting and migratory birds and raptors and to comply with the federal Migratory Bird Treaty Act, pre-construction surveys shall be conducted and construction avoidance measures shall be implemented if necessary.

Preconstruction Survey: The project site shall be surveyed by a qualified biologist prior to construction to evaluate nesting bird habitat. If work is scheduled to take place between February 1 and August 31, a pre-construction nesting bird survey shall be conducted by a qualified biologist within 14 days of construction, covering a radius of 500 feet for raptors and 100 feet for other migratory birds at all locations. The preconstruction survey can be conducted concurrently with the Swainson's hawk survey identified in **Mitigation Measure BIO-9**.

Avoidance and Minimization: If an active bird nest is found within these buffers, species-specific measures shall be prepared by a

qualified biologist and implemented to prevent abandonment of the active nest. If an active nest is present, a minimum exclusion buffer of 100 feet shall be maintained during construction, depending on the species and location. The perimeter of the nest setback zone shall be fenced or adequately demarcated with stakes and flagging, and construction personnel and activities restricted from the area. A survey report by a qualified biologist verifying that no active nests are present, or that the young have fledged, shall be submitted prior to initiation of grading in the nest-setback zone. A qualified biologist shall monitor construction activities that occur near active nest areas to ensure that no inadvertent impacts on these nests occur.

Implementation of **Mitigation Measure BIO-25** requires avoiding tree removal and other work activities during the nesting season and, if possible, conducting preconstruction surveys for nesting hawks and other migratory birds prior to any work during the nesting season, and additional measures to ensure avoidance of any "take". Implementation of **Mitigation Measure BIO-25** would reduce potential construction-related impacts, both permanent and temporary in nature, on nesting migratory birds to a less than significant level with mitigation incorporated.

Wildlife movement corridors are linear habitats that function to connect two or more areas of significant wildlife habitat. These corridors may function on a local level as links between small habitat patches (e.g., streams in urban settings) or may provide critical connections between regionally significant habitats (e.g., deer movement corridors). Wildlife corridors typically include vegetation and topography that facilitate the movements of wild animals from one area of suitable habitat to another in order to fulfill foraging, breeding, and territorial needs.

The project site consists of open space grasslands and provides habitat for local and regional wildlife movement. However, as noted in Chapter 2.0, Project Description, surrounding land uses are largely residential.

Implementation of **Mitigation Measures BIO-1 through BIO-14,** would ensure that temporary impacts to migrating special-status wildlife species, including burrowing owls and Swainson's hawk would be less than significant. Implementation of **Mitigation Measure BIO-25** would ensure that temporary impacts to migratory birds would be less than significant. Implementation of **Mitigation Measure BIO-15** would ensure that temporary impacts to special-status bats would be less than significant. Implementation of general avoidance measures from the Solano HCP, **Mitigation Measure BIO-6 through BIO-22** would further reduce temporary impacts to migrating special-status wildlife species. With **Mitigation Measures BIO-1 through BIO-15 and Mitigation Measure BIO-25**, the project would not temporarily impact special-status wildlife species. Once operational, the project would not create additional interference to migration. Therefore, impacts would be less than significant with incorporation of the mitigation measures above.

e. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? ***(Less Than Significant with Mitigation Incorporated)***

The proposed project would likely require the removal of several trees. The City of Vacaville regulates the removal of trees as specified in the City of Vacaville Municipal Code, Title 14, Chapter 14.02.250.060 – Tree Preservation.

A protected tree is any tree on public or private property in the City with a diameter at breast height (dbh) of 6 inches or more. For private property, a tree removal permit will be issued by the Director of Community Development based on the following criteria:

- Condition of the tree
- Species of the tree
- Number of existing trees
- Sound forestry practice
- Size of the tree
- Location of the tree
- Replacement proposal

All the trees on the property are 6-inches or greater dbh and are comprised of walnut, elms, maples, palms, London plain sycamores, ash, redwood, and other ornamentals. Prior to the issuance of a demolition or grading permit, the project applicant will obtain a tree removal permit for any tree to be removed from the project site in compliance with the City of Vacaville Tree Preservation Ordinance.

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? ***(Less Than Significant Impact with Mitigation Incorporated)***

The project site lies within the Draft Solano Multispecies Habitat Conservation (HCP) Plan Area.[14] The Solano HCP has been developed to support the issuance of a Section 10(a)1(B) incidental take permit under the federal Endangered Species Act of 1973 (as amended). The Solano HCP has expanded the scope of the Biological Opinion and includes additional voluntary applicants and additional species for incidental take coverage. These additional species include federally listed fish species under the jurisdiction of the National Marine Fisheries Service (NMFS) and species listed as threatened or endangered under the State's Endangered Species Act. The proposed project would be covered by the Solano HCP therefore, measures from HCP would be used to mitigate impacts to covered species.

As required under the HCP, species-specific planning surveys would be conducted for all covered species and other special-status species potentially affected by the project. Compensatory mitigation for impacts to listed species and their habitats (as well as other HCP covered species), would be provided through payment of the appropriate fees required under the HCP. The mitigation

[14] LSA, 2012. Draft Solano Multispecies Habitat Conservation Plan. October.

measures identified above are consistent with the provisions of the HCP and would be implemented as part of the proposed project. Further, the project applicant, or designee, would comply with compensatory mitigation requirements of the HCP (**Mitigation Measure BIO-1 through Mitigation Measure BIO-25**), including the payment of development fees. Therefore, the proposed project would not conflict with the provisions of the HCP, and with incorporation of mitigation, this impact would be less than significant.

4.5 CULTURAL RESOURCES

	Potentially Significant Impact	Less Than Significant 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 formal cemeteries?	☐	☐	☐	☒

The analysis in this section is based on the *Extended Phase I Cultural Resources Evaluation* [15] prepared by Archeo-Tec (Cultural Resources Evaluation Report). This report is available in Appendix C.

*a. Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5? **(Less Than Significant with Mitigation Incorporated)***

For a cultural resource to be considered a historical resource (i.e., eligible for listing in the California Register of Historical Resources [CRHR]), it generally must be 50 years or older. Under CEQA, historical resources can include precontact (i.e., Native American) archaeological deposits, historic-period archaeological deposits, historic buildings, and historic districts.

To identify historical resources on the project site, the following tasks were completed: (1) a records search was conducted at the Northwest Information Center (NWIC) of the California Historical Resources Information System;[16] (2) relevant literature and historical maps were reviewed to assess the potential for buried historic-period and precontact Native American archaeological deposits; and (3) an archaeologist surveyed the project site to identify evidence of archaeological deposits. The results of these tasks are described in greater detail in a Cultural Resources Evaluation Report prepared for the project and are summarized below.[17]

No built-environment historical resources are at the project site. Two historic period resources, including elements of an early 20th century farmstead and mid-20th century irrigation system were identified on the Orr Parcel (APN 137-01-6); however, it was determined that these resources were not eligible for listing in the National Register of Historic Places (NRHP) or the CRHR under any criteria.

Although the Cultural Resource Evaluation did not yield historically significant resources, there is a possibility that the proposed project could impact as-yet-unrecorded, historic-period subsurface deposits associated with the farmstead on the parcel. If such deposits exist, they may consist of

15 Archeo-Tec. 2022. *Extended Phase I Cultural Resources Evaluation for the Vanden Cove Project.* July 22.

16 The NWIC is an affiliate of the State of California Office of Historic Preservation and is the official State repository of cultural resources records and reports for Solano County.

17 Archeo-Tec. 2022, op. cit.

trash pit, privy, or well features associated with structures dating to the early 20th century. Such features could qualify as significant cultural resources. With implementation of **Mitigation Measure CULT-1**, this impact would be less than significant.

Mitigation Measure CULT-1: **Archaeological Alert Sheet and Crew Training.** The project applicant, or designee, shall implement an Archaeological Alert Sheet and Crew Training Program to mitigate the impacts to archaeological resources. The Archaeological Alert Sheet and Crew Training should be prepared and performed prior to any ground-disturbing work at all locations within the project site. This Alert Sheet shall be distributed to all project personnel, including construction – crew and their supervisory personnel, the Project Design Team and the future contractor(s). The Alert Sheet shall contain information regarding potential archaeological resources and the actions to take in the case of inadvertent discovery of cultural resources, including contact protocol and avoidance and minimization measures.

Mitigation Measure CULT-2: **Initial Archaeological Monitoring.** Initial archaeological monitoring shall be completed for the northwest corner of the Orr parcel (APN 137-01-6) by a qualified archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology. This includes demolition-related excavation such as foundation removal, topsoil removal, mass excavation, utility trenching, and any other observable soil-disturbing impacts. Monitoring may be reduced to "spot checking" at the discretion of the Principal Investigator. Thereafter, mitigation would be limited to accidental discovery measures as outlined by the Alert Sheet and Training. Archaeological monitoring is not recommended for areas of the project site that lie outside of the farmstead footprint.

Mitigation Measure CULT-3: **Archaeological Discovery Protocol.** Consistent with Standard Condition of Approval (SCOA) 12, should an archaeological deposit be encountered during project subsurface construction activities, all ground-disturbing activities within 25 feet shall be redirected and a qualified archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology contacted to assess the situation, determine if the deposit qualifies as a historical resource, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. If the deposit is found to be significant (i.e., eligible for listing in the California Register of Historical Resources), the project applicant shall be responsible for funding and implementing appropriate mitigation measures. Mitigation measures may include recordation of the archaeological deposit, data recovery and analysis, and public

outreach regarding the scientific and cultural importance of the discovery. Upon completion of the selected mitigations, a report documenting methods and findings shall be prepared and submitted to the City's Community Development Director for review and approval, and the final report shall be submitted to the Northwest Information Center at Sonoma State University. Significant archaeological materials shall be submitted to an appropriate curation facility and used for public interpretive displays, as appropriate and in coordination with a local Native American tribal representative.

With implementation of **Mitigation Measures CULT-1 through CULT-3**, which require construction crew training in the identification of potential subsurface cultural resources, completion of archaeological monitoring for the northwest corner of the Orr parcel (APN 137-01-6), and work stoppage in the event of an archaeological discovery, potential impacts to archaeological historical resources would be reduced to a less than significant level with mitigation incorporated. **Mitigation Measure CULT-3** supplements and expands the City's SCOA 12, which addresses the treatment of archaeological remains and artifacts encountered during construction activities.

b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? ***(Less Than Significant with Mitigation Incorporated)***

Pursuant to *State CEQA Guidelines* Section 15064.5(c)(1), "When a project will impact an archaeological site, a lead agency shall first determine whether the site is an historical resource." Those archaeological sites that do not qualify as historical resources shall be assessed to determine if they qualify as "unique archaeological resources" pursuant to California Public Resources Code (PRC) Section 21083.2. **Mitigation Measures CULT-1 and CULT-2** require construction crew education and training in the identification of potential cultural resources that may be encountered during construction activities, and the completion of archaeological monitoring on a portion of the site that is deemed potentially sensitive for such resources. Archaeological deposits identified during project construction would be treated by the City and project applicant—in consultation with a qualified archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology—in accordance with **Mitigation Measure CULT-3.** With implementation of these mitigation measures, the project's potential impacts on archaeological resources would be less than significant.

c. Would the project disturb any humans remains, including those interred outside of formal cemeteries? ***(No Impact)***

There are no known human remains at the project site. In the event that human remains are identified during project construction, these remains would be treated in accordance with Section 7050.5 of the California Health and Safety Code and Section 5097.98 of the Public Resources Code, (PRC) as appropriate.

Section 7050.5 of the California Health and Safety Code states that, in the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be

no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the remains are discovered has determined whether or not the remains are subject to the coroner's authority. If the human remains are of Native American origin, the coroner must notify the California Native American Heritage Commission (NAHC) within 24 hours of this identification. The NAHC will identify a Native American Most Likely Descendant (MLD) to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods.

Section 5097.98 of the PRC states that the NAHC, upon notification of the discovery of Native American human remains pursuant to Health and Safety Code Section 7050.5, shall immediately notify those persons (i.e., the MLD) it believes to be descended from the deceased. With permission of the landowner or a designated representative, the MLD may inspect the remains and any associated cultural materials and make recommendations for treatment or disposition of the remains and associated grave goods. The MLD shall provide recommendations or preferences for treatment of the remains and associated cultural materials within 48 hours of being granted access to the site. With these regulations in place, no impact on human remains is anticipated, and no mitigation is necessary.

4.6 ENERGY

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Result in a 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?	☐	☐	☒	☐

The following section describes the potential impacts regarding energy resources that could result from implementation of the proposed project and is based on *Air Quality, Greenhouse Gas, and Energy Technical Report for the Vanden Estates Project.*[18] This report is included as Appendix A.

*a. Would the project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation? **(Less Than Significant Impact)***

The proposed project would increase the demand for energy through day-to-day operations and fuel consumption associated with project construction. This section discusses energy use resulting from implementation of the proposed project and evaluates whether the proposed project would result in the wasteful, inefficient, or unnecessary consumption of energy resources or conflict with any applicable plans for renewable energy and energy efficiency.

Construction Energy Use. Construction of the proposed project would require energy for activities such as the manufacture and transportation of building materials, grading activities, and building construction. Construction of the proposed project would require electricity to power construction-related equipment. Construction of the proposed project would not involve the consumption of natural gas.

Transportation energy represents the largest energy use during construction and would occur from the transport and use of construction equipment, delivery vehicles and haul trucks, and construction worker vehicles that would use petroleum fuels (e.g., diesel fuel and/or gasoline). Therefore, the analysis of energy use during construction focuses on fuel consumption. Construction trucks and vendor trucks hauling materials to and from the project site would be anticipated to use diesel fuel, whereas construction workers traveling to and from the project site would be anticipated to use gasoline-powered vehicles. Fuel consumption from transportation uses depends on the type and number of trips, vehicle miles traveled (VMT), the fuel efficiency of the vehicles, and the travel mode.

[18] Ramboll, 2022. *Air Quality, Greenhouse Gas, and Energy Technical Report for the Vanden Estates Project*. July.

Estimates of fuel consumption (diesel fuel and gasoline) from construction equipment, construction trucks, and construction worker vehicles were based on default construction equipment assumptions and trip estimates from the California Emissions Estimator Model (CalEEMod) and fuel efficiencies from EMFAC2021. For the purposes of the energy analysis, all construction equipment was assumed to be diesel-fueled;[19] electricity- or gasoline-fueled equipment would not be expected to substantially affect energy resource demands. Fuel consumption rates in gallons per horsepower-hour (gal/hp-hr) were calculated from California Air Resources Board's (CARB) 2017 Off-road Diesel Emission Factors database.[20]

Fuel consumption estimates are presented in Table 4.6.A.

Table 4.6.A: Proposed Project Construction Energy Usage

Energy Use Type[1, 2]	Gasoline (gallons)	Diesel (gallons)	Natural Gas (MMBtu)	Electricity (MWh)
Off-Road Construction Equipment (2023)	--	86,644	--	--
On-Road Construction Trips (2023)	1,043	478	0.48	0.25
Off-Road Construction Equipment (2024)	--	59,930	--	--
On-Road Construction Trips (2024)	5,158	1,808	0.25	1.23
Off-Road Construction Equipment (2025)	--	60,382	--	--
On-Road Construction Trips (2025)	3,284	1,126	0.22	0.99
Total Usage	**9,485**	**210,368**	**0.94**	**2.47**

Source: Ramboll (July 2022).
Notes:
1 On-road mobile source fuel use is based on vehicle miles traveled (VMT) for all years of construction and fleet-average fuel consumption in gallons per mile from EMFAC2021 for calendar years 2023 through 2025 in Solano County.
2 Off-road diesel fuel usage based on a fuel usage rate of 0.057 gallons of diesel per horsepower (hp)-hour for equipment up to 100 HP and 0.052 gallons of diesel per horsepower (hp)-hour for equipment greater than 100 HP, consistent with diesel conversion factors provided in CARB 2017 Off-road Diesel Emission Factors database.
MMBtu = metric million British Thermal Unit
MWh = megawatt hour

Total energy consumption would occur over different calendar years and would fluctuate depending on the type of construction activity underway during any particular time period. Construction is expected to take place in 2023 through 2025 for the proposed project. Gasoline and diesel fuel would be the primary energy source for vehicles driven by construction crews and to power the large trucks used to deliver and retrieve construction equipment, materials, and debris. Total gasoline and diesel fuel usage by the transportation sector in Solano County was 169 million gallons and 54 million gallons, respectively, in 2020. Proposed construction fuel usage would represent approximately 0.1 percent of the County's transportation sector diesel and gasoline fuel usage. Off-road construction equipment also consumes fuel while idling.

19 While renewable diesel would be used when feasible, the emission calculations assumed that conventional diesel fuel would be used to be conservative.
20 CARB. 2022. 2017 Off-road Diesel Emission Factors. Website: https://arb.ca.gov/emfac/emissions-inventory (accessed September 2022).

CARB implemented The Airborne Toxic Control Measure (ATCM) to Limit Diesel-Fueled Commercial Motor Vehicle Idling, which limits idling to 5 minutes at any one location to save fuel as CARB estimated that heavy-duty vehicles (off-road equipment) can consume up to one gallon of diesel fuel per hour of idling, which can total to 1,500 gallons of diesel fuel per year per vehicle. By implementing this rule, idling is greatly reduced, and the use of diesel fuel is reduced. The proposed project would comply with this ATCM, which has led to fuel savings of approximately 121 million gallons per year Statewide since full implementation.

As such, project construction would have a negligible effect on local and regional energy supplies. Furthermore, impacts related to energy use during construction would be temporary and relatively small in comparison to Solano County's overall use of the State's available energy resources. No unusual project characteristics would necessitate the use of construction equipment that would be less energy efficient than at comparable construction sites in the region or the State. In addition, construction activities are not anticipated to result in an inefficient use of energy as gasoline and diesel fuel would be supplied by construction contractors who would conserve the use of their supplies to minimize their costs on the project. The project would not cause or result in the need for additional energy facilities or an additional or expanded delivery system. For these reasons, fuel consumption during construction would not be inefficient, wasteful, or unnecessary and this impact would be less than significant.

Operational Energy Use. Operational energy use associated with the proposed project operations would require long-term consumption of energy in the form of electricity, natural gas, gasoline, and diesel fuel. The electricity, natural gas, and water usage that would be required for operation of the proposed buildings have been estimated based on project specific building area estimates, 2019 Title 24 requirements, and CalEEMod default assumptions. Electricity would be used as the primary power source for the proposed residential units, including to operate the heating, ventilation, and air conditioning (HVAC) systems. In addition, water use for buildings would require the consumption of electricity to supply and distribute potable water to the buildings and to treat wastewater generated at the buildings. Natural gas use for the buildings would primarily be associated with cooking and hearths.

The proposed project would be required to comply with the following Standard Condition of Approval (SCOA) required for all design permits, use permits, and planned developments, and subdivision maps:

> ***SCOA 79:*** The State of California requires that prescriptive energy standards be met or energy calculations be submitted to the Building Official for all new construction and when conditioned space volume is increased in an existing facility. The energy design shall meet the current State adopted residential and nonresidential standards of the California Energy Commission.

Mobile fuel usage was evaluated using CalEEMod default trip lengths and trip types. Gasoline, diesel, natural gas, and electricity use rates were calculated based on CalEEMod default trip rates and trip lengths and fuel efficiency rates derived from EMFAC2021 and the U.S. Department of Energy. Fuel efficiency for gasoline, diesel, and natural gas fueled vehicles was calculated from EMFAC2021 daily VMT and fuel consumption data, averaged across all vehicle categories for

operational year 2025. Fuel efficiency for electric vehicles was obtained from U.S. Department of Energy data. In addition, electricity demand for electric vehicles is based on VMT estimated for the proposed project and estimated electric vehicle (EV) energy economy (in kilowatt-hours [kWh] per mile), assuming 30 kWh per 100 miles for the proposed project. This is a conservative assumption as EV fuel efficiency is expected to increase in future years, resulting in decreased electricity demand.[21]

Electricity, natural gas, and fuel usage estimates associated with the proposed project are shown in Table 4.6.B.

Table 4.6.B: Proposed Project Operational Energy Usage

Energy Use Type	Gasoline (gallons)	Diesel (gallons)	Natural Gas (MMBtu)	Electricity (MWh)
Building Electricity Consumed	--	--	--	893
Building Electricity Generated	--	--	--	893
Building Natural Gas	--	--	3,036	--
Mobile Sources	131,228	291	--	52
Water and Wastewater	--	--	--	57
Landscaping	--	135	--	--
Hearth	--	--	1,144	--
Total Usage	**131,228**	**426**	**4,180**	**108**

Source: Ramboll (July 2022).
Note: Building electricity as shown represents the annual average electricity consumption. However, 2019 Title 24 requires low-rise residences to produce as much on-site renewable electricity as they consume, so the net electricity use in this category is expected to be zero on an annual basis.
MMBtu = metric million British Thermal Unit
MWh = megawatt hour

Based on the energy use analysis, the proposed project operational fuel consumption would represent an increase relative to the existing site; however, the proposed project would implement measures to reduce energy consumption such as energy efficient lighting and building design and rooftop solar panels. In addition, in 2020 the total generated electricity for Solano County was 3,321 gigawatt hours (GWh).[22] The California Energy Commission (CEC) estimates that statewide energy demand will increase to 321,300 GWh in 2030 based on the mid baseline forecast.[23] As shown in Table 4.6.B, the proposed project's anticipated long-term operational electricity usage is approximately 108 megawatt hours (MWh) per year. This small increase represents less than 0.004 percent of the total 2020 Solano County electricity usage.

As shown in Table 4.6.B, the proposed project's annual operational natural gas consumption is estimated to be approximately 4,180 metric million British Thermal Unit (MMBtu). In comparison,

[21] U.S. Department of Energy (DOE). Fuel Economy Guide. Electric. Website: https://www.fueleconomy.gov/feg/evsbs.shtml (accessed September 2022).

[22] CEC. 2020a. *Electricity Consumption by County*. Website: http://www.ecdms.energy.ca.gov/elecbycounty.aspx (accessed September 2022).

[23] CEC. 2020b. Final 2019 Integrated Energy Policy Report. Docketed February 2020. Website: https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2019-integrated-energy-policy-report/2019-iepr (accessed September 2022).

Solano County natural gas demand was 2,173,561.7 MMBtu in 2020.[24] The increase in natural gas usage associated with operation of the proposed project is less than 0.2 percent of Solano County natural gas consumption.

Electrical and natural gas demand associated with project operations would not be considered inefficient, wasteful, or unnecessary in comparison to other similar developments in the region. Furthermore, the proposed project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency. The project would be required to adhere to all federal, State, and local requirements for energy efficiency, including the Title 24 standards. Title 24 building energy efficiency standards establish minimum efficiency standards related to various building features, including appliances, water and space heating and cooling equipment, building insulation and roofing, and lighting, which would reduce energy usage.

In addition, as identified in Table 4.6.B, it is estimated that the proposed project would generate an increase in consumption of diesel fuel of 426 gallons per year and an increase of gasoline of 131,228 gallons per year. This increase is less than 0.001 percent of 2020 Solano County diesel consumption and less than 0.08 percent of 2020 Solano County gasoline consumption. In future years as the fleet becomes more electrified, this consumption is anticipated to decrease, and electricity consumption will increase.

Based on this analysis, the proposed project is not expected result in the wasteful, inefficient, or unnecessary consumption of fuel or energy, and the proposed project avoids wasteful, inefficient, or unnecessary consumption of fuel or energy. As a result, impacts would be less than significant.

*b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency? **(Less Than Significant Impact)***

Discussion of whether construction and operation of the proposed project would result in a conflict with adopted energy conservation plans or violate energy efficiency standards are discussed below relative to construction vehicles and equipment, building efficiency, and transportation.

Construction Vehicles and Equipment. Construction of the proposed project would require use of on-road trucks for soil and debris hauling and material deliveries, and off-road equipment such as excavators, cranes, forklifts, and pavers. The proposed project would comply with State and local requirements designed to minimize idling and associated emissions, which also minimizes use of fuel. In accordance with YSAQMD's Construction Equipment Exhaust Mitigation, mitigation of construction equipment may include idling times for heavy duty trucks and vehicles limited to a maximum of 5 minutes. In accordance with CARB emissions standards, all construction equipment with a model year of 2012 or later would comply with the engine standards of 13 California Code of Regulations Section 2449.

Building Efficiency. The proposed project's anticipated electricity and natural gas use in buildings are shown in Table 4.6.B above. In addition, as discussed above, new building construction is subject

[24] CEC. 2020c. 2020 Gas Consumption by County. Website: http://www.ecdms.energy.ca.gov/gasbycounty.aspx (accessed September 2022).

to California's Title 24, which reduces energy use in residential and commercial buildings through progressive updates to both the Green Building Standards Code (Title 24, Part 11) and the Energy Efficiency Standards (Title 24, Part 6). Provisions added to Title 24 over the years include consideration and possible incorporation of new energy efficiency technologies and methods for building features such as space conditioning, water heating, lighting, as well as construction waste diversion goals. Additionally, some standards focus on larger energy saving concepts such as reducing loads at peak periods and seasons, improving the quality of energy-saving installations, and performing energy system inspections. Past updates to the Title 24 standards have proven very effective in reducing building energy use, with the 2013 update to the energy efficiency standards estimated to reduce energy consumption in residential buildings by 25 percent and energy consumption in commercial buildings by 30 percent, relative to the 2008 standards.

Transportation. The proposed project's anticipated transportation fuel usage is shown in Table 4.6.B above. As mentioned previously, fuel efficiency continues to improve over time and helps reduce fuel usage.

Based on the above analysis, the proposed project is expected to have a less than significant impact related to conflicts with adopted energy conservation plans or violations with energy efficiency standards.

4.7 GEOLOGY AND SOILS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special 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 or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
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 waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

Unless otherwise noted, the following analysis is based on the Geotechnical Investigation prepared for the proposed project by TRC dated February 23, 2022.[25] A copy of the Geotechnical Investigation is included in Appendix D of this report.

a. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. ***(Less Than Significant Impact)***

The San Francisco Bay Area is one of the most seismically active regions in the United States. The significant earthquakes that occur in the Bay Area are generally associated with crustal movement along well-defined active fault zones of the San Andreas Fault system, which regionally trend in a northwesterly direction. Fault rupture is generally expected to occur along

[25] TRC. 2022. *Geotechnical Investigation, Vanden Road Residential Development.* February 23.

active fault traces that have exhibited signs of recent geological movement (i.e., within the last 11,000 years).

Alquist-Priolo Earthquake Fault Zones delineate areas around active faults with potential surface fault rupture hazards that would require specific geological investigations prior to approval of certain kinds of development within the delineated area. The site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone. The nearest known active fault is the Rio Vista Fault, which is located approximately 1.5 miles southwest of the project site. The potentially active Great Valley Thrust Fault is located about 1.5 miles west of the site. Therefore, fault rupture through the site is not anticipated and the proposed project would not directly or indirectly cause substantial adverse effects related to fault rupture, and this impact would be less than significant.

ii. Strong seismic ground shaking? ***(Less Than Significant Impact)***

Due to the location of the project site in a seismically active area, strong seismic ground shaking at the site is highly probable during the life of the project. The intensity of ground shaking would depend on the characteristics of the fault, distance from the fault, the earthquake magnitude and duration, and site-specific geologic conditions. The Geotechnical Investigation completed for the proposed project includes design recommendations to manage potential concerns associated with strong seismic shaking and conformance with the California Building Code (CBC) would ensure potential impacts associated with strong seismic ground shaking would be reduced to a less than significant level. Additionally, the proposed project would be required to comply with the following Standard Conditions of Approval (SCOAs) required for all design permits, use permits, and planned developments that address geotechnical and seismic concerns:

> ***SCOA 104:*** Developer shall prepare and submit to the City Engineer a Geotechnical Investigation Report prepared by a Civil Engineer or Geotechnical Engineer, licensed in the State of California, to be used in the preparation of the grading plan. The Geotechnical Investigation Report shall provide recommendations for all grading and remediation work. The Developer shall comply with the recommendations of the Geotechnical Investigation Report and any additional requirements deemed necessary by the City Engineer and Chief Building Official.
>
> ***SCOA 105:*** A grading, geotechnical, and erosion control plan shall be submitted concurrently with the Final Map and Improvement Plans. Plans shall show any effect on adjacent properties.
>
> ***SCOA 106:*** For projects with greater than 5,000 cubic yards of grading, grading plans shall be prepared by a Civil Engineer licensed by the State of California in accordance with Appendix Chapter 33 of the California Building Standards Code and Section 11 of the Standard Specifications. The plans shall be accompanied by a Soils Report prepared, signed, and wet-stamped by a geotechnical engineer licensed by the State of California, and shall be submitted to the City Engineer for concurrent review with the Improvement Plans and Final Map.

With implementation of these SCOAs, conformance with the CBC and implementation of the design recommendations in the Geotechnical Investigation, impacts related to seismic ground shaking would be less than significant.

iii. Seismic-related ground failure, including liquefaction? ***(Less Than Significant Impact)***

Soil liquefaction is a phenomenon primarily associated with saturated soil layers located close to the ground surface. During ground shaking, these soils lose strength and acquire "mobility" sufficient to permit both horizontal and vertical movements. Soils most susceptible to liquefaction are loose to moderately dense, saturated, non-cohesive soils with poor drainage, such as sands and silts with interbedded or capping layers of relatively low permeability soil. However, loose sands that contain a significant amount of fines (i.e., silt and clay) may also liquefy.

Lateral spreading typically occurs as a form of horizontal displacement of relatively flat-lying alluvial material toward an open or "free" face such as an open body of water, channel, or excavation. In soils this movement is generally due to failure along a weak plane and may often be associated with liquefaction. As cracks develop within the weakened material, blocks of soil displace laterally towards the open face. Cracking and lateral movement may gradually propagate away from the face as blocks continue to break free. Generally, failure in this mode is analytically unpredictable since it is difficult to evaluate where the first tension crack will occur.

The project site is partially located within an area zoned by the State of California as having potential for seismically induced liquefaction hazards. Based on results of soil testing, the project site has sand and silt layers between the depths of approximately 15.5 to 47 feet that have the potential to liquefy, resulting in approximately 1-inch to 2-inches of total settlement in the upper 50 feet, with differential settlements from liquefaction on the order of 1-inch in a horizontal distance of 50 feet. Given the depth and non-continuous potentially liquefiable soil layers, the probability of lateral spreading occurring at the site during a seismic event is low. The Geotechnical Investigation includes recommendations to ensure the proposed improvements are designed to accommodate the potential seismic and static settlements including the use and proper design of post-tensioned mat foundations. Additionally, the proposed project would be required to conform with the CBC and **SCOAs 104 through 106** (discussed in Section 4.7.a.ii). With implementation of the SCOAs, conformance with the CBC and implementation of the design recommendations in the Geotechnical Investigation, impacts related to seismic-related ground failure and liquefaction would be less than significant.

iv. Landslides? ***(Less Than Significant Impact)***

The project site is located in an area described as flatland by the United States Geological Survey (USGS) with no steeply sloped areas in the nearby vicinity of the project site that are susceptible to landslides.[26] Therefore, the potential of the proposed project to exposure people or structures to risk as a result of landslides would be less than significant.

[26] City of Vacaville. 2015. *Vacaville General Plan – Safety Element*.

b. Would the project result in substantial soil erosion or the loss of topsoil? ***(Less Than Significant Impact with Mitigation Incorporated)***

Topsoil is defined as the upper part of the soil profile that is relatively rich in humus and is technically known as the A-horizon of the soil profile.[27] Grading and earthmoving during project construction has the potential to result in erosion and loss of topsoil. Exposed soils could be entrained in stormwater runoff and transported off the project site. However, this impact would be reduced to a less than significant level through **Mitigation Measure WQ-1**, which includes preparation of a Stormwater Pollution Prevention Plan (SWPPP) (refer to Section 4.10, Hydrology and Water Quality). Although designed primarily to protect stormwater quality, the SWPPP would incorporate Best Management Practices (BMPs) to minimize erosion. Additional details regarding the SWPPP are provided in Section 4.10 of this Initial Study. With incorporation of **Mitigation Measure WQ-1**, impacts from the project would result in a less than significant impact.

c. Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? ***(Less Than Significant Impact)***

As part of the Geotechnical Investigation, four hollow-steam auger exploratory borings were drilled to depths ranging from approximately 30 to 35 feet and three Cone Penetration Tests (CPTs) were advanced to depths from 50 to 95.5 feet to determine subsurface conditions at the project site. In general, the borings encountered stiff to hard fat clay to a depth of approximately 4.5 feet, underlain by interbedded layers of medium stiff to hard lean clay, and medium stiff sandy lean clay to depths ranging from approximately 16.5 to 21.5 feet. Below the depths of 16.5 to 21.5 feet, the borings encountered interbedded layers of medium dense to dense clayey sand and medium dense poorly graded sand with clay, and very stiff to hard clay to depths ranging from 30 to 35 feet. Soils inferred in the CPTs were interpreted to include interbedded layers of clay, silty clay, clayey silt, sandy silt, and sand to a depth of 95.5 feet, the maximum depth explored.

As discussed in Section 4.7.a, site soils would not likely be subject to lateral spreading or landslides, but could be subject to liquefaction. However, implementation of **SCOAs 104 through 106** (discussed in Section 4.7.a.ii), conformance with the CBC, and implementation of the design recommendations in the Geotechnical Investigation would ensure that potential risks to people and structures as a result of liquefaction would be reduced to a less-than-significant level.

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)***

Expansive soils are characterized by the potential for shrinking and swelling as the moisture content of the soil decreases and increases, respectively. Shrink-swell potential is influenced by the amount and type of clay minerals present and can be measured by the percent change of the soil volume.

[27] California State Mining and Geology Board. 2014. Surface Mining Reclamation Act Regulations. California Code of Regulations, Title 14, Division 2, Chapter 8, Subchapter 1.

Testing at the project site indicates that near surface soils on the project site have high expansion potential.

The Geotechnical Investigation includes recommendations to reduce the potential for damage to the proposed project buildings and associated improvements due to the presence of highly expansive surficial soils, such as the use of slabs-on-grade, installation of sufficient reinforcement for any flatwork, and use of non-expansive fill. Additionally, the proposed project would be required to conform with the CBC and **SCOAs 104 through 106** (discussed in Section 4.7.a.ii). With implementation of the SCOAs, conformance with the CBC, and implementation of the design recommendations in the Geotechnical Investigation, impacts related to expansive soils would be less than significant.

e. Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water? ***(No Impact)***

The proposed project would connect to the City's wastewater conveyance system. On-site treatment and disposal of wastewater are not proposed for the project; therefore, the proposed project would have no impacts associated with soils incapable of supporting alternative wastewater disposal systems.

f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? ***(Less Than Significant with Mitigation Incorporated)***

Although no paleontological resources or unique geological features are known to exist within or near the project site, the proposed project would require ground disturbance to a depth of up to 12 feet below ground surface for individual house foundations and excavation to a depth of 8 to 12 feet below ground surface for proposed joint utilities. The possibility of accidental discovery of paleontological resources during project construction cannot be discounted and the following mitigation measure shall be incorporated.

Mitigation Measure GEO-1: Should paleontological resources be encountered during project subsurface construction activities, all ground-disturbing activities within 25 feet shall be redirected and a qualified paleontologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. For purposes of this mitigation, a "qualified paleontologist" shall be an individual with the following qualifications: (1) a graduate degree in paleontology or geology and/or a person with a demonstrated publication record in peer-reviewed paleontological journals; (2) at least two years of professional experience related to paleontology; (3) proficiency in recognizing fossils in the field and determining their significance; (4) expertise in local geology, stratigraphy, and biostratigraphy; and (5) experience collecting vertebrate fossils in the field. If the paleontological resources are found to be significant and project activities cannot

avoid them, measures shall be implemented to ensure that the project does not cause a substantial adverse change in the significance of the paleontological resource. Measures may include monitoring, recording the fossil locality, data recovery and analysis, a final report, and accessioning the fossil material and technical report to a paleontological repository. Upon completion of the assessment, a report documenting methods, findings, and recommendations shall be prepared and submitted to the City for review. If paleontological materials are recovered, this report also shall be submitted to a paleontological repository such as the University of California Museum of Paleontology, along with significant paleontological materials. Public educational outreach may also be appropriate.

The project applicant shall inform its contractor(s) of the sensitivity of the project site for paleontological resources and shall verify that the following directive has been included in the appropriate contract documents:

> *"The subsurface of the construction site may be sensitive for fossils. If fossils are encountered during project subsurface construction, all ground-disturbing activities within 25 feet shall be redirected and a qualified paleontologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. Project personnel shall not collect or move any paleontological materials. Fossils can include plants and animals, and such trace fossil evidence of past life as tracks or plant imprints. Ancient marine sediments may contain invertebrate fossils such as snails, clam and oyster shells, sponges, and protozoa; and vertebrate fossils such as fish, whale, and sea lion bones. Contractor acknowledges and understands that excavation or removal of paleontological material is prohibited by law and constitutes a misdemeanor under California Public Resources Code, Section 5097.5."*

Therefore, implementation of **Mitigation Measure GEO-1**, would reduce potential impacts to paleontological resources to a less than significant level.

4.8 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?	☐	☐	☒	☐

Greenhouse gases (GHGs) are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced global climate change are:

- Carbon dioxide (CO_2);
- Methane (CH_4);
- Nitrous oxide (N_2O);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Sulfur Hexafluoride (SF_6).

Over the last 200 years, humans have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere and enhancing the natural greenhouse effect, believed to be causing global warming. While manmade GHGs include naturally occurring GHGs such as CO_2, methane, and N_2O, some gases, like HFCs, PFCs, and SF_6 are completely new to the atmosphere.

Certain gases, such as water vapor, are short-lived in the atmosphere. Others remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is excluded from the list of GHGs above because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

These gases vary considerably in terms of Global Warming Potential (GWP), a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to CO_2, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of pounds or tons of "CO_2 equivalents" (CO_2e).

The following section is based on *Air Quality, Greenhouse Gas, and Energy Technical Report for the Vanden Estates Project.*[28] This report is included as Appendix A.

a. Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? ***(Less Than Significant Impact)***

Section 15064.4 of the *State CEQA Guidelines* states "A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project." In performing that analysis, the lead agency has discretion to determine whether to use a model or methodology to quantify GHG emissions, or to rely on a qualitative analysis or performance-based standards. In making a determination as to the significance of potential impacts, the lead agency then considers the extent to which the project may increase or reduce GHG emissions compared to the existing environmental setting, whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project, and the extent to which the project complies with regulations or requirements adopted to implement a Statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

Therefore, consistent with the *State CEQA Guidelines*, Section 15183.5, if a project is consistent with an adopted qualified Greenhouse Gas Reduction Strategy that meets the standards, it can be presumed that the project would not have significant GHG emission impacts. The City of Vacaville Energy and Conservation Action Strategy (ECAS), adopted in 2021, meets the requirements of *State CEQA Guidelines*, Section 15183.5; therefore, the proposed project is evaluated for consistency with the City's ECAS. The ECAS includes a range of GHG reduction measures, implementation of which would enable the City to meet its 2035 GHG emissions reduction target. The project's consistency with the ECAS is evaluated in Table 4.6.C below.

Table 4.6.C: Proposed Project Consistency with the ECAS

ECAS Action	Descriptions	Consistency
Transportation and Land Use		
LU-1	**Continue Telecommuting.** Encourage telecommuting. The City's goal is to have half of eligible employees telecommuting three days a week.	**Not applicable.** The project does not include employment land uses.
LU-2	**Improve Capacity for Electric Vehicles.** The City requires that all new multifamily, retail, and office developments provide 15% of required parking spaces as EV ready and 15% of required parking spaces with EV chargers. The cost of charging must be priced to provide energy and maintain the chargers. These standards will also be required for new City managed parking lots and may be adjusted if demand for EV charging increases.	**Not applicable.** The project is not a multifamily development project and does not include new parking lots.
LU-3	**Implement Transportation Demand Management for New Development.** New projects subject to CEQA	**Consistent.** A transportation demand management program

[28] Ramboll. 2022. *Air Quality, Greenhouse Gas, and Energy Technical Report for the Vanden Estates Project*. July.

Table 4.6.C: Proposed Project Consistency with the ECAS

ECAS Action	Descriptions	Consistency
	review must develop and implement transportation demand management programs. Residential developments will separate parking from leases and charge for off-street parking. Lease holders will also provide transit subsidies and carpool incentives to employees. The City will establish paid on-street and permit parking. Retail, office, and industrial projects will also offer employees cash out programs, where they can receive the cost of their parking spot in cash if they choose not to use it; a 50% transit subsidy; and a $100 per month carpool incentive.	would be implemented. Leasing is not expected as part of the project.
LU-4	**Implement Transportation Demand Management for Existing Development.** Businesses in Vacaville with more than 15 employees are required to offer cash out and commute market reductions.	**Not applicable**. The project does not include employment land uses.
LU-5	**Improve Bus Electrification.** All urban buses should be replaced by electric buses by 2035.	**Not applicable.** This measure applies to the City, not individual residential projects.
LU-6	**Improve City Fleet.** The City will inventory publicly owned vehicles and equipment and identify vehicles that will be phased out before 2030 and can be replaced with more fuel-efficient models. City will develop fuel economy standards for each type of vehicle.	**Not applicable.** This measure applies to the City, not individual residential projects.
LU-7	**Increase Land Use Diversification**. Reducing car trips by creating mixed neighborhoods where daily activities are within a quarter mile of residences. Increasing density to maximize the number of people who have access to these uses.	**Not consistent.** The project is a single-family housing development.
LU-8	**Transit Oriented Development.** Implement traffic calming and discourage excessive parking. Provide affordable housing near transit. The city will explore increasing the number of homes and jobs within a quarter mile of high-quality transit.	**Not consistent**. No public transportation currently serves this area.
Energy		
E-1	**Become a Marine Clean Energy (MCE) Member Community.** Join a community choice energy provider to provide cleaner energy. MCE is an option that offers customers 60% and 100% renewable options for energy consumption.	**Not applicable.** PG&E would provide natural gas and electricity for the project. However, future residents may elect to join a community choice provider.
E-2	**Require Energy Audits for Sales of Existing Residential Units.** All residential units are required to provide an energy audit as part of their closing documents and to advertise the benefits of energy audits to all residents. Exemptions can be made for homes built within the last 10 years in order to reduce unnecessary costs.	**Not applicable**. This measure applies to existing buildings that do not meet the latest building efficiency standards, not new construction.
E-3	**Adopt an All-Electric New Construction Preferred Ordinance.** The City will adopt an all-electric ordinance and enforce it through building inspections. Special exceptions will be made for industrial, hospital, and	**Not applicable.** The City has not adopted an all-electric ordinance at the time of this writing.

Table 4.6.C: Proposed Project Consistency with the ECAS

ECAS Action	Descriptions	Consistency
	similar uses that demonstrate there is no viable electrification option for important equipment due to technological constraints.	
E-4	**Develop an Existing Building Electrification Plan.** Phase out natural gas in existing buildings by incentivizing residents to replace existing natural gas appliances, such as stoves and water heaters, with efficient electric options.	**Not applicable**. No existing buildings are included as part of the project.
Solid Waste		
S-1	**Implement Organic Waste Reduction Requirements.** Reduce organics to 50% below 2014 levels by 2020 and 75% below 2014 levels by 2025 through organics collection programs, contamination monitoring, education and outreach, enforcement and penalties, edible food recovery programs, organics self-haul programs, ordinances and policy changes, procurement of recovered organic materials and more.	**Not applicable.** This measure applies to the City, not individual residential projects.
Off Road Equipment		
O-1	**Increase Renewable and Alternative Fuel for Construction.** Holistically reduce the emissions from construction equipment in Vacaville. The City will revise its construction bid process so that to be eligible for City construction contracts, a bidder must submit documentation that their fleet will reduce conventional fuel use by 20% by 2035.	**Consistent**. The project would use renewable diesel to the extent feasible.
Carbon Sequestration		
C-1	**Plant Trees.** Create a more all-encompassing push to add to both City-owned trees and trees on private property. Strategically place trees in line with buildings and sunlight so as to shade buildings and reduce the need to heat and cool buildings. The City's goal is to plant at least 10,000 trees through initiatives such as street tree planting programs on major streets where there are major gaps, shading requirements for commercial and residential projects, and providing trees to residents.	**Consistent.** Approximately 100 street trees and yard trees would be planted as part of the project.
C-2	**Farm Carbon.** Apply compost to public greenspaces to allow more carbon to be held by the soil. 4.57MT CO_2e is anticipated to be reduced by 2035 for every acre of land spread with compost.	**Not applicable.** This measure applies to the City, not individual residential projects.

Source: Ramboll (July 2022).
Note: Not applicable refers to measures that are not relevant to new development and measures not within the project applicant's control.
ECAS = City of Vacaville General Plan and Energy and Conservation Action Strategy

As shown in Table 4.6.C, the proposed project is consistent with most aspects of the City of Vacaville ECAS. Because many aspects of the project's emissions inventory would benefit from further regulatory and technological advancements, the project is not expected to obstruct the attainment

of the State's long-term GHG reduction goal for 2050. Therefore, the proposed project would be consistent with the City's ECAS and would not generate GHG emissions that may have a significant effect on the environment. Therefore, impacts would be less than significant.

b. 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 Impact)***

The following discussion evaluates the proposed project according to the goals of Assembly Bill (AB) 32, the AB 32 Scoping Plan, Executive Order (EO) B-30-15, Senate Bill (SB) 32, and AB 197.

AB 32 is aimed at reducing GHG emissions to 1990 levels by 2020. AB 32 requires the CARB to prepare a Scoping Plan that outlines the main State strategies for meeting the 2020 deadline and to reduce GHGs that contribute to global climate change. The AB 32 Scoping Plan has a range of GHG reduction actions, which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 implementation fee to fund the program.

EO B-30-15 added the immediate target of reducing GHG emissions to 40 percent below 1990 levels by 2030. CARB released a second update to the Scoping Plan, the 2017 Scoping Plan,[29] to reflect the 2030 target set by EO B-30-15 and codified by SB 32. SB 32 affirms the importance of addressing climate change by codifying into statute the GHG emissions reductions target of at least 40 percent below 1990 levels by 2030 contained in EO B-30-15. SB 32 builds on AB 32 and keeps California on the path toward achieving the State's 2050 objective of reducing emissions to 80 percent below 1990 levels. The companion bill to SB 32, AB 197, provides additional direction to the CARB related to the adoption of strategies to reduce GHG emissions. Additional direction in AB 197 intended to provide easier public access to air emissions data that are collected by CARB was posted in December 2016.

In addition, the Draft 2022 Scoping Plan Update[30] assesses progress toward the statutory 2030 target, while laying out a path to achieving carbon neutrality no later than 2045. The 2022 Scoping Plan Update focuses on outcomes needed to achieve carbon neutrality by assessing paths for clean technology, energy deployment, natural and working lands, and others, and is designed to meet the State's long-term climate objectives and support a range of economic, environmental, energy security, environmental justice, and public health priorities.

The Scoping Plan contains GHG reduction measures that work towards reducing GHG emissions, consistent with the targets set by AB 32, EO B-30-15 and codified by SB 32 and AB 197. The measures applicable to the proposed project include energy efficiency measures, water conservation and efficiency measures, and transportation and motor vehicle measures, as discussed below.

29 California Air Resources Board (CARB). 2017. *California's 2017 Climate Change Scoping Plan*. November.

30 CARB. 2021. *Draft 2022 Scoping Plan Update*. May 10. Website: https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp.pdf (accessed August 2022).

Energy efficiency measures are intended to maximize energy efficiency building and appliance standards, pursue additional efficiency efforts including new technologies and new policy and implementation mechanisms, and pursue comparable investment in energy efficiency from all retail providers of electricity in California. In addition, these measures are designed to expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings. As discussed above, the proposed project would comply with the California Green Building Standards Code (CALGreen Code) regarding energy conservation and green building standards. Therefore, the proposed project would comply with applicable energy measures.

Water conservation and efficiency measures are intended to continue efficiency programs and use cleaner energy sources to move and treat water. Increasing the efficiency of water transport and reducing water use would reduce GHG emissions. As noted above, the project would comply with the CALGreen Code, which includes a variety of different measures, including reduction of wastewater and water use. In addition, the proposed project would be required to comply with the California Model Water Efficient Landscape Ordinance. Therefore, the proposed project would not conflict with any of the water conservation and efficiency measures.

The goal of transportation and motor vehicle measures is to develop regional GHG emissions reduction targets for passenger vehicles. Specific regional emission targets for transportation emissions would not directly apply to the proposed project. The second phase of Pavley standards will reduce GHG emissions from new cars by 34 percent from 2016 levels by 2025. Vehicles traveling to the project site would comply with the Pavley II (LEV III) Advanced Clean Cars Program. Therefore, the proposed project would not conflict with the identified transportation and motor vehicle measures.

The proposed project would comply with existing State regulations adopted to achieve the overall GHG emissions reduction goals identified in AB 32 and SB 32. In addition, as described above, the proposed project would be consistent with the City's ECAS. Therefore, the proposed project would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the GHG emissions. This impact would be less than significant.

4.9 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 2 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 a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒

The following discussion is based on the findings from the *Phase I Environmental Site Assessment*[31] (Phase I ESA) prepared by TRC for the project site. The Phase I ESA is included in Appendix E of this report.

*a. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? **(Less Than Significant Impact)***

The proposed project involves the demolition of the existing residential structures and associated outbuildings on the project site and the construction of 114 new single-family residential units and associated improvements, including rezoning of the site. Because the proposed project is for private residential use, it would generally not involve transport, use, or disposal of significant quantities of hazardous materials; only small quantities of chemicals would be used for routine maintenance that would not pose a significant threat to human or environmental health.

Construction of the proposed project would involve the use and transport of hazardous materials. These materials could include fuels, oils, paints, and other chemicals used during construction

[31] TRC. 2021. *Phase I Environmental Site Assessment. Zocchi, Orr, and Neukirch Parcels*. November 4.

activities. Handling and transportation of hazardous materials could result in accidental releases or spills and associated health risks to workers, the public, and environment.

Transport and use of hazardous materials would be subject to all applicable State and federal laws, such as Hazardous Materials Transportation Act, the Resource Conservation and Recovery Act, the California Hazardous Materials Management Act, California Health and Safety Code, and California Code of Regulations Title 8 and Title 22. Therefore, compliance with existing regulations would ensure that the proposed project would not create a significant hazard to the public or the environment associated with the routine transport, use, or disposal of hazardous materials by ensuring these materials are properly handled during construction of the proposed project. Therefore, this impact would be less than significant.

b. Would the project 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? ***(Less Than Significant Impact)***

There are two main ways that the public and/or the environment could be affected by the release of hazardous materials from the project site, including: (1) exposing workers and/or the public to potentially contaminated soil and groundwater during construction and/or operation of the project; or (2) exposing workers and/or the public to hazardous building materials (e.g., lead paint, asbestos) during demolition of existing structures.

As described above, small quantities of common hazardous materials would be used at the project site during construction and operation of the proposed project. Improper use, storage, or handling could result in a release of hazardous materials into the environment which could pose a risk to construction workers and the public. However, the project applicant would be required to comply with existing government regulations during the use and disposal of these materials, and such materials would not be used in sufficient strength or quantity to create a substantial risk to human or environmental health.

The Phase I ESA prepared for the project site did not identify any potential Recognized Environmental Conditions in connection with the project site. The Phase I ESA included the following observations: hazardous materials for general household use stored in containers of less than five gallons with no evidence of spills or mismanagement; one pole-mounted transformer with no evident markings indicating whether the transformer fluids contain polychlorinated bi-phenols; a mound of fill material; and existing drinking water wells and septic systems that would need to be properly abandoned under a permit. However, none of these observations were considered to be a Recognized Environmental Condition. Additionally, the site history, adjoining and surrounding property histories, and environmental record reviews did not indicate the potential for the existence or migration of significant contaminants at the project site. Therefore, the proposed project would have a less than significant impact related to the release of hazardous materials into the environmental during both the construction and operational periods.

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 existing or proposed schools within 0.25 mile of the proposed project. Additionally, as noted in Section 4.9.a, development of the proposed project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials and, as noted in Section 4.9.b, construction activities would not create a hazard to the public and environment through reasonably foreseeable upset and accident conditions. Therefore, there would 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? ***(No Impact)***

The project site is not included on any list of hazardous materials site compiled pursuant to Government Code Section 65962.5,[32] and no impact would occur.

e. Would the project be located within an airport land use plan or, where such a plan has not been adopted, within 2 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? ***(Less Than Significant Impact)***

The project site is located approximately 4 miles north of the Travis Air Force Base and approximately 3 miles southeast of the Nut Tree Airport. The project site is not located within the Nut Tree Airport influence area but is within Compatibility Zone D, Other Airport Environs, of Travis Air Force Base Land Use Compatibility Plan.[33] Compatibility Zone D does not place any restrictions on the types of land uses allowed, with the exception of land uses that could cause hazard to flight, such as physical, visual, and electric forms of interference and land uses that attract birds.[34] Additionally, any object over 200 feet tall requires airspace review. Therefore, the proposed project would be consistent with the land use compatibility zone of the Travis Air Force Base Land Use Compatibility Plan and would not result in a safety hazard or excessive noise for people residing or working in the project area. Impacts would be less than significant.

f. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? ***(Less Than Significant Impact)***

The City of Vacaville adopted the Association of Bay Area Governments' (ABAG) Taming Natural Disasters report[35] as its official Local Hazard Mitigation Plan. The Local Hazard Mitigation Plan offers

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32 California Environmental Protection Agency (CalEPA). 2020. Cortese List Data Resources. Website: calepa.ca.gov/sitecleanup/corteselist/ (accessed July 2022).

33 City of Vacaville, 2015. *Vacaville General Plan – Land Use Element*.

34 Ibid.

35 Association of Bay Area Governments (ABAG). 2010. Taming Natural Disasters Multi-Jurisdictional Local Hazard Mitigation Plan for the San Francisco Bay Area. 2010 Update of 2005 Plan. Website: https://abag.ca.gov/sites/default/files/theplan-chapters-intro.pdf (accessed September 2022).

methods to mitigate natural hazards and enhance disaster resistance. The Plan focuses on natural disasters, including earthquake hazards (surface faulting, ground shaking, liquefaction, landslides, and tsunamis), and weather-related hazards (flooding, landslides, wildfires, drought, and climate change).[36]

The proposed project would not alter or block adjacent roadways and implementation of the proposed project would not be expected to impair the function of nearby emergency evacuation routes. Additionally, the proposed project would be required to comply with the following Standard Conditions of Approval (SCOAs) required for all design permits, use permits, and planned developments that addresses access roads and emergency vehicle access:

> ***SCOA 262:*** Access roads with a minimum unobstructed width of 20 feet shall be provided to the front and rear of structures. A minimum vertical clearance of 13 feet 6 inches shall be provided. Access roads shall be engineered to support the imposed load of the apparatus which is typically 25 tons and shall be designed per the City Public Work's Department Standards. An access road shall be provided to within 150 feet of all exterior walls of the first floor of the buildings. The route of the access road shall be approved by the Fire Marshal. Dead-end access roads in excess of 150 feet in length shall be provided with an approved means for turning around the apparatus. The final design of the turnaround shall be reviewed and approved by the Fire Marshal prior to installation.
>
> ***SCOA 263:*** Every building shall be accessible to Fire Department apparatus by way of all-weather access roadways during the time of construction. These roads shall have a minimum unobstructed width of 20 feet and shall be required to have a minimum 'first lift' of pavement applied which shall support the imposed load of a fire apparatus which is typically 25 tons. The developer shall be required to provide the Fire Marshal with a site plan showing the location, width, grades, and cross section of the proposed access roads to be used during construction. Permits shall not be issued and combustible construction shall not be allowed on the site until this site plan is reviewed and approved and stamped by the Fire Department.
>
> ***SCOA 265:*** Prior to the issuance of any grading or building permits, the Fire Marshal shall approve the location of all Emergency Vehicle Access Roads within the project site. Unless otherwise approved, the access points to any Emergency Vehicle Access Roads shall be located at the end of cul-de-sacs and across utility easements, and shall be kept locked at all times with a City 1C04 lock.
>
> ***SCOA 266:*** Prior to the issuance of any grading or building permits, the Fire Marshal shall approve the location of all Emergency Vehicle Access Roads around the perimeter of the site. Such Emergency Vehicle Access roads shall have average grades of not more than 20% with no section greater than 25%. The minimum width of such roads shall be 20 feet. Side slopes shall not exceed 4%. These roads shall be engineered to withstand a minimum load of 12 tons. At a minimum, this road shall be graded and compacted with decomposed granite or equivalent and shall be kept clear of all flammable vegetation at all times. The Fire

[36] City of Vacaville. 2021. *Vacaville General Plan and ECAS EIR.*

Marshal may require the road to be surfaced with pavement if it is determined the road will not be or is not being properly maintained in accordance with these standards.

SCOA 267: The Fire Marshal shall identify on the final site development plans where metal grates shall be provided for emergency fire apparatus cross V-ditches in the event of a fire or emergency. These grates shall have a minimum width of 10 feet and be designed and engineered to accommodate a minimum load of 12 tons.

With implementation of these SCOAs, the proposed project would have a less than significant impact on the implementation of an adopted emergency response plan or emergency evacuation plan.

g. Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires? ***(No Impact)***

The project site is in an urban area and is not within or adjacent to a wildland fire hazard area.[37] Therefore, the proposed project would not expose people or structures to a significant loss, injury or death involving wildland fires and there would be no impact.

[37] California Department of Forestry and Fire Protection (CAL FIRE). FHSZ Viewer. Website: https://egis.fire.ca.gov/FHSZ/ (accessed July 1, 2022).

4.10 HYDROLOGY AND WATER QUALITY

	Potentially Significant Impact	Less Than Significant 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;	☐	☒	☐	☐
iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☒	☐	☐
iv. Impede or redirect flood flows?	☐	☐	☒	☐
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?	☐	☒	☐	☐

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)***

The proposed project involves the demolition of the existing residential structures and associated outbuildings on the project site and the construction of 114 new single-family residential units and associated improvements. Pollutants of concern during construction include sediments, trash, petroleum products, concrete waste (dry and wet), sanitary waste, and chemicals. Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality. During construction activities, excavated soil would be exposed, and there would be an increased potential for soil erosion and sedimentation compared to existing conditions. In addition, pollutants of concern may be spilled or leaked and have the potential to be transported via stormwater runoff into the receiving waters of Almo Creek.

During construction, the disturbed soil area would be approximately 24.52 acres. Because construction of the proposed project would disturb greater than 1 acre of soil, the project is subject to the requirements of the California State Water Resources Control Board's (SWRCB) National Pollution Discharge Elimination System (NPDES) permit *Waste Discharge Requirements for*

Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002, as amended by orders No. 2010-0014-DWQ, and 2012-0006-DWQ)[38] (Construction General Permit). The Construction General Permit (CGP) requires the preparation of a Stormwater Pollution Prevention Plan (SWPPP) and implementation of Best Management Practices (BMPs) during construction activities. Construction BMPs would include, but not be limited to, Erosion Control and Sediment Control BMPs designed to minimize erosion and retain sediment on-site and Good Housekeeping BMPs to prevent spills, leads, and discharge of construction debris and waste into receiving waters. Implementation of the following measure will reduce impacts to water quality standards and waste discharge requirements through implementation of the CGP as follows:

Mitigation Measure WQ-1: **Construction General Permit.** Prior to issuance of a grading permit, the project applicant, or designee, shall obtain coverage under the *State Water Resources Control Board National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System No. CAS000002, as amended by Orders No. 2010-0014-DWQ and 2012-0006-DWQ)* (Construction General Permit). This shall include the submission of Permit Registration Documents (PRDs), including a Notice of Intent (NOI) for coverage under the permit to the State Water Resources Control Board (SWRCB) via the Stormwater Multiple Application and Report Tracking System (SMARTS). The project applicant shall provide the Waste Discharge Identification Number (WDID) to the City of Vacaville (City) to demonstrate proof of coverage under the Construction General Permit. A Stormwater Pollution Prevention Plan (SWPPP) shall be prepared and implemented for the proposed project in compliance with the requirements of the Construction General Permit. The SWPPP shall identify construction best management practices (BMPs) to be implemented to ensure that the potential for soil erosion and sedimentation is minimized and to control the discharge of pollutants in stormwater runoff as a result of construction activities. Upon completion of construction and stabilization of the site, a Notice of Termination will be submitted via SMARTs.

Adherence to the Construction General Permit, **Mitigation Measure WQ-1**, would ensure that the proposed project would not violate any water quality standards or waste discharge requirements

[38] California Regional Water Quality Control Board (RWQCB). 2013. Order No. 2009-0009-DWQ, NPDES No. CAS000002, as amended by Orders No. 2010-0014-DWQ, and 2012-0006-DWQ, *Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities* (accessed August 19, 2022).

associated with State requirements. With incorporation of **Mitigation Measure WQ-1** impacts to water quality would be less than significant.

The proposed project must comply with the City's Municipal Code[39] which specifies provisions for urban storm water quality, management and discharge control including a requirement that new development must comply with the California Stormwater Quality Association (CASQA) *Stormwater BMP Handbook for Construction.*[40] The purpose of these BMPs is to control the volume, rate, and potential pollutant load of stormwater runoff during construction. Implementation of the following measure will reduce impacts to water quality standards and waste discharge requirements through implementation of the City of Vacaville Municipal Code as follows:

Mitigation Measure WQ-2: **City of Vacaville Municipal Code.** Prior to issuance of a grading permit, the project applicant, or designee, shall submit final project plans to the City for review and approval, which address compliance with the water quality management requirements of Title 14 Land Use and Development Code, Division 14.26 which specify provisions for urban storm water quality, management and discharge control including the requirement that new development comply with the California Stormwater Quality Association (CASQA) *Stormwater BMP Handbook for Construction*.

Adherence to the City of Vacaville Municipal Code, **Mitigation Measure WQ-2**, would ensure that the proposed project would not violate any water quality standards or waste discharge requirements associated with City requirements. With incorporation of **Mitigation Measure WQ-2** impacts to water quality would be less than significant.

According to the Geotechnical Investigation Report, groundwater was encountered during exploratory borings at depths of 16 feet below ground surface (bgs). Excavation associated with the proposed project is anticipated to reach a maximum depth of 12 feet bgs. Therefore, groundwater dewatering is not anticipated to be required during construction. However, due to the relatively shallow site groundwater, construction activities may require groundwater dewatering. If dewatering is required, the project would be required to comply with the *General Waste Discharge Requirements for Limited Threat Discharges to Surface Waters (General Waste Discharge Permit),* Order No. R5-2022-006, NPDES No. CAG995002.[41] This order requires water sampling, analysis, treatment (if required) and reporting of limited threat discharges to surface waters including dewatering related discharges of groundwater extracted during construction prior to its release into

[39] City of Vacaville Municipal Code. 2022. Codified through Ordinance 1796. *Title 14.26 Urban Stormwater Quality Management*. Website: https://www.codepublishing.com/CA/Vacaville/#!/Vacaville14/Vacaville1426.html (accessed August 19, 2022).

[40] California Stormwater Quality Association. 2019. *Stormwater BMP Handbook for Construction.* December. Website: https://www.casqa.org/resources/bmp-handbooks/construction (accessed September 21, 2022).

[41] California Regional Water Quality Control Board Central Valley Region (RWQCB). 2022. Order No. R5-2022-006, NPDES No. CAG995002*, General Waste Discharge Requirements for Limited Threat Discharges to Surface Waters* (accessed August 19, 2022)

surface waters to ensure that effluent limitations for constituents are not exceeded. As a result, groundwater dewatering during project construction would not introduce pollutants into receiving waters or violate water quality standards or waste discharge requirements. Implementation of the following measure will reduce impacts to water quality from groundwater dewatering through implementation of the General Waste Discharge Requirements/NPDES Permit for Limited Threat Discharges to Surface Waters as follows:

Mitigation Measure WQ-3: **General Waste Discharge Requirements/NPDES Permit for Limited Threat Discharges to Surface Waters.** At least 45 days prior to groundwater dewatering activities, the project applicant, or designee, shall submit an NOI to the Central Valley Regional Water Quality Control Board (RWQCB) to obtain coverage under the *General Waste Discharge Requirements for Limited Threat Discharges to Surface Waters (General Waste Discharge Permit),* Order No. R5-2022-006, NPDES No. CAG995002. The construction contractor shall comply with the requirements of the General Waste Discharge Permit. Groundwater dewatering activities shall comply with all applicable provisions in the General Waste Discharge Permit, including water sampling, analysis, treatment (if required), and reporting of dewatering-related discharges. Upon completion of groundwater dewatering activities, a Notice of Termination (NOT) shall be submitted to the Central Valley RWQCB.

Therefore, if groundwater dewatering is required, adherence to the Groundwater Discharge Permit for Limited Threat Discharges to Surface Waters, **Mitigation Measure WQ-3**, would ensure that the proposed project would not violate any water quality standards or waste discharge requirements and impacts to water quality would be less than significant.

The 24.52-acre project site is currently developed and includes a total of 1.57 acres (6.4 percent) of impervious surfaces. Upon construction of the proposed project, approximately 12.08 acres (49 percent) of the project site would be covered by impervious surfaces and approximately 12.44 acres (51 percent) would be covered by pervious surfaces. The project would increase the impervious surface area by 10.51 acres compared to the existing condition which could adversely affect storm drain capacity.

In order to ensure sufficient storm drain capacity, the project would comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) General Permit for Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) RWQCB Order No. 2013-001-DWQ, NPDES No. CAS000004, as amended by Order 2015-0133-EXEC, Order WQ 2016-0069-EXEC, Order 2017-XXXX-DWQ, Order 2018-0001-EXEC, and

Order 2018-0007-EXEC[42]. This permit is for small community operators to efficiently regulate stormwater discharges under a single permit. Permittees must develop and implement a Stormwater Management Plan (SWMP) with the goal of reducing the discharge of pollutants to the maximum extent practicable. Permittees shall regulate development through the following: site design measures, source control measures, Low Impact Development (LID) Design Standards, Hydromodification Measures, Operation and Maintenance of Storm Water Control Measures, and Post-Construction BPMs. Additionally, the 10- and 100-year post-development peak flows shall be reduced to 85 percent of pre-development levels. Finally, the MS4 requires ongoing water quality monitoring and corrective actions if water quality thresholds are not maintained. Implementation of the following measure will reduce impacts to water quality from stormwater impacts through adherence to the Small Municipal Separate Storm Sewer Systems MS4 Permit as follows:

Mitigation Measure WQ-4: **Small Municipal Separate Storm Sewer Systems MS4 Permit.** Prior to issuance of grading or building permits or prior to recordation upon subdivision of land, the project applicant, or designee, shall submit a Final Storm Water Management Plan (SWMP) to the City of Vacaville, for review and approval, in compliance with the *National Pollutant Discharge Elimination System (NPDES) General Permit for Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s)* RWQCB Order No. 2013-001-DWQ, NPDES No. CAS000004, as amended by Order 2015-0133-EXEC, Order WQ 2016-0069-EXEC, Order 2017-XXXX-DWQ, Order 2018-0001-EXEC, and Order 2018-0007-EXEC. The project applicant shall demonstrate compliance with the MS4 through site design measures, source control measures, Low Impact Development (LID) Design Standards, Hydromodification Measures, Operation and Maintenance of Storm Water Control Measures, and Post-Construction BPMs in the SWMP. Additionally, the 10- and 100-year post-development peak flows shall be reduced to 85 percent of pre-development levels. Finally, the MS4 requires ongoing water quality monitoring and corrective actions if water quality thresholds are not maintained. The City of Vacaville, or designee, shall ensure that the SWMP complies with the MS4.

The proposed project would be required to comply with the Small Municipal Separate Storm Sewer Systems MS4 Permit which requires the preparation of a SWMP and implementation of operational BMPs to target and reduce pollutants of concern in storm water runoff from the project site. With incorporation of **Mitigation Measure WQ-4** impacts to water quality would be less than significant.

[42] California Regional Water Quality Control Board (RWQCB). 2019. Order No. 2013-001-DWQ, NPDES No. CAS000004, as amended by Order 2015-0133-EXEC, Order WQ 2016-0069-EXEC, Order 2017-XXXX-DWQ, Order 2018-0001-EXEC, and Order 2018-0007-EXEC*, National Pollutant Discharge Elimination System (NPDES) General Permit for Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s)* (accessed August 19, 2022)

Additionally, the project has the potential to adversely affect existing City storm drain capacity. Therefore, the project would be required to comply with the *Storm Drain Design Standards Section DS 4* developed by the City of Vacaville. These standards provide the minimum requirements for design of a storm drain system that will collect storm water. As part of these requirements, the project would need to develop a Storm Drainage Master Plan (SDMP) Report. The project shall mitigate the increase of the 10- and 100-year peak runoff from the project site over the predevelopment conditions. Detention facilities must be designed for the 100-year, 24-hour storm event. Implementation of the following measure will reduce impacts to stormwater impacts through adherence to the Storm Drain Design Standards Section DS 4 as follows:

Mitigation Measure WQ-5: **Storm Drain Design Standards Section DS 4.** Prior to issuance of grading or building permits or prior to recordation upon subdivision of land, the project applicant, or designee, shall submit a Final Storm Drainage Master Plan Report to the City of Vacaville, for review and approval, in compliance with the City of Vacaville Storm Drain Design Standards Section DS 4. The project shall mitigate the increase of the 10- and 100-year peak runoff from the project site over the predevelopment conditions. Detention facilities must be designed for the 100-year, 24-hour storm event.

Compliance with **Mitigation Measure WQ-5** would reduce operational impacts related to surface waste discharge requirements and/or degradation of water quality to a less than significant level.

Incorporation of **Mitigation Measure WQ-1 and WQ-2** address construction water quality impacts through implementation of the CGP and City of Vacaville Municipal Code. **Mitigation Measure WQ-3** will ensure that groundwater dewatering during construction does not adversely impact water quality. **Mitigation Measure WQ-4** ensures state MS4 compliance measures for stormwater, and **Mitigation Measure WQ-5** implements storm drain compliance consistent with City of Vacaville requirements. Impacts to water quality and waste discharge standards would be less than significant with mitigation incorporated.

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 with Mitigation Incorporated)***

According to the Geotechnical Investigation Report prepared for the project, groundwater was encountered during exploratory borings at depths at 16 feet bgs. Excavation associated with the proposed project is anticipated to reach a maximum depth of 12 feet bgs. Although not anticipated, if dewatering is required, as required in **Mitigation Measure WQ-3**, it would be conducted in accordance with the requirements of the *General Waste Discharge Requirements for Limited Threat Discharges to Surface Waters (General Waste Discharge Permit),* Order No. R5-2022-006, NPDES No. CAG995002.

Groundwater dewatering would be localized and temporary, and the volume of groundwater removed would not be substantial. In addition, any volume of water removed during groundwater dewatering would be minimal compared to the size of the Solano Groundwater Subbasin, which has

a surface area of 354,600 square miles and a sustainable yield of 190,000 acre-feet per year Solano Subbasin Groundwater Sustainability Agency (Solano GSA).[43] Groundwater dewatering would not interfere with the sustainable management of the groundwater basin because the groundwater basin has been sustainably managed over the last 10 years and will continue to be sustainably managed.[44] Therefore, construction impacts related to depletion of groundwater supplies or interference with groundwater recharge would be less than significant.

Development of the project would increase impervious surface area on the project site by 10.51 acres, which would decrease opportunities for infiltration and groundwater recharge. However, the hard clay soils do not provide substantial infiltration under the existing condition. With project construction, water would be directed via sheetflow to detention basins on site, which would also have low permeability soils. Therefore, recharge would not change substantially from the existing condition, and no impacts would occur due to groundwater recharge.

Project operations would not require groundwater extraction. While the project would increase water use, the City of Vacaville obtains water from: (1) surface water from Lake Berryessa, transported through Putah South Canal as part of the Solano Project; (2) surface water from the Sacramento Delta, transported through the North Bay Aqueduct as part of the State Water Project; and (3) groundwater from City-owned local production wells. While some of the project's water may be obtained from groundwater during dry years, the Solano GSA ensures that sufficient water supplies are available to prevent groundwater overdraft. For these reasons, impacts related to depletion of groundwater supplies or interference with groundwater recharge in a manner that may impede sustainable groundwater management would be less than significant with mitigation incorporated.

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)***

During construction activities, approximately 24.52 acres of area would be disturbed. Soil would be exposed, and drainage patterns would be temporarily altered during grading and other construction activities, and there would be an increased potential for soil erosion and siltation compared to existing conditions. Additionally, during a storm event, soil erosion and siltation could occur at an accelerated rate. As discussed above under Section 4.10.a, the Construction General Permit requires the preparation of a SWPPP to identify construction BMPs to be implemented as part of the proposed project to reduce impacts on water quality during construction, including those impacts associated with soil erosion and siltation. As specified in **Mitigation Measure WQ-1** and **Mitigation Measure WQ-2**, the proposed project would comply with the requirements of the Construction General Permit and the City of Vacaville Municipal

[43] Solano Subbasin Groundwater Sustainability Agency. 2021. *Solano Subbasin Groundwater Sustainability Plan*. November 30.

[44] Ibid.

Code for construction BMPs. With compliance with the requirements in the Construction General Permit and implementation of the construction BMPs as specified in **Mitigation Measure WQ-1** and **Mitigation Measure WQ-2**, construction impacts related to on- or off-site erosion or siltation would be less than significant.

The 24.52-acre project site is currently developed and includes a total of 1.57 acres (6.4 percent) of impervious surfaces. In the proposed condition, approximately 12.08 acres (49 percent) of the project site would be covered by impervious surface and not prone to on-site erosion or siltation because no soil would be included in these areas. The remaining approximately 12.44 acres (51 percent) would be covered by pervious surfaces containing landscaping that would minimize on-site erosion and siltation. However, the proposed project would increase impervious area on the project site, which would result in a net increase in stormwater runoff that can lead to downstream erosion in receiving waters (City storm drains which ultimately outflow to Almo Creek). The proposed project would include the construction of 18-inch storm drains with associated catch basins and manholes, throughout the project area that would connect to two detention basins and existing stormwater facilities on Purple Martin Drive. Surface water would flow via sheet flow to the on-site storm drains, catch basins, and manholes and ultimately into the detention basins where they would be treated via biomodification before entering city storm drains. Additionally, as specified in **Mitigation Measure WQ-4** and **Mitigation Measure WQ-5**, the proposed project would comply with the Small Municipal Separate Storm Sewer Systems MS4 Permit and the *Storm Drain Design Standards Section DS 4* developed by the City of Vacaville which requires the preparation of a SWMP, SDMP, and implementation of operational BMPs to target and reduce pollutants of concern in storm water runoff from the project site. Therefore, operational impacts related to substantial on- or off-site erosion or siltation would be less than significant with mitigation incorporated.

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 Section 4.10.a, project construction would comply with the requirements of the Construction General Permit and would include the preparation and implementation of a SWPPP. The SWPPP would include construction BMPs to control and direct on-site surface runoff to ensure that stormwater runoff from the construction site does not exceed the capacity of the stormwater drainage systems. With implementation of BMPs per **Mitigation Measures WQ-1 and WQ-2**, construction impacts related to a substantial increase in the rate or amount of surface runoff that would result in flooding would be less than significant with mitigation incorporated.

In the existing condition approximately 94 percent of the project site is pervious surface area and utilizes natural infiltration. For the remaining portion of the project site, stormwater runoff sheet flows from northwest to southeast, where it is eventually discharged into Almo Creek.

The proposed project would increase the amount of impervious surface from 1.57 acres to 12.08 ac, which would increase the stormwater runoff generated by the project site. The proposed basin plan would divide the project site into two almost equal-sized drainage areas. Drainage Management Area (DMA) 1 would collect stormwater from the northern half of the project site

and DMA 2 would collect stormwater from the southern half of the project site. Stormwater runoff from each of the DMAs would flow south and east via sheetflow until captured by the curb and gutter. Once captured by the curb and gutter, drainage would continue to flow south and east until captured by on site catch basins and to detention basins for treatment.

According to the proposed basin plan, the streets, storm drain system, and basins, were designed using the methodology outlined in the Small Municipal Separate Storm Sewer Systems MS4 Permit (**Mitigation Measure WQ-4**) are sized to reduce the 10- and 100-year post-development peak flows to 85 percent of pre-development levels. Because the on-site drainage systems and stormwater BMPs would be sized to collect and convey stormwater runoff on the project site, proposed project impacts related to on- or off-site flooding from an increase in surface runoff would be less than significant with mitigation incorporated.

iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or ***(Less Than Significant Impact with Mitigation Incorporated)***

As discussed under Section 4.10.a, pollutants of concern during construction include sediments, trash, petroleum products, concrete waste (dry and wet), sanitary waste, and chemicals. Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality. Drainage patterns would be temporarily altered during grading and other construction activities, and construction-related pollutants could be spilled, leaked, or transported via storm runoff into adjacent drainages and downstream receiving waters. However, as specified in **Mitigation Measure WQ-1**, the proposed project would be required to comply with the requirements set forth by the Construction General Permit and SWPPP, which would specify BMPs to be implemented to control the discharge of pollutants in stormwater runoff as a result of construction activities. Additionally, as discussed under Section 4.10.c.ii, the SWPPP would include construction BMPs to control and direct surface runoff on site to ensure that stormwater runoff from the construction site does not exceed the capacity of the stormwater drainage systems. Furthermore, any groundwater extracted during groundwater dewatering activities that is discharged to surface waters must meet the water quality limits specified in the applicable NPDES permit, as specified in **Mitigation Measure WQ-3**. For these reasons, with implementation of **Mitigation Measure WQ-1** and **Mitigation Measure WQ-3**, construction impacts related to creation or contribution of runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff would be less than significant.

The operation of the proposed project has the potential to introduce pollutants to the storm drain system from the proposed on-site uses. As discussed under Section 4.10.a, expected pollutants of concern from long-term operations include pathogens (bacteria/viruses), metals, nutrients, toxic organic compounds, pesticides/herbicides, sediments/total suspended solids, trash and debris, and oil and grease. As required by **Mitigation Measure WQ-4** and **Mitigation Measure WQ-5**, the proposed project would comply with the Small Municipal Separate Storm Sewer Systems MS4 Permit and the *Storm Drain Design Standards Section DS 4* developed by the City of Vacaville which requires the preparation of a SWMP, SDMP, and implementation of operational BMPs to target and reduce pollutants of concern in storm water runoff from the

project site. Therefore, with implementation of **Mitigation Measure WQ-4** and **Mitigation Measure WQ-5**, no substantial additional sources of polluted runoff would be discharged to the storm drain system and the project would not result in an exceedance in capacity of existing or planned stormwater systems. Impacts would be less than significant with mitigation incorporated.

iv. Impede or redirect flood flows? ***(Less Than Significant Impact)***

The project site is not located within a Federal Emergency Management Agency (FEMA) designated 100-year floodplain. According to the FEMA Flood Insurance Rate Map (FIRM) No. 06095C027E, the project site is located within Zone X[45]. Zone X is designated as an area determined to be outside the 500-year floodplain. As the proposed project would not place improvements and structures directly within a 100-year floodplain, the proposed project would not impede or redirect flood flows. Therefore, impacts related to impeding or redirecting of flood flows would be less than significant.

d. In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation? ***(No Impact)***

Tsunamis are ocean waves generated by tectonic displacement of the seafloor associated with shallow earthquakes, seafloor landslides, rock falls, and exploding volcanic islands. Tsunamis can have wavelengths of up to 120 miles and travel as fast as 500 miles per hour across hundreds of miles of deep ocean. Upon reaching shallow coastal waters, the waves can reach up to 50 feet in height, causing great devastation to near-shore structures. The project site is located approximately 50 miles from the Pacific Ocean shoreline which is well outside of the Tsunami zone. Therefore, the project site would not be subject to inundation from tsunamis, and there would be no risk of release of pollutants due to inundation from tsunami.

Seiching occurs when seismic ground shaking induces standing waves (seiches) inside water retention facilities (e.g., reservoirs and lakes). Such waves can cause retention structures to fail and flood downstream properties. The closest water retention facility to the project site is Lake Curry located approximately 8 miles east of the project site. Due to the distance from the project site, this facility would not cause a risk of inundation from seiche. Therefore, the project site would not be subject to inundation from seiche waves, and there would be no risk of release of pollutants due to inundation from seiche.

As discussed under Section 4.10.c.iv, the project site is located within Zone X (designated as an area determined to be outside the 500-year floodplain). The proposed project would introduce new residential uses and associated improvements onto the site; however, existing pollutants of concern are not anticipated to change due to land use changes. As discussed under Section 4.10.a, BMPs would be implemented to target and reduce pollutants of concern on the project site. In addition, as previously discussed in Section 4.9, Hazards and Hazardous Materials, hazardous substances

[45] Federal Emergency Management Act. 2009. *Flood Insurance Rate Map No. 06095C027E*. May. Website: https://msc.fema.gov/portal/search?AddressQuery=5730%20Vanden%20Road%2C%20Vacaville%2C%20CA#searchresultsanchor (accessed August 17, 2022).

associated with residential uses would be limited in both amount and use. The materials used on site would be contained, stored, and used in accordance with manufacturers' instructions and handled in compliance with applicable standards and regulations. There are no levees within the vicinity of the project site and as discussed above there are no water bodies within the vicinity of the project site that would pose a risk of flooding. Furthermore, because BMPs would reduce the introduction of pollutants on the site and any hazardous materials used on site would be properly stored and contained, there would be a low potential for pollutants to be released from the project site in the unlikely event of inundation of the project site. Therefore, there would be no impacts related to release of pollutants in the event of inundation from flooding.

e. Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan? ***(Less than Significant with Mitigation Incorporated)***

The project is within the jurisdiction of the Central Valley RWQCB. The Central Valley RWQCB adopted a Water Quality Control Plan (i.e., Basin Plan)[46] which designates beneficial uses for all surface and groundwater within its jurisdiction and establishes the water quality objectives and standards necessary to protect those beneficial uses. As summarized below, the project would comply with the applicable NPDES permits and would implement construction and operational BMPs to reduce pollutants of concern in stormwater runoff.

As discussed under Section 4.10.a, during construction activities, excavated soil would be exposed, and there would be an increased potential for soil erosion and sedimentation compared to existing conditions. In addition, chemicals, liquid products, petroleum products (e.g., paints, solvents, and fuels), and concrete-related waste may be spilled or leaked and have the potential to be transported via stormwater runoff into receiving waters. As specified in **Mitigation Measure WQ-1**, the proposed project would be required to comply with the requirements set forth by the Construction General Permit, which requires the preparation of a SWPPP and implementation of construction BMPs to control stormwater runoff and discharge of pollutants. In addition, as specified in **Mitigation Measure WQ-2**, the proposed project must comply with the City's Municipal Code which specify provisions for urban storm water quality, management and discharge control including a requirement that new development must comply with the California Stormwater Quality Association (CASQA) *Stormwater BMP Handbook for Construction*. The purpose of these BMPs is to control the volume, rate, and potential pollutant load of stormwater runoff during construction.

As discussed under Section 4.10.a, the primary pollutants of concern during project operations are pathogens (bacteria/viruses), metals, nutrients, toxic organic compounds, pesticides/herbicides, sediments/total suspended solids, trash and debris, and oil and grease. As stated under Section 4.10.a, specified in **Mitigation Measure WQ-4** and **Mitigation Measure WQ-5,** the proposed project would comply with the Small Municipal Separate Storm Sewer Systems MS4 Permit and the *Storm Drain Design Standards Section DS 4* developed by the City of Vacaville which requires the

[46] California Regional Water Quality Control Board Central Valley Region (RWQCB). 2019. *Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region*. Fifth Edition. Website: https://www.waterboards.ca.gov/centralvalley/water_issues?basin_plans/sacsjr_201902.pdf (accessed August 19, 2022).

preparation of a SWMP, SDMP, and implementation of operational BMPs to target and reduce pollutants of concern in storm water runoff from the project site. The proposed BMPs would capture and treat stormwater runoff and reduce pollutants of concern in stormwater runoff.

The Sustainable Groundwater Management Act (SGMA) was enacted in September 2014. SGMA requires governments and water agencies of high- and medium-priority basins to halt overdraft of groundwater basins. SGMA requires the formation of local Groundwater Sustainability Agencies (GSAs), which are required to adopt Groundwater Sustainability Plans to manage the sustainability of the groundwater basins. The project site is located within the Solano Groundwater Subbasin, which is managed by the Solano Subbasin Groundwater Sustainability Agency (Solano GSA). The Solano Groundwater Subbasin is identified as a medium priority basin; therefore, development of a Groundwater Sustainability Plan is required. In compliance with this requirement, Solano GSA prepared and submitted the *Solano Subbasin Groundwater Sustainability Plan*[47] to the California Department of Water Resources. The *Solano Subbasin Groundwater Sustainability Plan* states that the groundwater basin has been sustainably managed for more than the last 10 years and will continue to be sustainably managed. As discussed under Sections 4.10.a. and 4.10.b., the proposed project does not have the potential to impact groundwater quality, interfere with groundwater recharge, or decrease groundwater supplies. Any groundwater extracted during groundwater dewatering during construction would be minimal and would not interfere with the sustainable management of the groundwater basin. Additionally, project operation would not require groundwater extraction. Although the project would increase water use, which may be obtained from groundwater, the Solano GSA, ensures that sufficient water supplies are available so that groundwater overdraft does not occur. For these reasons, the proposed project would not conflict with or obstruct the implementation of a sustainable groundwater management plan. Therefore, no impact would occur related to conflict with or obstruction of water quality control plans or sustainable groundwater management plans.

With implementation of **Mitigation Measure WQ-1 through Mitigation Measure WQ-5**, the project would not result in water quality impacts that would conflict with Central Valley RWQCB's Water Quality Control Plan (Basin Plan). Impacts related to conflict with a water quality control plan would be less than significant with mitigation incorporated.

47 Solano Subbasin Groundwater Sustainability Agency (GSA). 2021. *Solano Subbasin Groundwater Sustainability Plan*. November 30.

4.11 LAND USE AND PLANNING

	Potentially Significant Impact	Less Than Significant 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?	☐	☐	☒	☐

*a. Would the project physically divide an established community? **(Less Than Significant Impact)***

The physical division of an established community typically refers to the construction of a physical feature (such as an interstate highway or railroad tracks) or removal of a means of access (such as a local road or bridge) that would impair mobility within an existing community, or between a community and outlying area. For instance, the construction of an interstate highway through an existing community may constrain travel from one side of the community to another; similarly, such construction may also impair travel to areas outside the community.

The project site is located in an urban area in the City of Vacaville and is surrounded primarily by existing and planned residential uses, as well as existing roadways. The proposed project would include the development of the project site with single-family residential uses and associated improvements. The proposed project would not require the construction of any new infrastructure that would divide an established community and would not remove any means of access. The proposed project would not result in a physical division of an established community or adversely affect the continuity of land uses in the vicinity. Therefore, this impact would be less than significant.

*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)***

The City of Vacaville General Plan Land Use Map designates the project site as Residential Low Density (RL) and the City's Zoning Map identifies the project site as Agriculture (AG) zoning district, which is an interim placeholder zoning district until such a time when development is proposed at the site. As noted in Chapter 2.0, Project Description, the proposed project is considered a "housing development project" that is subject to SB 330. Therefore, the City is obligated to process a zone change request separately to accommodate the proposed project. This would result in a rezone of the project site from AG to RL-6. The project is consistent with the existing General Plan Land Use designation of RL and with the rezone to RL-6, will also be consistent with the Zoning designation. In addition, the proposed project would also require building permits, a planned development permit, and vesting tentative map approval.

It should be noted that according to CEQA, policy conflicts do not, in and of themselves, constitute a significant environmental impact. Policy conflicts are considered to be environmental impacts only

when they would result in direct physical impacts or where those conflicts relate to avoiding or mitigating environmental impacts. As such, associated physical environmental impacts are discussed in this Initial Study under specific topical sections. The proposed project would not result in any direct physical impacts that cannot be mitigated to a less than significant level. As a result of the proposed Rezone, the proposed project would not conflict with any applicable land use plans, policies, or regulations that were adopted for the purpose of avoiding or mitigating an environmental effect and this impact would be less than significant.

4.12 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?	☐	☐	☐	☒

*a. 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? **(No Impact)***

The project site is located within an urban area on a partially developed site and there are no known mineral resources within the vicinity of the project site that would be of value to the region or to the State. The City of Vacaville General Plan identifies three areas with the potential to contain mineral resources including along Cement Hill, in the Vaca Mountains, and the western hills, none of which are in the nearby vicinity of the project site.[48] As such, development of the proposed project would not result in the loss of availability of a known mineral resource of value to the region or residents of the State, and there would be no impact related to the availability of mineral resources.

*b. 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)***

Refer to Section 4.12. a. The proposed project would not result in the loss of availability of any known locally important mineral resource recovery site. Therefore, no impact related to the availability of a mineral resources recovery site would occur.

[48] City of Vacaville, 2015.*General Plan, Conservation and Open Space Element*.

4.13 NOISE

	Potentially Significant Impact	Less Than Significant 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 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 2 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 analysis in this section is based on the Environmental Noise and Vibration Assessment[49] prepared by Saxelby Acoustics. This report is provided in Appendix F.

The following provides an overview of the characteristics of sound and the regulatory framework that applies to noise within the vicinity of the project site. The existing noise environment in and around the project site is also described.

Characteristics of Sound. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, or sleep. Several noise measurement scales exist that are used to describe noise in a particular location. A decibel (dB) is a unit of measurement that indicates the relative intensity of a sound. Sound levels in dB are calculated on a logarithmic basis. An increase of 10 dB represents a ten-fold increase in acoustic energy, while 20 dB is 100 times more intense and 30 dB is 1,000 times more intense. Each 10 dB increase in sound level is perceived as approximately a doubling of loudness; and similarly, each 10 dB decrease in sound level is perceived as half as loud. Sound intensity is normally measured through the A-weighted sound level (dBA). This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. The A-weighted sound level is the basis for 24-hour sound measurements which better represent how humans are more sensitive to sound at night. As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate or be reduced, resulting in a 6 dB reduction in the noise level for each doubling of distance from a single point source of noise to the noise sensitive receptor of concern.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous

[49] Saxelby Acoustics. 2022. *Environmental Noise and Vibration Assessment, Vanden Estates Residential.* July 27.

sound level (L_{eq}) is the total sound energy of time varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq}, the community noise equivalent level (CNEL), and the day-night average level (L_{dn}) based on dBA. L_{dn}, sometimes denoted as DNL, represents the time varying noise over a 24-hour period, with a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale, but without the adjustment for events occurring during the evening relaxation hours of 7:00 p.m. to 10:00 p.m.

Regulatory Framework. The City addresses noise in the Noise Element of the General Plan and in Section 14.09.240.140 of the City's Municipal Code (Noise). The Noise Element of the City's General Plan provides an understanding of existing and future noise conditions within the City, establishes a basis for evaluating potential noise impacts on future development, and includes policy statements to guide public and private planning to attain and maintain acceptable noise levels. The City's Noise Compatibility Standards are shown in Table 4.13.A below. As shown in Table 4.13.A, the "normally acceptable" noise level for single-family residential uses is 60 dBA L_{dn}, with a "conditionally acceptable" range between 55 dBA and 70 dBA. The "normally unacceptable" noise level is between 70 dBA and 75 dBA L_{dn}. Additionally, the following policies from the City's General Plan would be applicable to the proposed project:

- Policy NOI-P1.1: Require an acoustical analysis for all proposed projects that would locate noise sensitive land uses where the projected ambient noise level is greater than the respective "normally acceptable" noise level as indicated on Table NOI-3, and require mitigation of noise impacts that exceed the land use compatibility standards.

- Policy NOI-P1.2: Require that noise created by new transportation and non-transportation noise sources be mitigated, to the extent that is technically and economically feasible, to comply with the noise level standards of Table NOI-3.

- Policy NOI-P2.1: Reduce outdoor noise levels in existing residential areas, where economically and aesthetically feasible.

- Policy NOI-P2.3: Design subdivisions to minimize the transportation-related noise impacts to adjacent residential areas.

- Policy NOI-P2.5: Encourage the use of open space, earthen berms, parking, accessory buildings, and landscaping to buffer new and existing development from noise. Use sound walls only when other methods are not practical or when recommended by an acoustical expert as part of a mitigation program.

- Policy NOI-P2.6: Require that the effects of sound walls on noise levels in surrounding areas be considered and taken into account in the design, location, and construction of sound walls.

- Policy NOI-P4.2: Require the following construction noise control measures:

    - Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

Table 4.13.A: City of Vacaville Noise Compatibility Standards

Land Use Category	Community Noise Exposure, L_{dn} or CNEL, dB 55 60 65 70 75 80 85
Residential – Low Density Single Family, Duplex, Mobile Homes	
Residential – Multi-Family	
Transient Lodging Motels, Hotels	
Schools, Libraries, Churches, Hospitals, Nursing Homes	
Auditoriums, Concert Halls, Amphitheaters	
Sports Arena, Outdoor Spectator Sports	
Playgrounds, Neighborhood Parks	
Golf Courses, Riding Stables, Water Recreation, Cemeteries	
Office Buildings, Business Commercial and Professional	
Industrial, Manufacturing, Utilities, Agriculture	

Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements. Buildings are of conventional construction.
Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
Normally Unacceptable	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable	New construction or development should generally not be undertaken.

Source: *City of Vacaville General Plan* (2010).
CNEL = community noise equivalent level
dB = decibel
L_{dn} = day-night average level

- Locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction area.
- Utilize "quiet" air compressors and other stationary noise sources where technology exists.
- Limit hours of operation of outdoor noise sources through conditions of approval.

Section 8.10.060(O) of the City's Municipal Code prohibits construction activities within 500 feet from any occupied residence between the hours of 7:00 p.m. to 7:00 a.m. on Monday through Saturday, and anytime on Sundays or holidays. These restrictions do not apply to interior work, construction, repair work or grading activities that are performed by or under the direction of the homeowner at his or her residence on a Sunday or holiday, provided such work shall only be allowed between the hours of 8:00 a.m. and 7:00 p.m.

Because the City of Vacaville has yet to established vibration thresholds related to potential damage, vibration standards included in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment Manual* (FTA Manual) (FTA 2018)[50] are used in this analysis. The criteria for environmental impact from ground-borne vibration are based on the maximum levels for a single event. FTA guidelines show that a vibration level of up to 0.5 inches per second (in/sec) in peak particle velocity (PPV) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage. For a nonengineered timber and masonry building, the construction building vibration damage criterion is 0.2 in/sec in PPV.

Existing Noise Conditions. Certain land uses are considered more sensitive to noise than others. Examples of these include residential areas, educational facilities, hospitals, childcare facilities, and senior housing. The project site is located in an area surrounded by single-family homes.

Existing Ambient Noise Level Measurements. To quantify the existing ambient noise environment in the project vicinity, the Environmental Noise and Vibration Assessment included continuous (24-hour) noise level measurements at two locations on the project site and short-term noise level measurements at two locations. A summary of the noise level measurement survey results is provided in Table 4.13.B. The Environmental Noise and Vibration Assessment (Appendix F) contains the complete results of the noise monitoring. The sound level meters were programmed to record the maximum, median, and average noise levels at each site during the survey. The maximum value, denoted L_{max}, represents the highest noise level measured. The average value, denoted L_{eq}, represents the energy average of all of the noise received by the sound level meter microphone during the monitoring period. The median value, denoted L_{50}, represents the sound level exceeded 50 percent of the time during the monitoring period. The sound level meters were programmed to record the maximum, median, and average noise levels at each site during the survey. The maximum value, denoted L_{max}, represents the highest noise level measured. The average value, denoted L_{eq}, represents the energy average of all of the noise received by the sound level meter microphone during the monitoring period. The

[50] Federal Transit Administration (FTA). 2018. Office of Planning and Environment. *Transit Noise and Vibration Impact Assessment Manual, FTA-VA-90-1003-06*. September.

median value, denoted L_{50}, represents the sound level exceeded 50 percent of the time during the monitoring period. Larson Davis Laboratories model 820 and 831 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with a CAL 200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

Table 4.13.B: Long-Term and Short-Term Ambient Noise Level Measurements

Location	Date	L_{dn} (dBA)	Daytime Noise Levels (dBA)			Nighttime Noise Levels (dBA)		
			L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
LT-1: 70 ft to CL of Vanden Road	6/6/2022	59	56	48	73	52	47	68
LT-2: 960 ft to CL of Vanden Road	6/6/2022	53	47	44	60	46	45	58
ST-1: 60 ft to CL of Vanden Road	6/6/2022	N/A	59	50	74	N/A	N/A	N/A
ST-2: 1400 ft to CL of Vanden Road	6/6/2022	N/A	43	37	68	N/A	N/A	N/A

Source: Saxelby Acoustics (2022).
Note: Daytime hours: 7:00 a.m. to 10:00 p.m. Nighttime hours: 10:00 p.m. to 7:00 a.m.
dBA = A-weighted decibels
foot/feet
L_{50} = noise level exceeded 50 percent of the time
L_{dn} = day-night average noise level
L_{eq} = equivalent continuous noise level
L_{max} = maximum noise level

Noise Level Criteria for Short-Term Construction-Related Noise Level Increases. The FTA suggests a residential noise limit of 90 dBA L_{eq} for construction noise. This limit is applied to the proposed project.

a. Would the project result in 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 with Mitigation Incorporated)***

Construction Noise Impacts. Implementation of the proposed project would include construction activities that would result in a substantial temporary increase in ambient noise levels in the vicinity of the project site.

The closest sensitive receptors would be the existing single-family homes located immediately north and east of the project site. Project construction would result in short-term noise impacts to these receptors. Maximum construction noise would be short-term, generally intermittent depending on the construction phase, and variable depending on receiver distance from the active construction zone. The duration of noise impacts generally would be from one day to several days depending on the phase of construction. Project construction would occur for approximately 6 months. The level and types of noise impacts that would occur during construction are described below.

Table 4.13.C lists maximum noise levels recommended for noise impact assessments for typical construction equipment, based on a distance of 50 feet between the equipment and a noise

receptor. Construction-related short-term noise levels would be higher than existing ambient noise levels in the project area but would no longer occur once construction of the proposed project is complete. As shown in Table 4.13.C, construction activities would generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet. The majority of construction activity would occur at an average distance of 50 feet, or more, from the nearest sensitive receptors. Assuming that the worst-case noise level of 90 dBA L_{max} at 50 feet were to occur for a full hour, the hourly noise level would be 90 dBA L_{eq}. While this level is quite high, it complies with the FTA 90 dBA L_{eq} limit for residential noise exposure from construction activity and would be unlikely to occur at this level and at the same location for a long duration. It should also be noted that construction could occur at distances as close as approximately 25 feet, resulting in maximum (L_{max}) noise levels of up to 96 dBA L_{max}. However, it is not expected that this would be of long duration. Therefore, the predicted maximum average (L_{eq}) noise level is 90 dBA L_{eq}, as noted above.

Construction noise associated with development of new streets would be similar to noise that would be associated with public works projects, such as a roadway widening or paving projects. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours.

Noise would also be generated during the construction phase by increased truck traffic on area roadways. A project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from the construction site. This noise increase would be of short duration and would likely occur primarily during daytime hours.

Table 4.13.C: Typical Construction Equipment Noise Levels

Equipment Description	Maximum Noise Level (L_{max}), dBA at 50 feet
Auger Drill Rig	84
Backhoe	78
Compactor	83
Compressor (air)	78
Concrete Saw	90
Dozer	82
Dump Truck	76
Excavator	81
Generator	81
Jackhammer	89
Pneumatic Tools	85

Source: Roadway Construction Noise Model (FHWA 2006).
Note: Noise levels reported in this table are rounded to the nearest whole number.
[1] Maximum noise levels were developed based on Spec 721.560 from the Central Artery/Tunnel (CA/T) program to be consistent with the City of Boston's Noise Code for the "Big Dig" project.
dBA = A-weighted decibels
L_{max} = maximum instantaneous sound level

As discussed above, construction noise could result in a temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. Therefore, the project shall implement the following mitigation measures to reduce impacts due to construction noise:

Mitigation Measure NOI-1: **Construction Noise Hours.** No construction or grading equipment shall be operated nor any outdoor construction or repair work shall be permitted within 500 feet from any occupied residence between dusk (one-half hour after sunset) and 7:00 a.m., Monday through Saturday, and no such grading or construction activities shall be allowed on Sundays or holidays except as provided for herein:

- Interior work which would not create noise or disturbance noticeable to a reasonable person of normal sensitivity in the surrounding neighborhood shall not be subject to these restrictions;
- Construction or repair work performed by or under the direction of a homeowner at his or her residence is exempt from these restrictions on Sundays and holidays, but such construction or repair work shall be limited to the hours between 8:00 a.m. and dusk.

Mitigation Measure NOI-2: **Construction Noise Best Management Practices.** The project contractor shall ensure that the following construction noise BMPs are met on-site during all phases of construction.

- All equipment driven by internal combustion engines shall be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specifications. Mobile or fixed "package" equipment (e.g., arc welders, air compressors) shall be equipped with shrouds and noise- control features that are readily available for that type of equipment.
- All mobile or fixed noise-producing equipment used on the project site that are regulated for noise output by a federal, state, or local agency shall comply with such regulations while in the course of project activity.
- The construction contractor shall utilize "quiet" models of air compressors and other stationary noise sources where technology exists.
- At all times during project grading and construction, stationary noise-generating equipment shall be located as far as practicable from sensitive receptors and placed so that emitted noise is directed away from residences.

- Unnecessary idling of internal combustion engines shall be prohibited.
- Construction staging areas shall be established at locations that would create the greatest distance between the construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction activities, to the extent feasible.
- Construction site and access road speed limits shall be established and enforced during the construction period.
- The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only.
- Neighbors located adjacent to the construction site shall be notified of the construction schedule in writing.
- The construction contractor shall designate a "noise disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator shall be responsible for determining the cause of the noise complaint (e.g., starting too early, poor muffler, etc.) and instituting reasonable measures as warranted to correct the problem. A telephone number for the disturbance coordinator shall be conspicuously posted at the construction site.
- Construction noise mitigation measures shall be included in the grading plan submitted by the developer for review and approval by the Community Development Director prior to grading permit issuance.

Mitigation Measure NOI-1 would limit construction hours of operation to between 7:00 a.m. to dusk; **Mitigation Measure NOI-2** would implement best management practices for construction noise including equipment mufflers, quiet air compressors, and similar equipment noise attenuation, ensure noise equipment is not near sensitive receptors, minimize unnecessary idling, ensure that speed-limits onsite are enforced, ensure notification to nearby residents, designation of a noise coordinator, and ensure noise mitigation measures are included in the grading plan. Implementation of **Mitigation Measures NOI-1 and NOI-2** would reduce potential construction period noise impacts to sensitive receptors to less than significant levels.

Long-Term Noise Impacts. The proposed project would generate long-term noise impacts from traffic noise sources, as discussed below.

Off-site traffic noise impacts would result in a significant impact if traffic noise increased by 3 dBA or more over ambient noise levels without the project and would exceed the City's exterior noise

standards. To assess traffic noise impacts, the traffic noise levels along major roadways within the project vicinity were projected using FWHA modeling. The existing traffic volumes along local roadways in the project study area were provided by the City,[51] while truck usage and vehicle speeds on the local area roadways were estimated from field observations. It should be noted that according to the Environmental Noise and Vibration Assessment 22 light vehicles were counted on Vanden Avenue in a 10-minute traffic count. No medium or heavy trucks were observed. However, one percent medium and one percent heavy trucks were conservatively assumed for project-area roadways. Table 4.13.C lists the existing without and with project traffic noise levels on the roadway segments in the project vicinity. These noise levels represent worst-case scenarios, which assume that no shielding is provided between the traffic and the location where the noise contours are drawn. Appendix F provides the specific assumptions used in developing these noise levels and model printouts.

As shown in Table 4.13.D, the modeled traffic noise levels from road segments adjacent to the project site range from 53.0 dBA L_{dn} to 62.9 dBA L_{dn} at the closest typical setback distance of the sensitive receptors.

Table 4.13.D: Existing Traffic Noise Levels Without and With Project

Roadway	Segment	Predicted Exterior Noise Level (dBA L_{dn}) at Closest Sensitive Receptors		
		Existing No Project	Existing + Project	Change
Vanden Road	South of Alamo Drive	53.0	53.5	0.5
Vanden Road	North of Alamo Drive	57.9	58.4	0.5
Alamo Drive	East of Vanden Road	58.2	58.3	0.1
Alamo Drive	West of Vanden Road	62.9	63.0	0.1

Source: Saxelby Acoustics, 2022.
dBA = A-weighted decibels
L_{dn} = day-night average noise level

As shown in the far-right column on Table 4.13.D, the increase from baseline conditions in project-related traffic noise levels for future conditions would range from 0.1 to 0.5 dBA along the segments in the project vicinity that were analyzed. Therefore, all off-site traffic noise impacts would be less than significant, and the proposed project would not create a substantial permanent increase in ambient noise levels.

Implementation of **Mitigation Measures NOI-1 and NOI-2** would reduce potential construction period noise impacts to sensitive receptors to less than significant levels. Operational noise impacts to sensitive receptors would be less than significant. Therefore, with implementation of **Mitigation Measure NOI-1 and Mitigation Measure NOI-2**, 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 would be less than significant with mitigation incorporated.

[51] Owens, Glen. City of Vacaville Traffic Engineer. Personal email to Luke Saxelby. June 1, 2022.

b. Would the project result in generation of excessive groundborne vibration or groundborne noise levels? ***(Less Than Significant with Mitigation Incorporated)***

Ground-borne vibration from construction activity has the potential to be high when activities occur near project boundaries but would be mostly low to moderate as activities are more central to the project site. While there is currently limited information regarding vibration source levels, the levels shown in Table 4.13.E are utilized in this analysis and are based on the FTA Manual.

Table 4.13.E: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	PPV (in/sec)	L_V (VdB)[1]
Vibratory Roller	0.210	94
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] RMS VdB re 1 µin/sec.
µin/sec = microinches per second
ft = foot/feet
FTA = Federal Transit Administration
in/sec = inches per second
LV = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity in decibels

The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project boundary (assuming the construction equipment would be used at or near the project boundary). The formula for vibration transmission is provided below.

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

As stated above, it would take a minimum of 0.2 in/sec PPV for damage to occur to a non-engineered timber and masonry building. The project site is bounded by immediately adjacent existing residential uses to the north and east and existing residential uses across from Vanden Road to the west and Alamo Creek flood control channel to the south. The closest structure, located at 601 Purple Martin Drive, is approximately 8 feet from the project construction area limits. Utilizing the equation above, the operation of typical heavy construction equipment such as large bulldozers and drilling rigs at a distance of 8 feet would generate ground-borne vibration levels of 0.31 in/sec PPV which would exceed the 0.2 in/sec PPV guideline that is considered safe for non-engineered timber and masonry buildings. The use of vibratory rollers at distances of less than 26 feet may also exceed the 0.2 in/sec standard. To reduce impacts to ground borne vibration, the following mitigation measures shall be implemented:

Mitigation Measure NOI-3: **Compaction Vibration Avoidance near Sensitive Receptors.** Any compaction required less than 26 feet from the adjacent residential structures to the south should be accomplished by using static drum rollers which use weight instead of vibrations to achieve soil

compaction. As an alternative to this requirement, preconstruction crack documentation and construction vibration monitoring could be conducted to ensure that construction vibrations do not cause damage to any adjacent structures.

Mitigation Measure NOI-4: **Construction Equipment Buffer from Sensitive Receptors.** Use of bulldozers, loaded trucks, auger/drill rigs, and vibratory hammers shall occur at distances of 15 feet or greater from adjacent residential structures.

Implementation of **Mitigation Measure NOI-3** would ensure that compaction near sensitive receptors is accomplished with static drum rollers, and **Mitigation Measure NOI-4** would create a buffer from heavy construction equipment from sensitive receptors. With implementation of **Mitigation Measure NOI-3 and Mitigation Measure NOI-4,** potential vibration impacts during construction would be avoided for sensitive receptors. Therefore, impacts resulting in generation of excessive ground-borne vibration and ground-borne noise would be less than significant with mitigation incorporated.

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 2 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 the vicinity of a private airstrip. The proposed project site is also not within an airport land use plan, or within 2 miles of a public airport or public use airport. The closest airport to the project site is the Nut Tree Airport, located approximately 3 miles northwest of the project site. The project site is not within the 65 dBA CNEL noise contours of this or any other airport.[52] Therefore, the proposed project would not expose people residing or working in the project area to excessive noise levels, no impact would occur.

[52] Solano County Airport Land Use Commission. 1988. Airport/Land Use Compatibility Plan: Nut Tree Airport and Vacaville Gliderport. May.

4.14 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 an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐

a. Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? ***(Less Than Significant Impact)***

The proposed project would include the construction of 114 single-family residential units. Based on the City average household size of 2.81 persons per household,[53] the proposed project would increase the local population by approximately 320 persons. The population of the City was estimated to be approximately 103,078 persons as of July 1, 2021.[54] The anticipated population growth associated with the proposed project represents less than a 1 percent increase to the City's current population. The City's population is projected to grow by 1,987 persons to a total of 105,065 persons by 2040.[55] The proposed project represents approximately 16 percent of the population growth anticipated through 2040. Therefore, the proposed project would not result in substantial unplanned population growth in the area, and this impact would be less than significant.

b. Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? ***(Less Than Significant Impact)***

The project site is largely undeveloped, with the exception of two residential structures and associated outbuildings. Although the proposed project would result in the demolition of these existing structures, this would represent less than 0.01 percent of the 33,026[56] total households within the City and therefore would not be considered a substantial number of housing units. Additionally, because the proposed project includes the construction of 114 single-family residential units, the proposed project would result in a net gain of 112 residential units. Therefore, the proposed project would not result in the displacement of people or housing and would not require the construction of replacement housing elsewhere, and impacts would be less than significant.

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53 U.S. Census Bureau, 2021. *QuickFacts, Vacaville city, California*. Website: https://www.census.gov/quickfacts/fact/table/vacavillecitycalifornia/BZA010220 (accessed July 2022).

54 Ibid.

55 Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC). 2017. *Projections 2040*. Website: projections.planbayarea.org (accessed July 2022).

56 U.S. Census Bureau. 2021, op. cit.

4.15 PUBLIC SERVICES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i. Fire protection?	☐	☐	☒	☐
ii. Police protection?	☐	☐	☒	☐
iii. Schools?	☐	☐	☒	☐
iv. Parks?	☐	☐	☒	☐
v. Other public facilities?	☐	☐	☒	☐

a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: i. Fire protection? ii. Police protection? iii. Schools? iv. Parks? v. Other public facilities? ***(Less Than Significant Impact)***

Fire Protection. Fire suppression, emergency medical and rescue services, and other life safety services are provided to the project area and the site by the Vacaville Fire Department. There are five fire stations within the City, with the closest to the project site, Fire Station 75 at 111 Cogburn Circle, approximately 0.2 mile south of the project site.

As noted in Section 4.14, Population and Housing, the proposed project would result in an incremental increase in the population of the City and therefore incrementally increase the demand for emergency fire services and emergency medical services. However, the proposed project would be required to comply with all applicable codes for fire safety and emergency access. In addition, the Fire Department would review the site plans, fire truck access, and site fire flow design for the proposed project to ensure that adequate emergency access is provided prior to issuance of a building permit.

The Fire Department would continue providing services to the project site and would not likely require additional firefighters to serve the proposed project. The construction of a new or expanded fire station would also not be required. The potential increase in demand for service is not expected to adversely affect existing response times to the site or within the City. Additionally, the project applicant would be required to pay a fire development impact fee of $425 per dwelling unit which would be directed towards maintaining adequate service levels, ensuring that any impact to fire protection that could result from the proposed project would be offset by development fees, and in effect, reduce potential impacts to a less-than-significant level.

Police Protection. The City of Vacaville Police Department (Police Department) provides police protection to the project area and project site. The Police Department headquarters are located at 660 Merchant Street, approximately 3.1 miles northwest of the project site. As previously discussed, development of the proposed project would increase the population on the project site and incrementally increase demand for emergency police services to the project site. However, the Police Department would continue to provide service to the project site and would likely not require additional officers to serve the project. The construction of new or expanded police facilities would not be required. Additionally, the project applicant would be required to pay a police development impact fee of $949 per dwelling unit which would be directed towards maintaining adequate service levels, ensuring that any impact to police protection that could result from the proposed project would be offset by development fees, and in effect, reduce potential impacts to a less-than-significant level.

Schools. The project site is within the boundaries of the Travis Unified School District (TUSD). TUSD serves approximately 5,400 students and operates 9 schools, including five elementary schools, one middle school, one high school (grades 9–12), one alternative high school, and one community day school.[57]

The estimated number of students the proposed project would generate is derived by multiplying the number of students per dwelling unit (the student yield factor) by the number of dwelling units in the proposed project (114 new units). The California State Allocation Board Office of Public School Construction reports that the Statewide student yield factor of 0.7 students per dwelling unit is applicable for unified school districts.[58] Applying the Statewide average student yield factor, the proposed project would generate 80 students.

Senate Bill (SB) 50, which revised the existing limitation on developer fees for school facilities, was enacted as urgency legislation which became effective on November 4, 1998, as a result of the California voters approving a bond measure (Proposition 1A). SB 50 established a 1998 base amount of allowable developer fees (Level One fee) for residential construction (subject to adjustment) and prohibits school districts, cities, and counties from imposing school impact mitigation fees or other requirements in excess or in addition to those provided in the statute.

The TUSD requires payment of a school impact fee of $5.99 per square foot of residential development. The project sponsor would be required to pay this fee, prior to issuance of a certificate of occupancy. The TUSD is responsible for implementing the specific methods for mitigating school impacts under the Government Code. These fees would be directed towards maintaining adequate service levels, which would ensure that any impact to schools that could result from the proposed project would be offset by development fees, and in effect, reduce potential impacts to a less than significant level.

[57] Travis Unified School District (TUSD). 2022. *District Information*. Website: https://www.travisusd.org/domain/41 (accessed July 2022).

[58] California Office of Public School Construction. 2019. *School Facility Program Handbook*. January.

Parks. Development of the proposed project could increase the use of parks within the vicinity of the project site, including Magnolia Park, South Town Park, Cannon Station Park, and Meadowlands Park, and within the region, including Lagoon Valley Regional Park. However, this increase in use is not expected to adversely affect the physical conditions of local and regional open space areas or recreational facilities, or require the provision of new parks or facilities because the proposed project is anticipated to increase the City population by less than one percent. The proposed project would not result in a substantial increase in demand for park or recreation services in the vicinity, such that new facilities would be required to serve the project. Additionally, the project applicant would be required to pay a park and recreation development impact fee of $5,564 per dwelling unit and a greenbelt preservation fee of $296 per dwelling unit which would be directed towards funding the development of additional park sites and recreation facilities and the acquisition of greenbelt property surrounding Vacaville. These fees would ensure that any impact to parks that could result from the proposed project would be offset by development fees, and in effect, reduce potential impacts to a less than significant level. Therefore, the proposed project would have a less-than-significant impact related to the provision of park and recreational facilities.

Other Public Facilities. Development of the proposed project could also increase demand for other public services, including libraries, community centers, and public health care facilities. However, due to the minimal increase in population, the proposed project would not result in a substantial increase in the use of these facilities, such that new facilities would be needed to maintain service standards, as these facilities are not currently overused and have capacity to serve new demand. Therefore, impacts to other public facilities would be less than significant.

4.16 RECREATION

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
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?	☐	☐	☐	☒

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? ***(Less Than Significant Impact)***

Development of the proposed project could increase the use of parks within the vicinity of the project site, including Magnolia Park, South Town Park, Cannon Station Park, and Meadowlands Park, and within the region, including Lagoon Valley Regional Park. Although the proposed project would incrementally increase the use of these facilities, this minor increase in use is not expected to result in substantial physical deterioration of local parks, trails, and community centers and this impact would be less than significant. The proposed project is anticipated to increase the City's population by less than one percent and these facilities are anticipated to have capacity to serve this minimal increase in demand. Additionally, the project applicant would be required to pay a park and recreation development impact fee of $5,564 per dwelling unit and a greenbelt preservation fee of $296 per dwelling unit which would be directed towards funding the development of additional park sites and recreation facilities and the acquisition of greenbelt property surrounding Vacaville. These fees would ensure that any impact to parks that could result from the proposed project would be offset by development fees, and in effect, reduce potential impacts to a less than significant level. Therefore, the proposed project would have a less than significant impact on existing parks or other recreational facilities.

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 proposed project would involve development of the project site with residential uses. The proposed project does not include or require the construction or expansion of existing public recreational facilities. Therefore, development of the proposed project and associated recreational opportunities for use by project residents would not result in additional environmental effects beyond those described in this document, and no impact would occur.

4.17 TRANSPORTATION

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

a. Would the project conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities? ***(Less Than Significant Impact)***

The proposed project includes the construction of 114 new single-family homes and associated improvements. Vehicular access to the project site would be provided at four entry points, two of which would be located along Vanden Road on the west side of the site, one at Maverick Drive on the north side of the site, and the other at Purple Martin Drive, which consists of an emergency vehicle access on the east side of the site. Interior streets would provide vehicular access to each of the residential units. As part of the proposed project, Vanden Road would be expanded along the project frontage in order to allow for an ultimate 52-foot curb-to-curb width and ultimate 87-foot right-of way width, which matches the existing condition to the north and south of the project.

The proposed project would include a 25-foot-wide landscape strip with a 10-foot-wide meandering sidewalk along the entire project frontage, which is consistent with existing development to the north and south of the project. The proposed project would not affect access to bicycle or pedestrian facilities in the vicinity of the project site.

Roadway Analysis. On December 28, 2018, the California Office of Administrative Law and the California Governor's Office of Planning Research (OPR) cleared and adopted the revised *State CEQA Guidelines* Section 15064.3. Among the changes to the guidelines was the removal of vehicle delay and level of service (LOS) as the sole basis of determining CEQA impacts. With the implementation of the adopted guidelines, transportation impacts are to be evaluated based on a project's effect on vehicle miles traveled (VMT). On July 1, 2020, the provisions of Section 15064.3 became effective Statewide.

On May 29, 2020, the City of Vacaville (City) developed its *Traffic Impact Analysis (TIA) Guidelines for Vehicle Miles Traveled (VMT) and Level of Service Assessment*, which was most recently updated on January 11, 2021. On October 28, 2021, the City of Vacaville approved the City's updated General Plan Transportation Element and Energy and Conservation Action Strategy (ECAS) Supplemental

Environmental Impact Report (SEIR) (SCH #2020090526) to address VMT. The SEIR identified VMT as a significant and unavoidable impact and concluded with a statement of overriding considerations. Land use(s) for a specific project that are consistent with the General Plan land uses identified in the SEIR may tier off the General Plan's VMT analysis. Under this approach, VMT in the City is modeled by land use type and grouped by similar land uses within Transportation Analysis Zones (TAZs). Furthermore, the Interim Senate Bill (SB) 743 Implementation Guidelines for City of Vacaville[59]were adopted to provide guidance for specific projects within the General Plan. The discussion of the project's consistency with Section 15064.3 is discussed under Section 4.17.b, below.

Pedestrian, Bicycles, and Transit Analysis. The potential impacts of the project on pedestrian, bicycle and transit are described below.

Pedestrian Facilities. According to the U.S. Census Bureau,[60] pedestrian trips comprise approximately one percent of the total commute mode share in the City of Vacaville. The proposed project also would generate pedestrian trips to/from transit stops, recreation areas, and employment centers. The volume of pedestrian trips generated by the project would not exceed the carrying capacity of the sidewalks and crosswalks nearby.

There are currently no sidewalks along any of the project frontages, including the frontage along Vanden Road. Although very few pedestrian trips are anticipated to and from the site, the City's General Plan policies encourage non-motorized travel, including walking, bicycling, and transit.

Consistent with existing City policies, the proposed project would include a continuous sidewalk connection along its roadways including Vanden Road, Maverick Drive, and new interior roadways B, E, F, and G Streets. Therefore, the proposed project would have a less-than-significant impact on pedestrian facilities.

Bicycle Facilities. U.S. Census Bureau data indicate that bicycle trips comprise less than one percent of the total commute mode share in the City of Vacaville. The low volume of bicycle trips generated by the project would not exceed the bicycle-carrying capacity of streets surrounding the site, and the increase in bicycle trips would not by itself require new off-site bicycle facilities.

Consistent with existing City policies, the proposed project would include a continuous sidewalk connection along its roadways including Vanden Road, Maverick Drive, and new interior roadways B, E, F, and G Streets. No bike lanes (class II) facilities are present in the project vicinity; however, the General Plan Transportation Element identifies Vanden Road as a proposed bike route. The proposed project, by itself, would not require additional bicycle service to the area. The proposed project would not preclude, modify, or otherwise affect existing or proposed bicycle projects or policies identified in the General Plan Transportation

59 Fehr & Peers. 2020. *Interim SB 743 Implementation Guidelines for City of Vacaville*. October.

60 U.S. Census Bureau. 2020 Census. *5-year ACS Data Table B08134: Means of Transportation to Work by Travel Time to Work.* Website: https://data.census.gov/cedsci/table?q=B08134%3A%20MEANS%20OF%20TRANSPORTATION%20TO%20WORK%20BY%20TRAVEL%20TIME%20TO%20WORK&g=1600000US0681554&tid=ACSDT5Y2020.B08134 (accessed July 14, 2022).

Element. Therefore, the proposed project would have a less-than-significant impact on bicycle facilities.

Transit Service. Fixed-route bus service within the city is provided by City Coach, which is operated by the City of Vacaville. Service is provided by three routes operated throughout much of the city. Most of the routes either begin or end at one of the two City transportation centers: the Vacaville Transit Plaza, located at the corner of Monte Vista Avenue and Cernon Street in the Downtown, and the Vacaville Transportation Center, located at the northeasterly corner of Allison Drive and Ultais Drive. According to the U.S. Census, transit trips comprise approximately 1 percent of the total commute mode share in the City of Vacaville. In addition to commute trips, there would be additional transit trips to nearby schools, parks, and shopping areas. The low volume of transit trips generated by the project would not exceed the carrying capacity of the existing transit service to the site.

The proposed project, by itself, would not require additional transit service to the area or improvements to existing transit service frequencies. The proposed project would not preclude, modify, or otherwise affect existing or proposed transit projects or policies identified by the Vacaville Community-Based Transportation Plan. Therefore, the proposed project would have a less-than-significant impact related to transit service.

Additionally, the proposed project would be required to comply with the following Standard Conditions of Approval (SCOAs) required for all design permits, use permits, and planned developments that addresses public and private access roads:

SCOA 186: Where a Traffic Study is not required by Section 14.13.180 of the Land Use and Development Code, any traffic controls or other changes to the nearby streets required by the City Traffic Engineer shall be shown on the final development plans prior to the issuance of grading or building permits.

SCOA 188: The design and construction of all public street improvements shall conform to the City of Vacaville Public Works Department Standard Plans and Specifications for Public Improvements, latest edition, unless otherwise approved by the City Engineer or as may be required by any applicable Standard or Special Conditions of Approval.

Based on the above, and with implementation of these SCOAs, the proposed project would not conflict with an applicable plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities, and this impact would be less than significant.

*b. Would the project conflict or be inconsistent with CEQA Guidelines §15064.3, subdivision (b)? **(Less Than Significant Impact)***

The following VMT analysis is based on the Interim SB 743 Implementation Guidelines for City of Vacaville[61], OPR's *Technical Advisory on Evaluating Transportation Impacts in CEQA*[62] , and the California Air Pollution Control Officers Association (CAPCOA) Quantifying Greenhouse Gas Mitigation Measures[63]. The City's General Plan Transportation Element and ECAS Supplemental EIR (SCH #2020090526) address VMT in the City based on modeling by land use type and grouping similar land uses by TAZs.

VMT Screening Criteria. The City's Interim Guidelines present screening criteria, consistent with OPR's Technical Advisory, to identify when a proposed land use project is anticipated to result in a less than significant impact without conducting a more detailed VMT analysis. A land use project needs only to meet one of the below screening criteria to have a presumption of less than significance.

- **Small Projects**. The Technical Advisory concludes that, absent any information to the contrary, projects that generate 110 trips per day or less may be assumed to cause a less than significant transportation impact. This level of trip generation equates to about 10,000 square feet of office space, 11 single-family dwelling units, or 17 multi-family dwelling units. The project does not meet this screening criterion based on its proposed size and land use.

- **Project Near Transit Stations**: Projects located within 0.50 mile of an existing "major transit stop" or an "existing stop along a high-quality transit corridor may be presumed to have a less than significant impact absent substantial evidence to the contrary. The project site is not located within 0.50 mile of an existing major transit stop, or along a high-quality transit corridor, and therefore does not meet this screening criterion.

- **Affordable Residential Development**: Projects consisting of a high percentage of affordable housing may be assumed to cause a less than significant transportation impact on VMT because they may improve jobs-housing balance and/or otherwise generate less VMT than market-based units. The project does not include an affordable housing component and therefore does not meet this screening criterion.

- **Redevelopment Projects:** If a proposed redevelopment project leads to a net overall decrease in VMT (when compared against the VMT of the existing land uses), the project would lead to a

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61 Fehr & Peers, 2020. *Interim SB 743 Implementation Guidelines for City of Vacaville.* October. Website: https://www.ci.vacaville.ca.us/home/showpublisheddocument/17765/637514751017730000. (accessed September 26, 2022)

62 California Office of Planning and Research. 2018. *Technical Advisory on Evaluating Transportation Impacts in CEQA.* December. Website: https://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf. (accessed September 26, 2022).

63 California Air Pollution Control Officers Association (CAPCOA). 2021. *Quantifying Greenhouse Gas Mitigation Measures.* December. Website: https://www.airquality.org/ClimateChange/Documents/Final%20Handbook_AB434.pdf (accessed September 21, 2022).

less than significant transportation impact. The project consists of new single-family homes located on a vacant parcel and would not qualify as a redevelopment project.

- **Local Serving Retail:** Trip lengths may be shortened and VMT reduced by adding “local-serving" retail opportunities that improve retail destination proximity. The Technical Advisory generally describes retail development including stores less than 50,000 square feet as locally serving. The project is not a local serving retail use and therefore does not meet this screening criterion.

- **Low VMT Generating Area:** The City’s Interim Guidelines provide VMT screening maps for the most common land use types in the city. The maps present an estimate of VMT by land use for TAZs throughout the City and are used to identify areas within the City that are “low VMT generating” areas. The TAZs are color coded based on the percentage difference in VMT compared to the citywide average VMT per thousand square feet or VMT per dwelling unit. The project site is currently designed as Residential Low Density (RL) in the General Plan and based on the City’s VMT maps, the project is in an area that has a VMT that is zero to -4.9 percent below the citywide average (for single-family land use), which does not qualify as a low generating VMT area. Therefore, the project does not meet this screening criterion.

As outlined above, the proposed project does not meet any of the screening criteria identified in the City’s Interim Guidelines.

VMT Threshold of Significance for Residential Land Uses. For projects that do not qualify for any of the screening opportunities identified in the City’s Interim Guidelines, the City of Vacaville applies the following thresholds of significance when analyzing the VMT transportation impacts of residential land use projects under CEQA.

1. The project would cause a significant transportation impact if it would generate an average VMT per dwelling unit that is greater than 85 percent of the citywide average for that land use type.

2. If the above threshold is exceeded the project’s VMT impact could still be found to be less than significant if it does not cause the total VMT generated by the City of Vacaville to increase.

For Threshold 1, the City’s Interim SB 743 Implementation Guidelines provide additional specific VMT metrics by land use, based on outputs from the City’s travel demand model for the Base Year (2015). The thresholds for single-family unit uses are presented in Table 4.17.A below and are based on average VMT per dwelling unit (DU). As shown in the table, the Base Year citywide average VMT per DU is 86.4 and the significance impact threshold is 73.4, which represents 85 percent of the citywide average for that land use type. The project would need to generate a Base Year VMT per DU of 73.4 or lower to meet the City’s threshold.

For Threshold 2, as noted above, the City’s Interim Guidelines provide VMT screening maps for the most common land use types in the City. The project site is currently designated as Residential Low Density (RL) in the General Plan and based on the City’s VMT screening maps. The project site is in a TAZ that has a VMT that is zero to -4.9 percent below the citywide average (for single family dwelling unit uses). Based on the proposed land use and due to the relatively small size of the proposed project, the project would have a similar profile as its designated TAZ and, therefore,

would have a VMT per DU value that is equal to or less than the regional average. Therefore, it is anticipated that the project would meet these threshold criteria set forth in the City's Interim Guidelines.

Table 4.17.A: City of Vacaville VMT Thresholds for Single-Family Unit Uses

Land Use	Unit	Base Year (2015) (Average VMT per DU)	Threshold (Average VMT per DU)	Project TAZ VMT Per DU	Meets Criteria 1	Meets Criteria 2
Single-Family Unit	Dwelling Unit (DU)	86.4	73.4	82.2-86.4*	No	Yes

Source: Interim SB 743 Implementation Guidelines for City of Vacaville (Fehr & Peers 2021)
* VMT for this TAZ is -4.9 percent to 0 percent of the regional average.
DU = dwelling unit
SB = Senate Bill
TAZ = Traffic Analysis Zone
VMT = vehicle miles travelled

Typically, for small projects, the VMT profile is consistent with the baseline VMT profile of the TAZ that the project is located in. Therefore, consistent with the TAZ, the anticipated project VMT would be zero to -4.9 percent below the citywide average and the proposed project would be consistent with Threshold 2 because it would not cause the total VMT generated by the City of Vacaville to increase. Therefore, impacts would be less than significant.

c. Would the project substantially increase 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)***

Vehicular access to the project site would be provided at four entry points, two of which would be located along Vanden Road on the west side of the site, one at Maverick Drive on the north side of the site, and the other at Purple Martin Drive, which consists of an emergency vehicle access on the east side of the site. Interior streets would provide vehicular access to each of the residential units. As part of the proposed project, Vanden Road would be expanded along the project frontage in order to allow for an ultimate 52-foot curb-to-curb width and ultimate 87-foot right-of-way width, which matches the existing condition to the north and south of the project.

The design, construction, and maintenance of project access locations and on-site roads would be in compliance with the City's Municipal Code. Additionally, the proposed project would be required to comply with the City's **SCOAs 186 and 188** discussed in Section 4.17.a, as well as the following additional SCOAs required for all design permits, use permits, and planned developments that address public and private access roads:

> ***SCOA 192:*** Sight distance at the driveways intersecting public streets shall conform to Section 3-09 Stopping Sight Distance, and Standard Drawing 3-03 A and B and 3-04 of the Vacaville Standard Specifications. Special attention shall be given to note 1 and 2 on Standard Drawing 3-03 A and B. This may affect the location of any monument signs and landscaping, walls, etc.

SCOA 199: Intersections and expanded corners shall have a maximum 5-degree variance between 90-degree tangents and demonstrate that the corner is designed in accordance with City criteria. Developer's engineer shall adequately show that two AASHTO type SU-30 vehicle can turn the corner simultaneously, and that two cars can pass each other while making the turn with parked vehicles on each of the expanded corners to the satisfaction of the City Engineer and Director of Public Works. Developer shall also stripe the corners and intersections in accordance with City criteria.

SCOA 210: All private streets shall meet the minimum standards set forth in the City's Private Street Standards.

With implementation of these SCOAs, the proposed project would not substantially increase hazards due to a geometric design feature or incompatible uses, and impacts would be less than significant.

d. Would the project result in inadequate emergency access? ***(Less Than Significant Impact)***

The design, construction, and maintenance of project access locations and on-site roads would be in compliance with the City's Municipal Code and would meet all emergency access standards. The Vacaville Fire Department would also review the proposed site plan and Fire Access Plan and would provide input on final design in relation to emergency access prior to issuance of a building permit. The proposed project would not alter or block adjacent roadways and implementation of the proposed project would not be expected to impair the function of nearby emergency evacuation routes. Additionally, the proposed project would be required to comply with the following City SCOAs required for all design permits, use permits, and planned developments that address access roads and emergency vehicle access:

SCOA 262: Access roads with a minimum unobstructed width of 20 feet shall be provided to the front and rear of structures. A minimum vertical clearance of 13 feet 6 inches shall be provided. Access roads shall be engineered to support the imposed load of the apparatus which is typically 25 tons and shall be designed per the City Public Work's Department Standards. An access road shall be provided to within 150 feet of all exterior walls of the first floor of the buildings. The route of the access road shall be approved by the Fire Marshal. Dead-end access roads in excess of 150 feet in length shall be provided with an approved means for turning around the apparatus. The final design of the turnaround shall be reviewed and approved by the Fire Marshal prior to installation.

SCOA 263: Every building shall be accessible to Fire Department apparatus by way of all-weather access roadways during the time of construction. These roads shall have a minimum unobstructed width of 20 feet and shall be required to have a minimum 'first lift' of pavement applied which shall support the imposed load of a fire apparatus which is typically 25 tons. The developer shall be required to provide the Fire Marshal with a site plan showing the location, width, grades, and cross section of the proposed access roads to be used during construction. Permits shall not be issued, and combustible construction shall not be allowed on the site until this site plan is reviewed and approved and stamped by the Fire Department.

SCOA 265: Prior to the issuance of any grading or building permits, the Fire Marshal shall approve the location of all Emergency Vehicle Access Roads within the project site. Unless otherwise approved, the access points to any Emergency Vehicle Access Roads shall be located at the end of cul-de-sacs and across utility easements and shall be kept locked at all times with a City 1C04 lock.

SCOA 266: Prior to the issuance of any grading or building permits, the Fire Marshal shall approve the location of all Emergency Vehicle Access Roads around the perimeter of the site. Such Emergency Vehicle Access roads shall have average grades of not more than 20% with no section greater than 25%. The minimum width of such roads shall be 20 feet. Side slopes shall not exceed 4%. These roads shall be engineered to withstand a minimum load of 12 tons. At a minimum, this road shall be graded and compacted with decomposed granite or equivalent and shall be kept clear of all flammable vegetation at all times. The Fire Marshal may require the road to be surfaced with pavement if it is determined the road will not be or is not being properly maintained in accordance with these standards.

SCOA 267: The Fire Marshal shall identify on the final site development plans where metal grates shall be provided for emergency fire apparatus cross V-ditches in the event of a fire or emergency. These grates shall have a minimum width of 10 feet and be designed and engineered to accommodate a minimum load of 12 tons.

With implementation of these SCOAs, the proposed project would have a less than significant impact on emergency access.

4.18 TRIBAL CULTURAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i. 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	☐	☐	☐	☒
ii. 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 Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒

Assembly Bill (AB) 52, a law signed by then-Governor Jerry Brown in 2014, amended CEQA to require tribal cultural resources to be considered as potentially significant cultural resources under the CEQA environmental review process. The procedures under AB 52 offer tribes an opportunity to take an active role in the CEQA process in order to protect tribal cultural resources. Pursuant to AB 52, if a Native American identifies tribal cultural resources within a project site, the Native American shall contact the local Lead Agency.

As discussed in Section 4.5, Cultural Resources, the findings of the Cultural Resources Evaluation[64] support a finding that there are no known historical resources listed or eligible for listing in the California Register of Historical Resources (CRHR) at the project site. To address tribal cultural resources, the Native American Heritage Commission (NAHC) was contacted on November 29, 2021, to conduct a Sacred Lands File search and provide a Native American Consultation List for the project. The NAHC responded on February 17, 2022, that the Sacred Lands File search was negative for the presence of tribal cultural resources and provided a list of Native American contacts to be sent project notification letters per AB 52. On March 4, 2022, the regionally affiliated tribe (Yocha Dehe Wintun Nation) responded by letter indicated they have a cultural interest and would like to schedule a site visit. On April 5, 2022, a site visit was conducted with the Applicant, City staff, and YDWN staff. On May 6, 2022, the City received a response letter from YDWN to conclude

64 Archeo-Tec, 2022, op. cit.

consultation. YDWN stated no cultural monitor was needed for the project, but recommended cultural sensitivity training for any pre-project personnel

a. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: i. 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 ii. 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 Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe. ***(No Impact)***

As discussed in the Cultural Resources Evaluation (Appendix C) completed for the proposed project, record searches were conducted on November 30, 2021, at the Northwest Information Center of the California Historical Resources Information System, which identified no archaeological resources within the boundary of the project site and only two historic-period cultural resources within a 0.5-mile search radius. Field surveys conducted on December 3, 2021, and June 3, 2022, and 17 subsurface manual test excavations completed between June 7, 2022, and June 9, 2022, did not identify any archaeological artifacts or sites or built-environment historical resources at the project site. Two historic period resources, including elements of an early 20th century farmstead and mid-20th century irrigation system were identified; however, it was determined that these resources were not eligible for listing in the National Register of Historic Places (NRHP) or the CRHR under any criteria.

Native American consultation was conducted in compliance with AB 52. On February 18, 2022, AB 52 consultation letters were sent to all Native American contacts identified by the NAHC. No responses or requests for consultation were received as a result of the AB 52 consultation letters.

As such, there are no known significant archaeological or tribal cultural resources within the project site, and the proposed project would not cause a substantial adverse change in the significance of a tribal cultural resource defined as 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 CRHR or in a local register of historical resources as defined in PRC Section 5020.1(k).

Additionally, there are no tribal cultural resources within the project site that have been determined by the lead agency to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. The proposed project would not cause a substantial adverse change in the significance of a tribal cultural resource defined as 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 CRHR or in a local register of historical resources as defined in PRC Section 5020.1(k).

No impacts would occur to tribal cultural resources.

4.19 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 water 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?	☐	☐	☒	☐

a. Would the project 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? ***(Less Than Significant Impact)***

The City of Vacaville maintains existing sanitary sewer lines within the vicinity of the site, including a 24-inch line within the existing portion of Vanden Road to the west of the project site that runs through the southern portion of the project site eastward to Purple Martin Drive. The proposed project would include the installation of new 15-inch and 24-inch lines throughout the project site that would tie into the existing 24-inch lines. The new sanitary sewer line would be constructed in conformance with City standards, and its construction would not cause significant environmental effects.

The project site is served by water provided by the City of Vacaville via existing 12-inch mains located within Vanden Drive and Purple Martin Drive. The City's potable water supply is sourced from both surface and groundwater from a variety or reserves including the Solano Project, State Water Project (North Bay Aqueduct), Settlement Water provided by the Division of Water Rights, and municipal groundwater wells. The City's water system consists of two surface water treatment plants, thirteen groundwater wells (ten active), nine storage reservoirs, five booster pump stations, and over 340 miles of distribution and transmission pipelines.[65]

[65] City of Vacaville, 2021. *City of Vacaville 2020 Urban Water Management Plan.* June.

The City updated its Urban Water Management Plan (UWMP) in 2020, which was adopted in 2021. According to the UWMP, the annual water use in 2020 was 18,295 acre-feet. As discussed in Section 4.19.b, the proposed project would not substantially increase demand for water and would therefore not exceed the capacity of existing water treatment facilities. The proposed project would not require the construction of new water treatment facilities, or the expansion of existing facilities, other than those already planned as part of the City's Water Master Plan. The proposed project would include the installation of new 8-inch water lines on the site that would connect to the existing 12-inch mains located within Vanden Drive and Purple Martin Drive. The proposed project would connect directly to existing mains, which have sufficient capacity to accommodate the proposed project. Therefore, the impact of the proposed project on water infrastructure would be less than significant.

The proposed storm drainage infrastructure would include the construction of 18-inch storm drains with associated catch basins and manholes that would drain towards the eastern edge of the site into dual purpose detention basins, which would connect to an existing 24-inch stormwater drain located on Purple Martin Drive, which ties into the 48-inch mains on Leisure Town Road. The existing mains have sufficient capacity to accommodate the proposed project. Additionally, the project will incorporate a detention basin that will provide water quality treatment and slow the outflow rate, and on-site drainage would be designed consistent with the Phase II Small Municipal Separate Storm Sewer System (MS4) Program requirements for low impact development (LID). Therefore, the impact of the proposed project on stormwater infrastructure would be less than significant.

The proposed project would include connections to the existing Pacific Gas & Electrical Company electrical and gas infrastructure that runs adjacent to the project site on Vanden Road, and would not require any new infrastructure, aside from project-specific tie-ins and lines to serve the proposed project.

Therefore, because the proposed project would connect to existing utility services within or adjacent to the project site, the relocation or reconstruction of new or expanded water, wastewater treatment or stormwater drainage, electric power, or telecommunications facilities would not be required, and this impact would be less than significant.

b. Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years? ***(Less Than Significant Impact)***

The City of Vacaville provides water to the project site. As previously discussed, the City's potable water supply is sourced from both surface and groundwater from a variety or reserves including the Solano Project, State Water Project (North Bay Aqueduct), Settlement Water provided by the Division of Water Rights, and municipal groundwater wells. In 2020, the majority of the City's water supply came from local water sources, with 77 percent of the City's water coming from groundwater

and the Solano Project. The remaining 23 percent consisted of State Water Project water and Settlement Water.[66]

The City's 2020 UWMP describes the projected water supplies from each source and compares those to the projected demand over the next 25 years, in 5-year increments. The City has determined that groundwater and surface supplies are projected to meet or exceed projected water demands, even during extended drought conditions and that the future water supply will be adequate to offset future water demands during a normal year, a single dry year, and a five-consecutive-year drought.[67]

The existing water system infrastructure has adequate capacity to serve the proposed project. In addition, the proposed project would be required to coordinate with the City of Vacaville Fire Department to assess fire flow requirements and comply with them as part of the project. Based on the above, the City would have sufficient water supply to support the proposed project, and implementation of the project would not require new or expanded entitlements for water supplies, and impacts related to water supply would 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 City of Vacaville owns and operates its municipal wastewater collection system containing over 200 miles of sanitary sewer mains and seven lift stations. Wastewater is treated at the Easterly Wastewater Treatment Plant located at 6040 Vaca Station Road in Elmira, which treats an average of 7.5 million gallons of wastewater a day before it is released into Alamo Creek.[68] The design average dry weather flow capacity of the facility is 15 million gallons of wastewater per day[69]; therefore, the facility only treats an average of approximately 50 percent of its capacity on a daily basis.

The proposed project would generate domestic wastewater, treated by the Easterly Wastewater Treatment Plant. Considering the treatment plant only treats an average of approximately 50 percent of its capacity on a daily basis, the City would have sufficient capacity to serve the proposed project. Therefore, wastewater generated from the proposed project would not cause the Easterly Wastewater Treatment Plant to violate any wastewater treatment requirements, and this impact would be less than significant.

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66 Ibid.

67 Ibid.

68 City of Vacaville. *Wastewater Treatment*. Website: https://www.ci.vacaville.ca.us/government/utilities/sewer/wastewater-treatment (accessed July 2022).

69 California Regional Water Quality Control Board Central Valley Region (RWQCB). 2019. *Order R5-2019-0049, NPDES No. CA0077691, Waste Discharge Requirements for the City of Vacaville Easterly Wastewater Treatment Plant, Solano County*. June 7.

d. 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? ***(Less Than Significant Impact)***

The City of Vacaville currently contracts with Recology Vacaville Solano to provide weekly solid and yard waste, and recyclable material collection to Vacaville residents. In 2010, Vacaville's per capita disposal rate was 4.9 pounds per resident per day, well below the city's California Integrated Waste Management Board (CIWMB) target disposal rate of 6.5, but slightly above the statewide average of 4.5[70]. Solid waste collected from Vacaville is deposited at the Hay Road Landfill, located at 6426 Hay Road in Vacaville. The landfill has a capacity of 37,000,000 cubic yards, a remaining capacity of 30,433,000 cubic yards, and can accept 2,400 tons per day. [71]

On average, single-family uses generate approximately 12 pounds per household per day. Based on these rates, the proposed project would generate approximately 1,368 pounds per day of solid waste. As noted above, the Hay Road Landfill has adequate capacity to serve the proposed project. As such, the project would be served by a landfill with sufficient capacity to accommodate the project's waste disposal needs, and impacts associated with the disposition of solid waste would be less than significant.

e. Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste? ***(Less Than Significant Impact)***

The proposed project would comply with all federal, State, and local solid waste statutes and/or regulations related to solid waste and, as noted above, the Hay Road Landfill has adequate capacity to serve the proposed project. Therefore, the proposed project would result in a less than significant impact related to solid waste regulations.

70 City of Vacaville. 2021. *Vacaville General Plan and ECAS EIR, Utilities and Service Systems*.

71 California Department of Resources Recycling and Recovery (CalRecycle). 2019. SWIS Facility Detail. Recology Hay Road (48-AA-0002). Website: https://www2. calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1184?siteID=3582 (accessed July 2022).

4.20 WILDFIRE

	Potentially Significant Impact	Less Than Significant 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?	☐	☐	☒	☐

*a. Would the project substantially impair an adopted emergency response plan or emergency evacuation plan? **(Less Than Significant Impact)***

The project site is not located within any State responsibility areas (SRA) for fire service.[72] In addition, as noted in Section 4.9.f, the proposed project would not impair the implementation of, or physically interfere with, and adopted emergency response plan. Therefore, this impact would be less than significant.

*b. 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)***

Refer to Section 4.20.a, above. Additionally, as noted in Chapter 2.0, Project Description, the project site is bound by existing development on three sides. Therefore, the proposed project would not exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire, and this impact would be less than significant.

[72] California Department of Forestry and Fire Protection (CAL FIRE). FHSZ Viewer. Website: https://egis.fire.ca.gov/FHSZ/(accessed July 2022).

c. 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)***

Refer to Section 4.20.a. The proposed project is not located within an SRA for fire service and is not within a very high fire hazard severity zone. Therefore, the proposed project would not require the installation or maintenance of associated infrastructure, and this impact would be less than significant.

d. 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)***

Refer to Section 4.20.a and 4.20.b. The proposed project would not expose people or structures to significant risks as a result of post-fire slope instability or drainage and runoff changes. Impacts would be less than significant, and mitigation is not required.

4.21 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below 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?	☐	☒	☐	☐

The Mandatory Findings of Significance section discusses the potential of the proposed project to degrade the quality of the environment and any biological habitats. Impacts on a cumulative basis are also discussed, as well as the project having any environmental impacts that would cause substantial direct or indirect adverse impacts on human beings.

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 with Mitigation Incorporated)***

The proposed project involves the demolition of the existing residential structures and associated outbuildings on the project site and the construction of 114 new single-family residential units and associated improvements. Implementation of the proposed project would have the potential to adversely impact sensitive natural communities, special-status animals, and previously undiscovered cultural resources, and/or human remains. However, with implementation of the mitigation measures recommended in this Initial Study, including **Mitigation Measures AIR-1, BIO-1 through BIO-25, CULT-1 through CULT-3, GEO-1, NOI-1 through NOI-4, and WQ-1 through WQ-5** and compliance with City requirements and standard conditions of approval, development of the proposed project would not: (1) degrade the quality of the environment; (2) substantially reduce the habitat of fish or wildlife species; (3) cause a fish or wildlife population to drop below self-sustaining levels; (4) threaten to eliminate a plant or animal community; (5) reduce the number or restrict the range of a rare or endangered plant or animal species; or (6) eliminate important examples of the major periods of California history or prehistory. Impacts would 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 with Mitigation Incorporated)***

CEQA defines cumulative impacts as "two or more individual effects which, when considered together, are considerable, or which can compound to increase other environmental impacts." Section 15130 of the *State CEQA Guidelines* requires evaluation of potential environmental impacts when the project's incremental effect is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of "reasonably foreseeable probable future" projects, per *State CEQA Guidelines* Section 15355. Cumulative impacts can result from a combination of the proposed project together with other closely related projects that cause an adverse change in the environment. Cumulative impacts can result from individually minor but collectively significant projects taking place over time.

When future development proposals are considered by the City, these proposals would undergo environmental review pursuant to CEQA, and when necessary, mitigation measures would be adopted as appropriate. In most cases, this environmental review and compliance with project conditions of approval, relevant policies and mitigation measures, and the City General Plan, and compliance with applicable regulations would ensure that significant impacts would be avoided or otherwise mitigated to less than significant levels.

For all of the topics discussed in this Initial Study, the proposed project's impacts would be individually limited and not cumulatively considerable, because the impacts are either temporary in nature (i.e., limited to the construction period) or limited to the project site (i.e., accidental discovery). The potentially significant impacts that can be reduced to a less than significant level with implementation of recommended mitigation measures include the topics of, air quality, biological resources, cultural resources, geology and soils, and noise. These impacts would primarily be related to construction-period activities, would be temporary in nature, and would not substantially contribute to any potential cumulative impacts associated with these topics. For the topic of air quality, potentially significant impacts to air quality standards associated with project construction would be reduced to less than significant levels with implementation of **Mitigation Measure AIR-1**. For the topic of biological resources, implementation of **Mitigation Measures BIO-1 through BIO-17** would ensure that impacts related to special-status-species and local ordinances are reduced to a less than significant level. For the topic of cultural resources, potentially significant impacts to archaeological resources would be reduced to less than significant levels with implementation of **Mitigation Measures CULT-1 through CULT-3**. For the topic of geology and soils, potentially significant impacts related to paleontological resources would be reduced to less than significant levels with implementation of **Mitigation Measure GEO-1**. For the topic of noise, impacts would be reduced to a less than significant level with implementation of **Mitigation Measures NOI-1 through NOI-4.** For the topic of water quality, impacts would be reduced to a less than significant level with implementation of **Mitigation Measures WQ-1 through WQ-5.**

All environmental impacts that could occur as a result of the proposed project would be reduced to a less than significant level through the implementation of the mitigation measures recommended

in this document. Implementation of these measures would ensure that the impacts of the project would be below established thresholds of significance and that these impacts would not combine with the impacts of other cumulative projects to result in a cumulatively considerable impact on the environment as a result of project development. Therefore, this impact would be less than significant.

c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? ***(No Impact)***

The proposed project would not result in any environmental effects that would cause substantial direct or indirect adverse effects to human beings, beyond those topics previously discussed in Sections 4.1 through 4.21 of this Initial Study.

5.0 LIST OF PREPARERS

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6.0 REFERENCES

Archeo-Tec. 2022. Extended Phase I Cultural Resources Evaluation for the Vanden Cove Project. July 22.

Association of Bay Area Governments (ABAG). 2010. Taming Natural Disasters Multi-Jurisdictional Local Hazard Mitigation Plan for the San Francisco Bay Area. 2010 Update of 2005 Plan. Website: https://abag .ca.gov/sites/default/files/theplan-chapters-intro.pdf (accessed September 2022).

Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC). 2017. *Projections 2040*. Website: projections.planbayarea.org (accessed July 2022).

California Air Pollution Control Officers Association (CAPCOA). 2021. *Quantifying Greenhouse Gas Mitigation Measures.* December. Website: https://www.airquality.org/ClimateChange/ Documents/ Final%20Handbook_AB434.pdf (accessed September 21, 2022).

California Air Resources Board (CARB). 2017. *California's 2017 Climate Change Scoping Plan*. November.

_____. 2021. *Draft 2022 Scoping Plan Update*. May 10. Website: https://ww2.arb.ca.gov/sites/ default/files/2022-05/2022-draft-sp.pdf (accessed August 2022).

_____. 2022. *2017 Off-road Diesel Emission Factors*. Website: https://arb.ca.gov/emfac/emissions-inventory (accessed September 2022).

California Code of Regulations, Title 14, Division 2, Chapter 8, Subchapter 1.

California Department of Conservation (DOC). 2018. Division of Land Use Resource Protection. California Important Farmland Finder. Website: maps.conservation.ca.gov/dlrp/ciff (accessed July 1, 2022).

California Department of Fish and Wildlife (CDFW). 2018. *California Natural Communities List*. Website: nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153398&inline (accessed August 26, 2022).

California Department of Forestry and Fire Protection (CAL FIRE). FHSZ Viewer. Website: https:// egis.fire.ca.gov/FHSZ/ (accessed July 1, 2022).

California Department of Resources Recycling and Recovery (CalRecycle)., 2019. *SWIS Facility Detail. Recology Hay Road (48-AA-0002).* Website: https://www2. calrecycle.ca.gov/SolidWaste/ SiteActivity/Details/1184?siteID=3582 (accessed July 2022).

California Department of Transportation (Caltrans). 2018. California State Scenic Highway System Map. 2018. Website: https://caltrans.maps.arcgis.com/apps/webappviewer/index. html?id= 465dfd3d807c46cc8e8057116f1aacaa (accessed July 1, 2022).

California Energy Commission (CEC). 2020a. *Electricity Consumption by County*. Website: http://www.ecdms.energy.ca.gov/elecbycounty.aspx (accessed September 2022).

_____. 2020b. *Final 2019 Integrated Energy Policy Report*. Website: https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2019-integrated-energy-policy-report/2019-iepr, docketed February 2020 (accessed September 2022).

_____. 2020c. *2020 Gas Consumption by County*. Website: http://www.ecdms.energy.ca.gov/gasbycounty.aspx (accessed September 2022).

California Environmental Protection Agency (CalEPA). 2020. *Cortese List Data Resources*. Website: calepa.ca.gov/sitecleanup/corteselist/ (accessed July 2022).

California Office of Public School Construction. 2019. *School Facility Program Handbook*. January.

California Regional Water Quality Control Board (RWQCB). Central Valley Region. 2013. Order No. 2009-0009-DWQ, NPDES No. CAS000002, as amended by Orders No. 2010-0014-DWQ, and 2012-0006-DWQ, Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities (accessed August 19, 2022).

_____. 2019a. *Order No. 2013-001-DWQ, NPDES No. CAS000004, as amended by Order 2015-0133-EXEC, Order WQ 2016-0069-EXEC, Order 2017-XXXX-DWQ, Order 2018-0001-EXEC, and Order 2018-0007-EXEC, National Pollutant Discharge Elimination System (NPDES) General Permit for Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s)* (accessed August 19, 2022).

_____. 2019b. *Order R5-2019-0049, NPDES No. CA0077691, Waste Discharge Requirements for the City of Vacaville Easterly Wastewater Treatment Plant, Solano County*. June 7.

_____. 2019c. *Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region. Fifth Edition*. Website: https://www.waterboards.ca.gov/centralvalley/water_issues?basin_plans/sacsjr_201902.pdf (accessed August 19, 2022).

_____. 2022. *Order No. R5-2022-006, NPDES No. CAG995002, General Waste Discharge Requirements for Limited Threat Discharges to Surface Waters*.

California State Mining and Geology Board. 2014. Surface Mining Reclamation Act Regulations. California Code of Regulations, Title 14, Division 2, Chapter 8, Subchapter 1.

California Stormwater Quality Association. 2019. Stormwater BMP Handbook for Construction. December. Website: https://www.casqa.org/resources/bmp-handbooks/construction. (accessed September 21, 2022).

City of Vacaville. 2015. *City of Vacaville General Plan.*

_____. 2020. *Vacaville Zoning and General Plan Map as of January 2020.* January. Website: https://www.ci.vacaville.ca.us/government/community-development/citywide-general-plan-zoning-maps?locale=en (accessed September 21, 2022).

_____. 2021. *City of Vacaville 2020 Urban Water Management Plan*. June.

_____. 2021. *City of Vacaville General Plan and Energy and Conservation Action Strategy (ECAS) EIR.*

_____. 2022. Municipal Code. Codified through Ordinance 1796. Title 14.26 Urban Stormwater Quality Management. Website: https://www.codepublishing.com/CA/Vacaville/#!/Vacaville14/Vacaville1426.html (accessed August 19, 2022).

_____. *Wastewater Treatment*. Website: https://www.ci.vacaville.ca.us/government/utilities/sewer/wastewater-treatment (accessed July 2022).

Federal Emergency Management Act. 2009. *Flood Insurance Rate Map No. 06095C027E*. May. Website: https://msc.fema.gov/portal/search?AddressQuery=5730%20Vanden%20Road%2C%20Vacaville%2C%20CA#searchresultsanchor (accessed August 17, 2022).

Federal Highway Administration (FHWA). 2006. *Roadway Construction Noise Model*. February 15.

Federal Transit Administration (FTA). 2018. Office of Planning and Environment. *Transit Noise and Vibration Impact Assessment Manual, FTA-VA-90-1003-06*. September.

Fehr & Peers. 2020. *Interim SB 743 Implementation Guidelines for City of Vacaville*. October.

Governor's Office of Planning and Research (OPR). 2018. *Technical Advisory on Evaluating Transportation Impacts in CEQA*.

LSA Associates, Inc. (LSA). 2012. *Solano Multispecies Habitat Conservation Plan*. October.

Ramboll. 2022. *Air Quality, Greenhouse Gas, and Energy Technical Report for the Vanden Estates Project*. July.

Saxelby Acoustics. 2022. *Environmental Noise and Vibration Assessment, Vanden Estates Residential.* July 27.

Solano County. 2008. *Solano County General Plan*.

Solano Subbasin Groundwater Sustainability Agency (GSA). 2021. *Solano Subbasin Groundwater Sustainability Plan*. November 30.

Swaim Biological Inc. 2022. *Biological Resources Assessment for the Vanden Estates Project*. July.

Swainson's Hawk Technical Advisory Committee. 2000. *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley.* May 31. Website: https://nrm.dfg.ca.gov/ FileHandler.ashx?DocumentID=83990 (accessed September 21, 2022).

Travis Unified School District (TUSD). 2022. District Information. Website: https://www.travisusd.org/domain/41 (accessed July 2022).

TRC. 2021. *Phase I Environmental Site Assessment. Zocchi, Orr, and Neukirch Parcels*. November 4.

_____. 2022. *Geotechnical Investigation, Vanden Road Residential Development*. February 23.

United States Census Bureau. 2020 Census. 5-year ACS Data Table B08134: Means of Transportation to Work by Travel Time to Work. Website: https://data.census.gov/cedsci/table?q=B08134%3A% 20MEANS% 20OF%20TRANSPORTATION%20TO%20WORK%20BY%20TRAVEL% 20TIME% 20TO% 20WORK&g=1600000US0681554&tid=ACSDT5Y2020.B08134 (accessed on July 14, 2022).

_____. 2021. QuickFacts, Vacaville city, California. Website: https://www.census.gov/quickfacts/fact/table/vacavillecitycalifornia/BZA010220 (accessed July 2022).

United States Department of Energy (DOE). *Fuel Economy Guide. Electric*. Website: https://www.fueleconomy.gov/feg/evsbs.shtml (accessed September 2022).

United States Fish and Wildlife Service (USFWS). 2021. National Wetland Inventory (NWI). Online GIS database. Website: https://www.fws.gov/wetlands/ (accessed on August 26, 2022).

7.0 MITIGATION MONITORING AND REPORTING PROGRAM

This Mitigation Monitoring and Reporting Program (MMRP) is formulated based on the findings of the IS/MND. The MMRP, which is included in Table 7.A, lists mitigation measures prescribed in the IS/MND prepared for the Vanden Cove Subdivision Project and identifies mitigation monitoring requirements.

This MMRP has been prepared to comply with the requirements of State law (PRC Section 21081.6). State law requires the Lead Agency to adopt an MMRP when mitigation measures are required to avoid significant impacts. The MMRP is intended to ensure compliance with the mitigation measures identified in the IS/MND during implementation of the project.

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
SCOA 208	Plans submitted for Building, Grading, or Underground Permits shall indicate the exact location and design of all exterior lighting fixtures and shall include a photometric plan. All lighting shall be shielded or placed such that it does not shine directly on any adjoining properties or impact traffic on adjacent streets. Lighting shall be subject to the approval of the Director of Community Development.	Prior to issuance of grading or building permits	Project Applicant/ Engineer	City of Vacaville/ Director of Community Development	Prior to issuance of grading or building permits	Approval of photometric plan by the Director of Community Development
SCOA 209	A photometric plan shall be required for the proposed lighting. Minimum lighting of one (1) foot candle and a maximum six (6) foot candles shall be provided on the site.	Prior to issuance of grading or building permits	Project Applicant/ Engineer	City of Vacaville/ Director of Community Development	Prior to issuance of grading or building permits	Approval of photometric plan by the Director of Community Development
MM AIR-1: Air Quality Dust Control Measures	The following construction dust control measures shall be implemented by the project applicant, or their designee, during construction activities: ● Water all active construction sites at least twice daily. Frequency should be based on the type of operation, soil, and wind exposure. ● Haul trucks shall maintain at least 2 feet of freeboard. ● Cover all trucks hauling dirt, sand, or loose materials. ● Appy non-toxic binders (e.g., latex acrylic copolymer) to exposed areas after cut and fill operations and hydroseed area. ● Apply chemical soil stabilizers on inactive construction areas (disturbed	During construction	Project Applicant/ Contractor	City of Vacaville	During construction	Successful implementation of dust control measures during construction activities

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	lands within construction projects that are unused for at least four consecutive days). ● Plant tree windbreaks on the windward perimeter of construction projects if adjacent to open land. ● Plant vegetative ground dover in disturbed areas as soon as possible. ● Cover inactive storage piles. ● Sweep streets if visible soil material is carried out from the construction site. ● Treat site accesses to a distance of 100 feet from the paved road with 6 to 12-inch layer of wood chips or mulch. ● Treat site accesses to a distance of 100 feet from the paved road with 6-inch layer of gravel.					
MM BIO-1: Burrowing Owl Pre-Construction Surveys	Between February 1 and August 31, a Solano HCP approved Biologist shall conduct preconstruction surveys in known and suitable habitat areas to identify and subsequently avoid nesting areas for burrowing owls, including within 500 feet of planned work activities, access roads, and staging areas. Surveys shall be conducted within 14 days of the anticipated start of construction and shall follow standard Solano HCP protocols. An additional survey is required 24 hours before construction work will start. If a lapse in project-related construction work of 14 days or longer occurs during the nesting season, additional pre-	Prior to construction	Solano HCP Approved Biologist	City of Vacaville/ Solano HCP Approved Biologist	Prior to construction	Completion of preconstruction surveys for burrowing owls

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	construction surveys shall be required before project work may be reinitiated.					
MM BIO-2: Burrowing Owl Construction Buffers and Exclusion	The following measures shall be implemented for new construction activities if preconstruction surveys find burrowing owls to be present in the project site: 1. During the non-breeding season (September 1 through January 31), a circular exclusion zone with a radius of 250 feet shall be established around occupied burrows by the Contractor. 2. If an adequate exclusion zone cannot be established during the non-breeding season (except as provided below for buffer modifications), burrowing owls may be evicted from the entire construction area using passive relocation techniques and vegetation management provided suitable alternative burrows are located within 330 feet of the occupied burrows and can be protected during project construction or until such time that burrowing owls can be actively relocated (see Mitigation measure BIO-3). When possible a qualified biologist should try to identify resident and migrant owls during the preconstruction surveys. The Contractor shall prepare an Exclusion Plan for review and approval by the Solano County Water Agency (SCWA),	Prior to and curing construction	Solano HCP Approved Biologist/ Project Contractor	Solano HCP Approved Biologist/ HCP Technical Review Committee/ SCWA	During construction	Implementation and installation of burrowing owl construction buffers and exclusions

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	the California Department of Fish and Wildlife (CDFW), and the United States Fish and Wildlife Service (USFWS). The Exclusion Plan shall address the following minimum requirements. d. An assessment of available suitable burrows within 330 feet of the edge of the construction area and the extent of suitable contiguous foraging habitat remaining. e. Provisions to install artificial burrows if suitable donor burrows are not present. f. A maintenance and monitoring program that includes a minimum of 2 years following completion of the project that resulted in impacts. The maintenance program shall include provisions to maintain artificial burrows, if required, in usable condition and maintain vegetation height at 6 inches or less within 50 feet of the burrows. g. Protocols to confirm that the burrow(s) is unoccupied by burrowing owls and other species prior to destruction. Protocols shall include: 1. Properly functioning one-way doors shall be installed in all suitable burrows and in place for a minimum of 48 hours prior to burrow excavation;					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	2. Twice daily monitoring to confirm evidence that owls have been excluded from the burrow; and 3. Scoping of the burrows to confirm absence. h. Procedures for how the burrow(s) will be excavated. Excavation using hand tools with refilling to prevent reoccupation is preferable whenever possible (may include using piping to stabilize the burrow to prevent collapsing until the entire burrow has been excavated and it can be determined that no owls reside inside the burrow). i. Removal of other potential owl burrow surrogates or refugia on site. j. Monitoring of the site to evaluate success and, if needed, to implement remedial measures to prevent subsequent owl use to avoid take. k. Measures to make the site inhospitable to burrowing owls and fossorial mammals (e.g., by allowing vegetation to grow tall, heavy disking, or immediate and continuous grading) until activity is complete.					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	l. Reports describing the exclusion activities shall be submitted to SCWA. 3. During the breeding season (February 1st through August 31st), a Solano HCP approved Biologist shall establish a circular exclusion zone with a radius of 450 feet around each occupied burrow. No construction-related activity (e.g., site grading, staking, surveying, or use of any construction equipment) shall occur in the exclusion zone during the breeding season. Once the breeding season is over (e.g., the young have fledged and are no longer dependent on the adults), passive relocation may proceed as described under Mitigation Measure BIO-2 Section 2 and Mitigation Measure BIO-3 Section 1. 4. Construction buffer widths may be reduced from the 450-foot- wide breeding season buffers and 250-foot-wide non-breeding season buffers in accordance with the following requirements: m. A site-specific analysis prepared by a Solano HCP approved Biologist indicates that the nesting pair(s) or wintering owl(s) would not be adversely affected by construction activities. SCWA, in consultation with the HCP Technical Review Committee, must approve this					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	analysis in writing before construction can proceed. n. Monitoring by a Solano HCP approved Biologist is conducted for sufficient time (during all construction activities for a minimum of 10 consecutive days following the initiation of construction), the burrowing owls do not exhibit adverse reactions to construction activities (e.g., changes in behavioral patterns, reactions to noise), and the burrows are not in danger of collapse due to equipment traffic. o. Monitoring by a Solano HCP approved Biologist is continued at least once a week through the nesting/wintering cycle at that site, and no change in behavior by the owls is observed. This longer-term monitoring may be reduced to a minimum of 2 hours in the morning and 2 hours in the afternoon during construction activities; however, additional and more frequent monitoring may be required if any adverse reactions are noted. p. Monitoring reports from a Solano HCP approved Biologist are submitted to SCWA. If adverse effects are identified, construction activities shall cease					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	immediately, and construction shall not resume until the Approved Biologist, in consultation with SCWA, CDFW, and USFWS, has determined that construction may continue under modified restrictions or that nesting activity is complete.					
MM BIO-3: Burrowing Owl Nest Relocation or Translocation	Covered projects compliant with Solano HCP measures may not cause the disturbance, destruction, or conversion of active burrowing owl nests. In order to prevent disturbance to active nests, applicants shall either: (a) passively relocate resident burrowing owls prior to the nesting season onto suitable conserved lands; or (b) cooperate with and provide funding to SCWA to implement an Active Burrowing Owl Translocation Study to relocate the owls (amount to be determined based on cost of owl relocation). Determinations of the appropriate approach will be based on the best likely outcome for owls considering: (a) any conserved habitat availability near the affected nest site, and (b) the best available science. A biological assessment report shall be prepared by a Solano HCP approved Biologist for the reserve site where owls will be relocated. The assessment will discuss in detail the suitability of the site to support both foraging and nesting burrowing owls. 1. **Passive Relocation.** Project applicants may propose to passively relocate	Prior to and during construction	Project Applicant	City of Vacaville/ SCWA/ CDFW/ USFWS	Prior to and during construction	Completion of passive relocation or active translocation of any resident burrowing owls in accordance with all requirements

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	resident burrowing owls per Mitigation Measure BIO-2 above. Passive relocation may be permitted at the discretion of SCWA, CDFW, and USFWS based on potential protected and managed habitat near the affected nest site and the best available science under the following conditions: q. Sufficient and suitable burrows on conserved lands consistent with the criteria identified in Mitigation Measure BIO-5 below are present within 330 feet of the nest site. r. A passive relocation assessment shall be prepared to determine if passive relocation is preferable to active relocation. In this case, a passive relocation plan following CDFW's 2012 Staff Report on Burrowing Owl Mitigation (CDFW 2012 or as updated) shall be submitted to SCWA, CDFW, and USFWS. If approved, the plan shall be implemented and the passive relocation shall include but not be limited to monitoring of the passively relocated owls for a minimum of two years. 2. **Active Translocation.** If resident burrowing owls are not passively relocated onto conserved land, the City of Vacaville in collaboration with SCWA shall develop and implement a					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	scientific study to actively relocate the affected owls to suitable habitat, upon CDFW and USFWS approval. The Active Burrowing Owl Translocation Study shall evaluate the translocation of burrowing owls from active nests affected by the project to a release site on reserves within the Solano HCP Plan Area. A protocol for capture, acclimatization aviaries, holding period, feeding and other methods shall be developed by the City of Vacaville in collaboration with SCWA based on best available science. Active translocation shall be managed by the City of Vacaville and SCWA as applicable upon CDFW and USFWS approval. If owls are actively translocated, habitat enhancement shall include the relocation site. CDFW and USFWS review and approval of the Active Burrowing Owl Relocation Study is required unless CDFW or USFWS provides documentation that it lacks the resources to complete the review. If that is the case, the City of Vacaville in collaboration with SCWA shall instead obtain the review and written acceptance from a qualified burrowing owl expert with demonstrated successful burrowing owl relocation experience and authorship of scientific literature on burrowing owl, or another					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	combination of burrowing owl experience approved by CDFW and USFWS.					
MM BIO-4: Mitigation for Direct, Indirect, and Temporary Effects to Foraging Burrowing Owl Habitat	Mitigation measures for effects to burrowing owl are applicable to all covered activities in the Solano HCP Plan Area (e.g., construction) that would affect known and suitable burrowing owl habitat. All or portions of the mitigation for loss of breeding, foraging, and overwintering owl habitat may be addressed concurrently with habitat preservation and management requirements specified for other Natural Communities under the Solano HCP. 3. **Direct Effects:** Mitigation for the direct disturbance, destruction, or conversion of burrowing owl foraging habitat resulting from covered activities shall be provided as specified for applicable Natural Communities and/or Covered Species (i.e., Swainson's hawk with similar foraging habitat). Mitigation lands used to satisfy mitigation measures for other Natural Communities and/or covered species can be used to satisfy burrowing owl conservation if the reserve area meets the basic burrowing owl reserve standards from Chapter 7.0 and criteria specified in Chapter 5.0 of the Solano HCP. All burrowing owl foraging habitat affected directly by the project will be	Prior to and during construction	Project Applicant	Solano HCP Approved Biologist/ SCWA	Prior to and during construction	Completion of mitigation for direct, indirect, and temporary effects to foraging burrowing owl habitat

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	subject to the compensation requirement. 4. **Indirect Effects:** Indirect effects to burrowing owl foraging habitat from development in irrigated agriculture lands shall be mitigated through the preservation and management of irrigated agriculture foraging habitat at a ratio of 0.5:1 mitigation-to-effect in accordance with Chapter 6.0 mitigation requirements in the Solano HCP. 5. **Temporary Effects:** All temporarily disturbed burrowing owl habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio according to Solano HCP mitigation details.					
MM BIO-5: Mitigation for Loss of Known Nest Sites	Applicants proposing to implement covered activities (e.g., construction) resulting in the disturbance, destruction, or conversion of a burrowing owl known nest site (i.e., nest site that has been active for breeding within 5 years) shall preserve two known nest sites in the Solano HCP Plan Area. Mitigation for effects to known nest sites must include sufficient foraging habitat to support the nesting burrowing owls. The required amount of suitable foraging habitat the applicant must protect or enhance under priorities 2, 3, and 4 of this mitigation measure shall be equal to the amount of owl foraging habitat directly	Prior to construction	Project Applicant	SCWA/ CDFW/ USFWS/	Prior to construction	Completion of appropriate mitigation for loss of known burrowing owl nest sites

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	affected by the project. As described below, at a minimum, the area of protected or enhanced suitable owl foraging habitat shall be based on available foraging habitat at the affected nest site within 1,968 feet (600 meters) (CDFW 2012) of the nest or center of the nesting territory, whichever is greater. Since each project footprint and location is different, this owl foraging habitat mitigation requirement will be determined on a case-by-case basis in collaboration with SCWA, CDFW, and USFWS as applicable. Priorities for permanent nest site preservation (in descending order) are as follows: 6. Purchase of occupied nest credits from an HCP-certified mitigation bank, which CDFW and USFWS have verified to be in good standing at the time of purchase, before project construction begins. 7. Establishment of a new Solano HCP reserve that (a) permanently protects a known burrowing owl nest site and associated foraging habitat (requirement described above) within the Solano HCP Plan Area by placing a conservation easement; and (b) implementing and funding in perpetuity a Long-Term Management Plan before project construction					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	begins. Permanent preservation of known nest sites and associated foraging habitat must occur within the Solano HCP Plan Area and is subject to the requirements and approvals specified in Chapter 10.0 of the HCP. Each nest site shall include a minimum of three suitable burrows with sufficient foraging habitat. Nest sites, the Long-term Management Plan, and implementation funding must be reviewed and approved by SCWA, USFWS, and CDFW prior to project construction. 8. Purchase of known burrowing owl nest sites on lands preserved in the Solano HCP Reserve System which are not already committed as burrowing owl mitigation for other projects under the following conditions: s. A Burrowing Owl Habitat Enhancement Plan shall be prepared for the conserved lands following guidelines developed by SCWA, CDFW, and USFWS. The Habitat Enhancement Plan shall include, but is not limited to: 1. Installation of artificial burrows following a design approved by SCWA, CDFW, and USFWS unless sufficient natural burrows are available.					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	2. Incorporation of conspecific cues to attract burrowing owls such as acoustic playback of owl calls and imitation of whitewash. 3. A California ground squirrel assessment and plan to increase populations if necessary. 4. Predator control provisions including an assessment of feral cats and other potential burrowing owl predators, and reducing these threats by, for example, humanely removing feral cats or avian predators' hunting perches. 5. Vegetation height and thatch reduction through mowing or grazing. 6. An assessment of burrowing owl prey availability and plan to increase prey if necessary. 7. An adaptive management plan to address burrowing owl occupancy of protected lands. 8. Sufficient owl foraging habitat protection/enhancement requirement described above based on the project's size and direct effects to owl foraging habitat. t. Funding is provided for implementation of the Burrowing					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	Owl Habitat Enhancement Plan and for the in-perpetuity implementation of a long-term management plan (Chapter 10.0 of Solano HCP); and u. The preserved lands are part of the Solano HCP Reserve System. 9. If implementing priorities 1, 2, or 3 for known nest site protection is not feasible, applicants shall fund a Burrowing Owl Habitat Enhancement Plan following the requirements described under priority 3. The enhancement plan must be submitted to and approved by SCWA, CDFW, and USFWS. The enhancement plan will be implemented either on the new Solano HCP reserve established as mitigation for the project that resulted in effects to the known nest site (consistent with all habitat and funding requirements in priority 2 including the foraging habitat protection/enhancement requirement) or expand burrowing owl habitat on an existing suitable Solano HCP reserve. Implementation of the Burrowing Owl Habitat Enhancement Plan will improve conditions for burrowing owl in order to encourage the establishment and/or expansion of burrowing owl nesting populations consistent with applicable burrowing owl goals and objectives in Chapter 5.0 of the Solano HCP,					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	including providing sufficient habitat acreage and burrows to effectively support the number of nesting burrowing owls required by the Solano HCP.					
MM BIO-6: Habitat Enhancement	All applicants planning to conduct covered activities that affect burrowing owl known and suitable habitat in the Solano HCP Plan Area shall pay a Burrowing Owl Protection Fee prior to project construction to fund habitat expansion and enhancement for burrowing owl nesting and overwintering sites (see Chapter 11.0 of HCP). Project applicants that implement and fully mitigate effects under **Mitigation Measure BIO-5** priority 2 above or are otherwise exempt are not required to pay into the Burrowing Owl Protection Fee.	Prior to construction	Project Applicant	SCWA/ USFWS/ CDFW	Prior to construction	Payment of Burrowing Owl Protection Fee
MM BIO-7: Mitigation for Temporary Effects	If construction activities result in the loss of occupied nesting or wintering burrows (e.g., closure, collapse due to ground disturbance, or disturbance in the construction buffer zones) within the temporarily disturbed area, mitigation shall be provided according to the following criteria at all times of the year: 1. **Alternative Burrow Plan:** Applicants shall provide an Alternative Burrow Plan for review and approval by SCWA, USFWS, and CDFW. The Alternative Burrow Plan shall include, but is not limited to, the following:	After Project construction	Project Applicant	SCWA/ USFWS/ CDFW	After project construction/2 years following completion of the project	Completion and implementation of an Alternative Burrow Plan, restoration of disturbed habitats

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	a. An assessment of available suitable burrows within 330 feet of the edge of the construction area if suitable contiguous habitat remains. b. Provisions to install artificial burrows if suitable donor burrows are not present. c. A maintenance and monitoring program that includes a minimum of 2 years following completion of the project that resulted in the temporary effect. The maintenance program shall include provisions to maintain artificial burrows, if required, in usable condition and maintain vegetation height at 6 inches or less within 50 feet of the burrows. d. Compliance with this Mitigation Measure does not allow for the destruction or disturbance of an active burrow containing burrowing owls, including eggs and/or dependent young. Methods described in **Mitigation Measure BIO-2** and Chapter 6.0 of the Solano HCP will be used to confirm the burrow is vacant prior to temporary disturbance. 2. **Temporary Effects:** All temporarily disturbed burrowing owl habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio.					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	3. **Alternative:** If the Alternative Burrow Plan measure cannot be implemented because sufficient habitat is not present in surrounding, contiguous lands to support burrowing owls or if temporary effects cannot be restored at a 1:1 ratio within 1-year, temporary effects shall be mitigated per the requirements of **Mitigation Measure BIO-4** and **Mitigation Measure BIO-5**.					
MM BIO-8: Swainson's Hawk Nest Tree Preservation	Known, active, or potential nest trees shall be avoided to the maximum extent practicable. Applicants proposing to remove an otherwise healthy known, active or potential nest tree shall provide written justification for the tree removal to SCWA. Sufficient rationale for known, active or potential tree removal shall be primarily based on declining or poor suitability of the tree as a nesting site for Swainson's hawk and/or to meet public safety needs. The justification letter shall provide a clear analysis of the biological value of the tree to Swainson's hawk under pre-project conditions and post-project conditions (if the tree were to be avoided) and will consider the presence of alternate nest sites in the vicinity of the project site. Known, active or potential nest trees shall only be removed if there is a biological basis that the use of the tree is unlikely under post-project conditions. SCWA, in consultation with the HCP	Prior to construction	Project Applicant	SCWA/ HCP Technical Review Committee	Prior to construction	Approval of requests to remove healthy nest trees, implementation of nest tree removal mitigation measures

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	Technical Review Committee, will be responsible for approval of the requests to remove healthy nest trees and for ensuring adequate mitigation (**Mitigation Measure BIO-14**) provides mitigation requirements of nest tree removal).					
MM BIO-9: Swainson's Hawk Pre-construction Nest Surveys	Between March 1 and August 31, a Solano HCP approved Biologist shall conduct pre-construction surveys to identify and subsequently avoid effects to nesting areas for Swainson's hawk. Surveys shall follow approved Solano HCP protocols and be of sufficient intensity (typically 2 to 3 surveys) to document nesting within a 0.25 mile (1,320 feet) buffer around planned work activities. A final survey shall be conducted no more than 15 days prior to the anticipated start of construction. If a lapse in project-related construction work of 15 days or longer occurs, additional preconstruction surveys shall be required before project work may be reinitiated. Note: Swainson's hawk in the region is typically incubating during late April to early June and active nests can be difficult to find. As such, surveys during the late April to early June period may not be acceptable for determining the absence of Swainson's hawk nests.	Prior to construction	Solano HCP Approved Biologist	Solano HCP Approved Biologist	Prior to construction	Completion of preconstruction surveys for Swainson's Hawk nesting areas
MM BIO-10: Swainson's Hawk Active Nest Buffers	Construction work (including grading, earthmoving, surveying, and any operation of construction equipment) shall not occur within a 0.25-mile buffer	Prior to and during construction	Solano HCP Approved Biologist/	SWCA/ Solano HCP Approved Biologist	Prior to and during construction	Implementation of Swainson's Hawk active nest buffers in accordance with

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	zone around an active, occupied Swainson's hawk nest with eggs or young except as provided below. Construction work may commence in the buffer zone when a Solano HCP approved Biologist has confirmed that nesting activity is complete (e.g., Swainson's hawk young have fully fledged and are capable of flight and have left the nest, or the adults have abandoned the nest for a minimum of 7 days and there is no evidence of re-nesting activity). Nest trees may be removed between September 16 and February 1 when nests are unoccupied. The size of nest site buffer zones may be reduced only under the following conditions: 1. A site-specific analysis prepared by a Solano HCP approved Biologist indicates that the nesting pair under consideration are not likely to be adversely affected by construction activities (e.g., the nest is located in an area where the hawks are habituated to human activity and noise levels comparable to anticipated construction work). SWCA, CDFW, and USFWS must approve this analysis before construction may begin within 0.25 mile of a nest. 2. Monitoring by a Solano HCP approved Biologist is conducted for a sufficient time (during all construction activities		Project Contractor			approved site-specific analysis

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	for a minimum of 10 consecutive days following the initiation of construction), and the nesting pair does not exhibit adverse reactions to construction activities (e.g., changes in behavioral patterns, reactions to construction noise). 3. Monitoring by a Solano HCP approved Biologist is continued at least once a week through the nesting cycle at that nest. This longer-term monitoring may be reduced to a minimum of 2 hours in the morning and 2 hours in the afternoon during construction activities; however, additional and more frequent monitoring may be required if any adverse reactions are noted. 4. Weekly monitoring reports from a Solano HCP approved Biologist shall be submitted to SCWA, CDFW, and USFWS during construction and monitoring activities. If adverse effects are identified, construction activities shall cease immediately and construction shall not resume until the Solano HCP approved Biologist, in consultation with SCWA, has determined that construction may continue under modified restrictions or that nesting activity is complete.					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
MM BIO-11: Post-Construction Occupied Nest Avoidance	If a nest tree becomes occupied by Swainson's hawk during ongoing construction activities, construction activities shall not occur within 500 feet of the nest, except where monitoring consistent with the criteria in **Mitigation Measure BIO-10** documents that adverse effects will not occur.	During construction	Project Applicant/ Project Contractor	SWCA/ Solano HCP Approved Biologist	During construction	Halting of construction activities within 500 feet of any Swainson's hawk nests discovered during construction
MM BIO-12: Irrigated Agriculture Foraging Habitat Conservation	1. All mitigation shall be provided in the Irrigated Agriculture Potential Reserve Area, which is a designated portion of the Swainson's Hawk Irrigated Agriculture Conservation Area within the Solano HCP Plan Area. 2. **Direct Effects:** Direct effects to Swainson's hawk foraging habitat in the Irrigated Agriculture Conservation Area shall be mitigated through the preservation and management of high quality foraging habitat, with a site foraging score of at least 50, according to the Habitat Quantification Tool (HQT) Habitat Quality Score (see Chapter 5.0 and Appendix F of Solano HCP). Unsuitable parcels (i.e., site score is less than 50) are ineligible for becoming a Swainson's hawk reserve. The Plan requires the following ratios of affected (in acres) to reserve acreage depending on the HQT habitat quality category of the reserve site:					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	● Suitable habitat (site scores between 50 and 64) requires a mitigation ratio of 1.2:1 (mitigated-to-affected). ● Premium habitat (site score of 65 or higher) requires a mitigation ratio of 1:1 (mitigated-to-affected). 3. **Indirect Effects:** Indirect effects to Swainson's hawk foraging habitat within 250 feet of development shall be mitigated through the preservation and management of foraging habitats at the following ratios: ● Suitable habitat (site scores between 50 and 64) requires a mitigation ratio of 0.6:1 (mitigated-to-affected). ● Premium habitat (site score of 65 or higher) requires a mitigation ratio of 0.5:1 (mitigated-to-affected). 4. **Temporary Effects:** Temporary effects to Swainson's hawk foraging habitat shall not require direct compensation provided activities comply with **Mitigation Measure BIO-10**, and all temporarily disturbed habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio. 5. **Irrigated Agriculture Habitat Enhancement Program:** All applicants with development projects which convert irrigated or intensively cultivated farmland to non-farm uses shall pay a Farmland Conversion Fee to provide funding for the Habitat					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	Enhancement Fund program as described in Chapters 5.0 and 11.0 of the Solano HCP. Compliance with this measure by applicants will be used to implement a perpetual funding program for crop incentives and other habitat enhancement in the Irrigated Agriculture Potential Reserve Area to benefit Swainson's hawk. Costs shall be based on a per-acre basis of converted farmland.					
MM BIO-13 Swainson's Hawk Objectives	The following measure is designed to meet Solano HCP Swainson's Hawk Objectives in Chapter 5.0 by providing sufficient nesting habitat in proximity to suitable foraging habitat to support the current Swainson's hawk population in the Solano HCP Plan Area. All applicants must (a) avoid destruction of active Swainson's hawk nests occupied by eggs or dependent young, (b) avoid take of Swainson's hawks in compliance with the California Fish and Game Code Sections 3503 and 3503.5, and (c) meet the requirements specified in **Mitigation Measures BIO-9, BIO-10, and BIO-11, and Mitigation Measure BIO-14**.	During construction	Project Applicant	SWCA/ Solano HCP Approved Biologist/ CDFW	During construction	Avoidance of destruction of Swainson's hawk nests and take of Swainson's hawks during project construction
MM BIO-14: Swainson's Hawk Known Nest Trees	Covered Activities resulting in the loss of a Swainson's hawk known nest tree (tree that contained an active nest within 5 years) shall preserve either (a) a known nest tree or (b) an active nest (i.e., currently occupied by hawks, eggs, and/or	During construction	Project Applicant	SWCA/ Solano HCP Approved Biologist/ CDFW/ USFWS	During construction	Completion of all applicable mitigation if any impacts to Swainson's hawk known nest trees

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Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	dependent young). If known or occupied nests are unavailable on a Solano HCP reserve and preserving a known or occupied nest is not practicable, applicants will pay a Nest Protection Fee to provide funding to the HCP's Swainson's Hawk Nest Protection Program (see Chapters 5.0 and 11.0 of the Solano HCP). Under the Solano HCP removal of an active Swainson's hawk nest is not authorized; see Chapter 6.0 for details. Nest trees may only be removed when the nest site is no longer active. For the purposes of this Mitigation Measure BIO-14, loss of a known nest tree will occur if either of the following conditions is met: 1. The covered activity directly removes the nest tree or involves soil compaction or grading (excavation or fill) within more than 25 percent of the root zone of the nest tree. The root zone shall be determined by a qualified arborist but shall, at a minimum, be the greater of the horizontal distance from the tree at least equal to the tree's height or the outer edge of the tree canopy. 2. The covered activity results in direct effects within 250 feet of an active nest or known nest tree. If this occurs, that would be considered loss of a nest site because it would reduce the suitability					occur during construction, payment of Nest Protection Fee if applicable

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Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	of the nest site even if the tree itself is not removed. 3. Covered Activities affecting Swainson's hawk nests under conditions 1 or 2 shall: a. Directly comply with this Mitigation Measure BIO-14's nest preservation requirements (e.g., purchase of occupied nest credits from an HCP-certified mitigation bank or preserve a known nest tree (Chapter 10.0 of Solano HCP); or b. Upon approval from SCWA and the applicable Resource Agencies, the applicant will pay the current Nest Protection Fee described in Chapter 11.0 of the Solano HCP; or c. Demonstrate to and receive concurrence from SCWA, CDFW, and USFWS that the Covered Activity will not substantially increase disturbance to the active nest or known nest tree. Note: Indirect effects to Swainson's hawk known nest trees may occur from covered activities. If such activities cannot be conducted in compliance with **Mitigation Measure BIO-11**, then the above requirements will apply.					
MM BIO-15: Special-Status Bat Avoidance	To avoid and minimize impacts on roosting bats the following measures shall be implemented:	Prior to and during construction	Qualified Biologist	Qualified Biologist/ CDFW	Prior to and during construction	Implementation of special-status bat avoidance measures after the

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Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	Focused Habitat Assessment: Prior to tree and structure removal, a focused habitat assessment shall be conducted by a qualified bat biologist to determine if the subject trees and structures to be removed have potential habitat and if any signs of use by bats is observed. If suitable and/or occupied habitat or if signs of recent previous occupation is determined as part of the habitat assessment for special-status bats, a tree removal and demolition plan will be developed. The qualified biologist will develop the appropriate plan for eviction, exclusion and compensatory mitigation, if necessary, in coordination with the CDFW. *Preconstruction Surveys*: If suitable habitat is determined as part of the habitat assessment for special-status bats but occupied habitat is not observed, a preconstruction survey shall be conducted by a qualified biologist immediately prior to tree and structure removal to evaluate whether the site conditions have changed. Preconstruction surveys are used to determine what avoidance and minimization requirements are triggered before construction and whether construction monitoring is necessary. *Avoidance and Minimization*: If the species is discovered or if evidence of recent prior occupation is established, tree and structure removal shall be					completion of a habitat assessment and preconstruction surveys

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Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	scheduled by the project applicant, or designee, such that it minimizes impacts on special-status bats. Hibernation sites with evidence of prior occupation shall be sealed before the hibernation season (November–March), and nursery sites shall be sealed before the nursery season (April–August). If the site is occupied, then the action shall occur either prior to or after the hibernation season for hibernacula and after August 15 for nursery colonies. Tree and structure removal shall not take place as long as the site is occupied.					
MM BIO-16: Vehicular/ Equipment Operation and Maintenance	To avoid and minimize impacts from construction activities, operation, and maintenance of equipment to habitats for special-status species, the following measures shall be implemented: 1. When working in or adjacent to any aquatic habitat, the number of new temporary access routes or use of existing access routes, number and size of staging areas, and the total areas of the activity shall be limited to the minimum necessary to achieve the project goal. The boundaries of all new and existing access routes shall be clearly marked or flagged. These areas shall be outside of preserved aquatic habitat and other sensitive areas. 2. All fueling and maintenance of vehicles and other mechanized equipment shall	During construction	Project Contractor	City of Vacaville	During construction	Completion of appropriate vehicular and equipment operation and maintenance during project construction

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Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	be conducted in designated areas located at least 100 feet away from any aquatic habitat. Each designated fueling/maintenance area shall be protected by a containment barrier designed to prevent any spilled or leaked fuel or other contaminants from running into an aquatic habitat. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur. 3. All vehicles and other mechanized equipment used during construction shall be checked for oil, fuel, and coolant leaks prior to initiating work. Any equipment found to be leaking fluids shall not be used in or around aquatic habitat features. 4. The potential for wildfires shall be reduced by parking vehicles away from vegetation and by the use of shields, protective mats, and other fire prevention methods when welding, grinding, or conducting other activities that are likely to create a fire hazard. All construction sites shall have adequate sources of water, shovels, and fire extinguishers available for immediate use. All vehicles and heavy equipment used on construction sites shall have on-board fire extinguishers.					

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Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	5. During the dry season, vehicles shall never be parked or idled so that the undercarriage is in contact with vegetation. 6. In order to reduce the risk of spreading harmful pathogens into natural areas, vehicles, personal gear, sampling gear, work crew equipment, and other equipment that have been off-road in natural areas shall by sanitized (by manual scrubbing down or cleaning with a pressure washer) before the vehicle/equipment is allowed to be used in other natural areas. If the vehicle or equipment was operated in a creek, stream, or wetland, the equipment and/or tires shall also be decontaminated by the following procedures: a. Provide crews with sanitation kits. Sanitation kits should contain the following: Chlorine bleach (10/90 mixture bleach to water) or Clorox Clean-up®, scrub-brush, metal scraper, boot brush, and plastic gloves. b. Sanitize shoes, pruning gear, and other equipment before working in a natural area. c. Pressure wash or manually scrub tires and tracks for vehicles and equipment. Allow tires to completely dry (for at least 24					

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Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	hours) before being allowed use or entry in or near the vicinity of another creek or stream. d. Sanitize equipment with a 10 percent bleach solution or 99 percent copper sulfate pentahydrate solution (3/4 teaspoon per gallon of water). Vehicular cleaning work shall be conducted in self-contained work areas at least 100 feet from any aquatic habitat; wash water shall not be disposed of in any natural areas.					
MM BIO-17: Work Area Maintenance/ Hazardous Materials	To avoid and minimize impacts from hazardous materials and work area waste, the following measures shall be implemented: 1. Food, trash, and other solid wastes shall be disposed of in properly contained, covered refuse containers and regularly removed from the various structures and facilities. Following construction, all trash and construction debris shall be removed from the work area. 2. Building material storage areas containing hazardous or potentially toxic materials shall have an impermeable membrane between the ground and the hazardous material and shall be bermed to prevent the discharge of pollutants to groundwater and storm water runoff.	Prior to and during construction	Project Contractor	City of Vacaville	Prior to and during construction	Implementation of work area maintenance and hazardous materials impact avoidance measures during project construction

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	3. Materials deleterious or toxic to fish and wildlife including, but not limited to, asphalt, tires, concrete, construction materials, treated wood, and creosote-containing materials must be stockpiled in bermed containment areas that are lined with an impermeable membrane and designed to hold 125 percent of the total capacity of stored materials. All such materials may not be stored within 100 feet from the edge of any water body for more than 48 hours. Contaminant absorbent materials shall be stored in each containment area. Water collected in containment areas shall be disposed of according to federal, State, and local regulations. 4. An emergency response and cleanup plan shall be prepared prior to beginning work at the site. The plan shall detail the methods to be used to contain and clean up spills of petroleum products or other hazardous materials in the work area. 5. Containers for storage, transportation, and disposal of contaminated absorbent materials shall be provided on the project site. Petroleum products and contaminated soils shall be disposed of according to federal, State, and local regulations.					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
MM BIO-18: Water Quality Management	To avoid and minimize impacts to water quality, the following measures shall be implemented: 1. A Storm Water Pollution Prevention Plan (SWPPP), prepared in accordance with the State Water Resources Control Board (SWRCB), National Pollutant Discharge Elimination System (NPDES) Construction General Permit, shall be implemented for all construction activities where required under SWRCB regulations (see Mitigation Measure WQ-1). The SWPPP shall include Best Management Practices (BMPs) for controlling sediment, turbidity, and the release of other pollutants into aquatic habitats during construction. The SWPPP shall be subject to the approval of the Regional Water Quality Control Board (RWQCB) prior to the start of work. 2. No substances toxic to aquatic life shall be discharged or allowed to leach into an aquatic habitat. Every reasonable precaution to protect aquatic habitats from pollution with fuels, oils, bitumens, calcium chloride, dust suppressants, and other harmful materials shall be implemented.	Prior to and during construction	Project Contractor/ Engineer	City of Vacaville/ SWRCB	Prior to and during construction	Preparation and implementation of SWPPP, implementation of precautions to protect aquatic habitat
MM BIO-19: Worker Training and Notification Procedures	To avoid and minimize impacts to special-status species, the following measures shall be implemented:	Prior to and during construction	Approved Biologist	Approved Biologist/ City of Vacaville/	During construction	Completion of worker training by approved biologist and proper

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	1. All operations, maintenance, and construction personnel shall receive annual training about covered species potentially occurring in the project area for covered activities. 2. All construction personnel shall receive pre-project training from a Solano HCP approved Biologist about the sensitive nature of natural communities, covered species, and special management species potentially occurring in the vicinity of the construction site. 3. Training shall include the following: (a) descriptions of the sensitive natural communities, covered species, and special management species potentially occurring with work areas; (b) all routine measures required to protect the species/natural community during work and the possible penalties for not complying with these requirements; and (c) the requirement to stop all work and notify a supervisor or the project biologist if a covered species or special management species is observed in the project site. Operations, maintenance, and construction personnel shall report to their supervisor any observed incident of death or injury to a covered species or special management species or damage to			USFWS/ NMFS/ CDFW		reporting of any observed incident of death or injury to a covered species or special management species or damage to habitat

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	habitat. The supervisor shall immediately notify SCWA. The City of Vacaville shall report to the USFWS, National Marine Fisheries Service (NMFS), and/or CDFW, as appropriate, the following: (a) any incidence of observed or suspected take (harm, harassment, pursuit, hunting, shooting, wounding, killing, trapping, capture, collection, or any attempt to conduct these activities) of a listed animal species; (b) any other report of take or suspected take of a listed animal species not authorized under the Solano HCP; and (c) any observed destruction or damage to a plant covered species population or its suitable habitat. The report shall be made to the appropriate agencies within 24 hours of the incident and shall include pertinent information such as the date, time, location, species or habitat, and possible cause of the incident (if known).					
MM BIO-20: General Site Disturbance and Erosion Control Measures	To avoid and minimize impacts to water quality habitats and special-status species, the following measures shall be implemented: 1. Ground-disturbing activities shall be confined to the smallest area needed to complete the work. Project vehicles, especially heavy equipment, shall be limited to existing roadways whenever possible, especially when soils are moist.	During construction	Project Contractor	City of Vacaville	During construction	Completion of appropriate site disturbance and erosion control measures during construction

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	2. After the construction work is completed, temporarily disturbed areas shall be restored to their original pre-project condition, including topography and vegetation. If seeding is necessary when restoring to previous condition, local, native, noninvasive species seed mixes shall be used. 3. Disposal sites for dredged materials and debris shall be located in upland locations in a manner that prevents the disposed materials and debris from draining directly into an aquatic habitat. Standard construction BMPs and erosion control methods shall be used to ensure the material is contained over both the short and long term. 4. Erosion control and sediment detention devices (e.g., well-anchored sandbag cofferdams, certified weed-free straw bales, or silt fences) shall be in place during construction and following construction, as necessary to minimize fine sedimentation and siltation, and to detain sediment-laden water on site. These devices shall be placed at all locations where sediment input is likely to occur. A supply of erosion control materials shall be readily available to cover small sites that may become bare and to respond to sediment emergencies. Plastic					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	monofilament mesh covering for straw wattles, erosion control blankets, or erosion control materials are prohibited for erosion control. 5. Sediment shall be removed from sediment controls once the sediment has reached one-third of the exposed height of the control. The project applicant shall dispose of sediment collected in these devices at approved disposal sites away from the collection area. Collection devices shall be inspected at least once a day to ensure they are functioning properly. If a control measure does not function effectively, it shall be immediately repaired or replaced. Additional controls shall be installed as necessary. 6. All disturbed soils shall undergo erosion control treatment, including temporary native seeding and sterile straw mulch, prior to October 15 and following completion of construction work. Erosion control blankets shall be installed over disturbed soils on all gradients of over 30 percent. 7. Any stockpiles of soil used for fill material during construction shall be covered with a tarp or erosion control blanket, and silt fences shall be installed to prevent soils from moving into area waterways. If a greater than 40 percent chance of rain is forecast					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	within 24 hours, the project site shall be "rain proofed" with erosion control measures to ensure that no sediment or turbidity enters an aquatic habitat.					
CM BIO-21: Vegetation Management Measures	To avoid and minimize impacts to habitats for special-status species, the following measures shall be implemented: 1. Mechanical control methods such as mowing shall be used as an alternative to the application of herbicides whenever practicable in or near sensitive habitats and areas known to or likely to support covered species or special management species, including riparian and marsh areas, creeks, ponds, vernal pools, etc. 2. Mass application of herbicides shall be avoided to the maximum extent practicable. Spot spraying or more localized applications shall be used instead. Note: There are some limitations of pesticides and herbicides under the Solano HCP described in Chapter 2.0. 3. Herbicide mixing shall be limited to areas not prone to runoff such as concrete mixing/loading pads, disked soil in flat terrain, or graveled mixing pads. 4. The use of all herbicides shall comply with the requirements specified on the pesticide product labeling and Solano	Prior to and during construction	Project Contractor	City of Vacaville	Prior to and during construction	Completion of appropriate vegetation management measures

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Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	County Department of Pesticide Regulation regulations.					
MM BIO-22: Exclusion Fencing	To avoid and minimize impacts to habitats for special-status species, the following measures shall be implemented: ● Exclusion fencing, when required, shall be installed and maintained between project work areas and adjacent preserved habitat during all work activities. Exclusion fencing will consist of silt fabric, plywood, aluminum, or other SCWA-approved material at least 3 feet in height. The base of the fence will be buried a minimum of 3 to 5 inches in the ground to prevent animals from crawling under. The remainder of the fence will be left above ground to serve as a barrier for animals moving on the ground surface. The fence will be pulled taut at each support to prevent folds or snags. Support poles will be located on the inside of the exclusion area. Construction personnel will also install an orange plastic-mesh construction fence 1 foot on the development side of the exclusion fence to increase visibility unless the exclusion fence is composed of high visibility materials. Exclusion fencing shall be inspected weekly and repaired immediately when damage is observed during construction work.	During construction	Project Contractor	City of Vacaville/ Project Contractor	During construction	Installation and maintenance of exclusion fencing where required to protect special-status species habitat

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Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
MM BIO-23: Aquatic Resources Delineation	A formal jurisdictional waters delineation in accordance with the USACE Routine Approach for small areas (i.e., equal to or less than 5 acres) shall be conducted. The survey will include collection of data on soils, hydrology, and vegetation, where necessary, to determine the extent of potential waters of the U.S. in the project area. In addition, the delineation shall be conducted in accordance with the USACE Arid West Regional Supplement to the Wetland Delineation Manual (September 2008).	Prior to construction	Qualified Biologist	City of Vacaville	Prior to construction	Completion of a formal jurisdictional waters delineation
MM BIO-24: Regulatory Permits	The project applicant, or designee, shall apply for and obtain permits from the USACE (USACE, Clean Water Act [CWA] Section 404 permit) and Regional Water Quality Control Board (RWQCB, CWA Section 401 water quality certification) prior to the commencement of ground disturbing activities. If the project would result in the loss of wetland and/or non-wetland waters, mitigation shall be accomplished in accordance with permits issued by resource agencies of jurisdiction (USACE, CDFW, RWQCB, etc.) which permits may include on-site or off-site measures, credit purchase, in-lieu fees, etc.	Prior to construction	Project Applicant	City of Vacaville	Prior to construction	Obtainment of all necessary regulatory permits
MM BIO-25: Nesting and Migratory Bird Avoidance	To avoid and minimize impacts on nesting and migratory birds and raptors and to comply with the federal Migratory Bird Treaty Act, pre-construction surveys shall	Prior to and during construction	Qualified Biologist	City of Vacaville	Prior to and during construction	Completion of preconstruction surveys for nesting bird habitat and

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	be conducted and construction avoidance measures shall be implemented if necessary. *Preconstruction Survey*: The project site shall be surveyed by a qualified biologist prior to construction to evaluate nesting bird habitat. If work is scheduled to take place between February 1 and August 31, a pre-construction nesting bird survey shall be conducted by a qualified biologist within 14 days of construction, covering a radius of 500 feet for raptors and 100 feet for other migratory birds at all locations. The preconstruction survey can be conducted concurrently with the Swainson's hawk survey identified in **Mitigation Measure BIO-9**. *Avoidance and Minimization*: If an active bird nest is found within these buffers, species-specific measures shall be prepared by a qualified biologist and implemented to prevent abandonment of the active nest. If an active nest is present, a minimum exclusion buffer of 100 feet shall be maintained during construction, depending on the species and location. The perimeter of the nest setback zone shall be fenced or adequately demarcated with stakes and flagging, and construction personnel and activities restricted from the area. A survey report by a qualified biologist verifying that no active nests are present,					implementation of avoidance and minimization measures

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Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	or that the young have fledged, shall be submitted prior to initiation of grading in the nest-setback zone. A qualified biologist shall monitor construction activities that occur near active nest areas to ensure that no inadvertent impacts on these nests occur.					
MM CULT-1: Archaeological Alert Sheet and Crew Training	The project applicant, or designee, shall implement an Archaeological Alert Sheet and Crew Training Program to mitigate the impacts to archaeological resources. The Archaeological Alert Sheet and Crew Training should be prepared and performed prior to any ground-disturbing work at all locations within the project site. This Alert Sheet shall be distributed to all project personnel, including construction – crew and their supervisory personnel, the Project Design Team and the future contractor(s). The Alert Sheet shall contain information regarding potential archaeological resources and the actions to take in the case of inadvertent discovery of cultural resources, including contact protocol and avoidance and minimization measures.	Prior to construction	Project Applicant	City of Vacaville	Prior to construction	Implementation of Archaeological Alert Sheet and Crew Training Program
MM CULT-2: Initial Archaeological Monitoring	Initial archaeological monitoring shall be completed for the northwest corner of the Orr parcel (APN 137-01-6) by a qualified archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology. This includes demolition-related	Prior to and during construction	Project Applicant/ Qualified Archaeologist	City of Vacaville	Prior to and during construction	Completion of archaeological monitoring

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	excavation such as foundation removal, topsoil removal, mass excavation, utility trenching, and any other observable soil-disturbing impacts. Monitoring may be reduced to "spot checking" at the discretion of the Principal Investigator. Thereafter, mitigation would be limited to accidental discovery measures as outlined by the Alert Sheet and Training. Archaeological monitoring is not recommended for areas of the project site that lie outside of the farmstead footprint.					
MM CULT-3: Archaeological Discovery Protocol	Consistent with Standard Condition of Approval (SCOA) 12, should an archaeological deposit be encountered during project subsurface construction activities, all ground-disturbing activities within 25 feet shall be redirected and a qualified archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archeology contacted to assess the situation, determine if the deposit qualifies as a historical resource, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. If the deposit is found to be significant (i.e., eligible for listing in the California Register of Historical Resources), the project applicant shall be responsible for funding and implementing appropriate mitigation measures. Mitigation measures may include	During construction	County Contractor/ Qualified Archaeologist/ City of Vacaville	Qualified Archaeologist/ City of Vacaville	During construction	Completion of appropriate protocol upon the discovery of any archaeological resources

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Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	recordation of the archaeological deposit, data recovery and analysis, and public outreach regarding the scientific and cultural importance of the discovery. Upon completion of the selected mitigations, a report documenting methods and findings shall be prepared and submitted to the City's Community Development Director for review and approval, and the final report shall be submitted to the Northwest Information Center at Sonoma State University. Significant archaeological materials shall be submitted to an appropriate curation facility and used for public interpretive displays, as appropriate and in coordination with a local Native American tribal representative.					
SCOA 79	State of California requires that prescriptive energy standards be met or energy calculations be submitted to the Building Official for all new construction and when conditioned space volume is increased in an existing facility. The energy design shall meet the current State adopted residential and nonresidential standards of the California Energy Commission.	Prior to issuance of grading or building permits	Project Applicant/ Project Engineer	City of Vacaville Building Department	Prior to issuance of grading or building permits	Energy design in accordance with standards of the California Energy Commission
SCOA 104	Developer shall prepare and submit to the City Engineer a Geotechnical Investigation Report prepared by a Civil Engineer or Geotechnical Engineer, licensed in the State of California, to be used in the	Prior to and during construction	Project Applicant/ Project Engineer	City of Vacaville	Prior to and during construction	Preparation and implementation of Geotechnical Investigation

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	preparation of the grading plan. The Geotechnical Investigation Report shall provide recommendations for all grading and remediation work. The Developer shall comply with the recommendations of the Geotechnical Investigation Report and any additional requirements deemed necessary by the City Engineer and Chief Building Official.					Report recommendations
SCOA 105	A grading, geotechnical, and erosion control plan shall be submitted concurrently with the Final Map and Improvement Plans. Plans shall show any effect on adjacent properties.	Prior to issuance of grading or building permits	Project Applicant/ Project Engineer	City of Vacaville	Prior to issuance of grading or building permits	Submission of grading, geotechnical, and erosion control plan
SCOA 105	A grading, geotechnical, and erosion control plan shall be submitted concurrently with the Final Map and Improvement Plans. Plans shall show any effect on adjacent properties.	Prior to issuance of grading or building permits	Project Applicant/ Project Engineer	City of Vacaville	Prior to issuance of grading or building permits	Submission of grading, geotechnical, and erosion control plan
SCOA 106	For projects with greater than 5,000 cubic yards of grading, grading plans shall be prepared by a Civil Engineer licensed by the State of California in accordance with Appendix Chapter 33 of the California Building Standards Code and Section 11 of the Standard Specifications. The plans shall be accompanied by a Soils Report prepared, signed, and wet-stamped by a geotechnical engineer licensed by the State of California, and shall be submitted to the City Engineer for concurrent review with the Improvement Plans and Final Map.	Prior to issuance of grading or building permits	Project Applicant/ Licensed Civil Engineer/ Licensed Geotechnical Engineer	City of Vacaville/ City Engineer	Prior to issuance of grading or building permits	Submission and approval of grading plans and Soils Report

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Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
MM GEO-1	Should paleontological resources be encountered during project subsurface construction activities, all ground-disturbing activities within 25 feet shall be redirected and a qualified paleontologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. For purposes of this mitigation, a "qualified paleontologist" shall be an individual with the following qualifications : (1) a graduate degree in paleontology or geology and/or a person with a demonstrated publication record in peer-reviewed paleontological journals; (2) at least two years of professional experience related to paleontology; (3) proficiency in recognizing fossils in the field and determining their significance; (4) expertise in local geology, stratigraphy, and biostratigraphy ; and (5) experience collecting vertebrate fossils in the field. If the paleontological resources are found to be significant and project activities cannot avoid them, measures shall be implemented to ensure that the project does not cause a substantial adverse change in the significance of the paleontological resource. Measures may include monitoring, recording the fossil locality, data recovery and analysis, a final report, and accessioning the fossil material and technical report to a	During construction	Qualified Paleontologist/ Project Contractor	Qualified Paleontologist/ City of Vacaville	During construction	Implementation of appropriate protection measures for paleontological resources

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	paleontological repository. Upon completion of the assessment, a report documenting methods, findings, and recommendations shall be prepared and submitted to the City for review. If paleontological materials are recovered, this report also shall be submitted to a paleontological repository such as the University of California Museum of Paleontology, along with significant paleontological materials. Public educational outreach may also be appropriate. The project applicant shall inform its contractor(s) of the sensitivity of the project site for paleontological resources and shall verify that the following directive has been included in the appropriate contract documents: *"The subsurface of the construction site may be sensitive for fossils. If fossils are encountered during project subsurface construction, all ground-disturbing activities within 25 feet shall be redirected and a qualified paleontologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. Project personnel shall not collect or move any paleontological materials. Fossils can include plants and animals, and such trace fossil evidence of past life as tracks or plant imprints.*					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	Ancient marine sediments may contain invertebrate fossils such as snails, clam and oyster shells, sponges, and protozoa; and vertebrate fossils such as fish, whale, and sea lion bones. Contractor acknowledges and understands that excavation or removal of paleontological material is prohibited by law and constitutes a misdemeanor under California Public Resources Code, Section 5097.5."					
SCOA 262	Access roads with a minimum unobstructed width of 20 feet shall be provided to the front and rear of structures. A minimum vertical clearance of 13 feet 6 inches shall be provided. Access roads shall be engineered to support the imposed load of the apparatus which is typically 25 tons and shall be designed per the City Public Work's Department Standards. An access road shall be provided to within 150 feet of all exterior walls of the first floor of the buildings. The route of the access road shall be approved by the Fire Marshal. Dead-end access roads in excess of 150 feet in length shall be provided with an approved means for turning around the apparatus. The final design of the turnaround shall be reviewed and approved by the Fire Marshal prior to installation.	Prior to issuance of grading or building permits	Project Applicant/ Project Engineer	City of Vacaville Public Works Department, Fire Marshal	Prior to issuance of grading or building permits	Approval of access road and turnaround dimensions and route

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
SCOA 263	Every building shall be accessible to Fire Department apparatus by way of all-weather access roadways during the time of construction. These roads shall have a minimum unobstructed width of 20 feet and shall be required to have a minimum 'first lift' of pavement applied which shall support the imposed load of a fire apparatus which is typically 25 tons. The developer shall be required to provide the Fire Marshal with a site plan showing the location, width, grades, and cross section of the proposed access roads to be used during construction. Permits shall not be issued and combustible construction shall not be allowed on the site until this site plan is reviewed and approved and stamped by the Fire Department.	Prior to issuance of grading or building permits	Project Applicant/ Project Engineer	City of Vacaville Fire Department, Fire Marshal	Prior to issuance of grading or building permits	Approval of building access and access roads
SCOA 265	Prior to the issuance of any grading or building permits, the Fire Marshal shall approve the location of all Emergency Vehicle Access Roads within the project site. Unless otherwise approved, the access points to any Emergency Vehicle Access Roads shall be located at the end of cul-de-sacs and across utility easements, and shall be kept locked at all times with a City 1C04 lock.	Prior to issuance of grading or building permits	Project Applicant/ Project Engineer	City of Vacaville Fire Department, Fire Marshal	Prior to issuance of grading or building permits	Approval of Emergency Vehicle Access Road locations and access restrictions
SCOA 266	Prior to the issuance of any grading or building permits, the Fire Marshal shall approve the location of all Emergency Vehicle Access Roads around the perimeter of the site. Such Emergency	Prior to issuance of grading or building permits	Project Applicant/ Project Engineer	City of Vacaville Fire Department, Fire Marshal	Prior to issuance of grading or building permits	Approval of Emergency Vehicle Access Road grades, widths,

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	Vehicle Access roads shall have average grades of not more than 20% with no section greater than 25%. The minimum width of such roads shall be 20 feet. Side slopes shall not exceed 4%. These roads shall be engineered to withstand a minimum load of 12 tons. At a minimum, this road shall be graded and compacted with decomposed granite or equivalent and shall be kept clear of all flammable vegetation at all times. The Fire Marshal may require the road to be surfaced with pavement if it is determined the road will not be or is not being properly maintained in accordance with these standards.					weight capacities, and surfacing
SCOA 267	The Fire Marshal shall identify on the final site development plans where metal grates shall be provided for emergency fire apparatus cross V-ditches in the event of a fire or emergency. These grates shall have a minimum width of 10 feet and be designed and engineered to accommodate a minimum load of 12 tons.	Prior to issuance of grading or building permits	Project Applicant/ Project Engineer	City of Vacaville Fire Department, Fire Marshal	Prior to issuance of grading or building permits	Approval of emergency fire apparatus metal grates dimensions, location, and weight capacity
MM WQ-1: Construction General Permit	Prior to issuance of a grading permit, the project applicant, or designee, shall obtain coverage under the State Water Resources Control Board National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System No.	Prior to issuance of grading permit, during construction, after the completion of construction	Project Applicant/ Project Engineer	SWRCB/ City of Vacaville	Prior to issuance of grading permit, during construction, after the completion of construction	Preparation and implementation of a SWPPP in compliance with the requirements of the Construction General Permit, submission of a Notice of

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	CAS000002, as amended by Orders No. 2010-0014-DWQ and 2012-0006-DWQ) (Construction General Permit). This shall include the submission of Permit Registration Documents (PRDs), including a Notice of Intent (NOI) for coverage under the permit to the State Water Resources Control Board (SWRCB) via the Stormwater Multiple Application and Report Tracking System (SMARTS). The project applicant shall provide the Waste Discharge Identification Number (WDID) to the City of Vacaville (City) to demonstrate proof of coverage under the Construction General Permit. A Stormwater Pollution Prevention Plan (SWPPP) shall be prepared and implemented for the proposed project in compliance with the requirements of the Construction General Permit. The SWPPP shall identify construction best management practices (BMPs) to be implemented to ensure that the potential for soil erosion and sedimentation is minimized and to control the discharge of pollutants in stormwater runoff as a result of construction activities. Upon completion of construction and stabilization of the site, a Notice of Termination will be submitted via SMARTs.					Termination upon completion of construction

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
MM WQ-2: City of Vacaville Municipal Code	Prior to issuance of a grading permit, the project applicant, or designee, shall submit final project plans to the City for review and approval, which address compliance with the water quality management requirements of Title 14 Land Use and Development Code, Division 14.26 which specify provisions for urban storm water quality, management and discharge control including the requirement that new development comply with the California Stormwater Quality Association (CASQA) Stormwater BMP Handbook for Construction.	Prior to issuance of grading permit	Project Applicant/ Project Engineer	City of Vacaville	Prior to issuance of grading permit	Submission and approval of project plans which address compliance with the water quality management requirements of Title 14 Land Use and Development Code, Division 14.26
MM WQ-3: General Waste Discharge Requirements/NPDES Permit for Limited Threat Discharges to Surface Waters	At least 45 days prior to groundwater dewatering activities, the project applicant, or designee, shall submit an NOI to the Central Valley Regional Water Quality Control Board (RWQCB) to obtain coverage under the General Waste Discharge *Requirements for Limited Threat Discharges to Surface Waters (General Waste Discharge Permit),* Order No. R5-2022-006, NPDES No. CAG995002. The construction contractor shall comply with the requirements of the General Waste Discharge Permit. Groundwater dewatering activities shall comply with all applicable provisions in the General Waste Discharge Permit, including water sampling, analysis, treatment (if required), and reporting of dewatering-related discharges. Upon completion of	At least 45 days prior to groundwater dewatering activities	Project Applicant/ Project Contractor	Central Valley RWQCB	During construction	Compliance with requirements of the General Waste Discharge Permit

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	groundwater dewatering activities, a Notice of Termination (NOT) shall be submitted to the Central Valley RWQCB.					
MM WQ-4: Small Municipal Separate Storm Sewer Systems MS4 Permit.	Prior to issuance of grading or building permits or prior to recordation upon subdivision of land, the project applicant, or designee, shall submit a Final Storm Water Management Plan (SWMP) to the City of Vacaville, for review and approval, in compliance with the *National Pollutant Discharge Elimination System (NPDES) General Permit for Waste Discharge Requirements (WDRs) for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s)* RWQCB Order No. 2013-001-DWQ, NPDES No. CAS000004, as amended by Order 2015-0133-EXEC, Order WQ 2016-0069-EXEC, Order 2017-XXXX-DWQ, Order 2018-0001-EXEC, and Order 2018-0007-EXEC. The project applicant shall demonstrate compliance with the MS4 through site design measures, source control measures, Low Impact Development (LID) Design Standards, Hydromodification Measures, Operation and Maintenance of Storm Water Control Measures, and Post-Construction BPMs in the SWMP. Additionally, the 10- and 100-year post-development peak flows shall be reduced to 85 percent of pre-development levels. Finally, the MS4 requires ongoing water quality monitoring and corrective actions	Prior to issuance of grading or building permits	Project Applicant/ Project Engineer	City of Vacaville	Prior to issuance of grading or building permits	Submission and approval of a Final SWMP in compliance with the MS4

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	if water quality thresholds are not maintained. The City of Vacaville, or designee, shall ensure that the SWMP complies with the MS4.					
MM WQ-5: Storm Drain Design Standards Section DS4	Prior to issuance of grading or building permits or prior to recordation upon subdivision of land, the project applicant, or designee, shall submit a Final Storm Drainage Master Plan Report to the City of Vacaville, for review and approval, in compliance with the City of Vacaville Storm Drain Design Standards Section DS 4. The project shall mitigate the increase of the 10- and 100-year peak runoff from the project site over the predevelopment conditions. Detention facilities must be designed for the 100-year, 24-hour storm event.	Prior to issuance of grading or building permits or prior to recordation upon subdivision of land	Project Applicant/ Project Engineer	City of Vacaville	Prior to issuance of grading or building permits or prior to recordation upon subdivision of land	Submission and approval of Final Storm Drainage Master Plan Report in compliance with City of Vacaville Storm Drain Design Standards Section DS 4
MM NOI-2: Construction Noise Best Management Practices MM NOI-1: Construction Noise Hours	No construction or grading equipment shall be operated nor any outdoor construction or repair work shall be permitted within 500 feet from any occupied residence between dusk (one-half hour after sunset) and 7:00 a.m., Monday through Saturday, and no such grading or construction activities shall be allowed on Sundays or holidays except as provided for herein: ● Interior work which would not create noise or disturbance noticeable to a reasonable person of normal sensitivity in the surrounding neighborhood shall not be subject to these restrictions;	During construction	Project Applicant/ Project contractor	City of Vacaville	During construction	Compliance with allowable construction hours

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	● Construction or repair work performed by or under the direction of a homeowner at his or her residence is exempt from these restrictions on Sundays and holidays, but such construction or repair work shall be limited to the hours between 8:00 a.m. and dusk.					
MM NOI-2: Construction Noise Best Management Practices	The project contractor shall ensure that the following construction noise BMPs are met on-site during all phases of construction. All equipment driven by internal combustion engines shall be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specifications. Mobile or fixed "package" equipment (e.g., arc welders, air compressors) shall be equipped with shrouds and noise-control features that are readily available for that type of equipment. ● All mobile or fixed noise-producing equipment used on the project site that are regulated for noise output by a federal, state, or local agency shall comply with such regulations while in the course of project activity. ● The construction contractor shall utilize "quiet" models of air	During construction	Project Applicant/ Project Contractor	City of Vacaville	During construction	Implementation of applicable construction noise BMPs

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	compressors and other stationary noise sources where technology exists. ● At all times during project grading and construction, stationary noise-generating equipment shall be located as far as practicable from sensitive receptors and placed so that emitted noise is directed away from residences. ● Unnecessary idling of internal combustion engines shall be prohibited. ● Construction staging areas shall be established at locations that would create the greatest distance between the construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction activities, to the extent feasible. ● Construction site and access road speed limits shall be established and enforced during the construction period. ● The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. ● Neighbors located adjacent to the construction site shall be notified of the construction schedule in writing. ● The construction contractor shall designate a "noise disturbance coordinator" who would be					

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	responsible for responding to any local complaints about construction noise. The disturbance coordinator shall be responsible for determining the cause of the noise complaint (e.g., starting too early, poor muffler, etc.) and instituting reasonable measures as warranted to correct the problem. A telephone number for the disturbance coordinator shall be conspicuously posted at the construction site. ● Construction noise mitigation measures shall be included in the grading plan submitted by the developer for review and approval by the Community Development Director prior to grading permit issuance.					
MM NOI-3: Compaction Vibration Avoidance near Sensitive Receptors	Any compaction required less than 26 feet from the adjacent residential structures to the south should be accomplished by using static drum rollers which use weight instead of vibrations to achieve soil compaction. As an alternative to this requirement, preconstruction crack documentation and construction vibration monitoring could be conducted to ensure that construction vibrations do not cause damage to any adjacent structures.	During construction	Project Contractor	City of Vacaville	During construction	Appropriate compaction vibration avoidance near sensitive receptors
MM NOI-4: Construction Equipment Buffer from Sensitive Receptors	Use of bulldozers, loaded trucks, auger/drill rigs, and vibratory hammers shall occur at distances of 15 feet or greater from adjacent residential structures.	During construction	Project Contractor	City of Vacaville	During construction	Appropriate construction equipment buffer from sensitive receptors

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
SCOA 186	Where a Traffic Study is not required by Section 14.13.180 of the Land Use and Development Code, any traffic controls or other changes to the nearby streets required by the City Traffic Engineer shall be shown on the final development plans prior to the issuance of grading or building permits.	Prior to issuance of grading or building permits	Project Applicant	City of Vacaville/ City Traffic Engineer	Prior to issuance of grading or building permits	Implementation of any traffic controls or nearby streets required by the City Traffic Engineer into final development plans
SCOA 188	The design and construction of all public street improvements shall conform to the City of Vacaville Public Works Department Standard Plans and Specifications for Public Improvements, latest edition, unless otherwise approved by the City Engineer or as may be required by any applicable Standard or Special Conditions of Approval.	Prior to issuance of grading or building permits	Project Applicant	City of Vacaville Engineer	Prior to issuance of grading or building permits	Design and construction of public street improvements in compliance with applicable standards
SCOA 192	Sight distance at the driveways intersecting public streets shall conform to Section 3-09 Stopping Sight Distance, and Standard Drawing 3-03 A and B and 3-04 of the Vacaville Standard Specifications. Special attention shall be given to note 1 and 2 on Standard Drawing 3-03 A and B. This may affect the location of any monument signs and landscaping, walls, etc.	Prior to issuance of grading or building permits	Project Applicant	City of Vacaville	Prior to issuance of grading or building permits	Construction of driveways with appropriate sight distance in accordance with applicable standards
SCOA 199	Intersections and expanded corners shall have a maximum 5-degree variance between 90-degree tangents and demonstrate that the corner is designed in accordance with City criteria. Developer's engineer shall adequately	Prior to issuance of grading or building permits	Project Applicant	City of Vacaville	Prior to issuance of grading or building permits	Proper design of intersections and expanded corners in accordance with City criteria

Table 7.A: Vanden Cove Subdivision Project Mitigation Monitoring and Reporting Program

Mitigation Measure/Standard Condition of Approval	Avoidance and Minimization Measure	Timing	Implementing Party	Monitoring Party	Frequency and Duration of Monitoring	Performance Criteria
	show that two AASHTO type SU-30 vehicle can turn the corner simultaneously, and that two cars can pass each other while making the turn with parked vehicles on each of the expanded corners to the satisfaction of the City Engineer and Director of Public Works. Developer shall also stripe the corners and intersections in accordance with City criteria.					
SCOA 210	All private streets shall meet the minimum standards set forth in the City's Private Street Standards.	Prior to issuance of grading or building permits	Project Applicant	City of Vacaville	Prior to issuance of grading or building permits	Design of all private streets in accordance with the City's Private Street Standards

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APPENDIX A

AIR QUALITY, GREENHOUSE GAS, AND ENERGY TECHNICAL REPORT

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Prepared for:
Discovery Builders

Prepared By:
Ramboll US Consulting, Inc
San Francisco, California

Date
July 2022

Project Number
1690024749

AIR QUALITY, GREENHOUSE GAS, AND ENERGY TECHNICAL REPORT

VANDEN ESTATES

VACAVILLE, CALIFORNIA

RAMBOLL Bright ideas. Sustainable change.

CONTENTS

TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ATCM	Airborne Toxic Control Measure
BMP	Best Management Practice
CAAQS	California Ambient Air Quality Standard
CalEEMod®:	California Emission Estimator Model
CAP	Criteria Air Pollutants
CARB:	California Air Resources Board
CEC	California Energy Commission
CEQA:	California Environmental Quality Act
CO	Carbon Monoxide
CO_2:	Carbon Dioxide
CO_2e:	Carbon Dioxide Equivalent
DPM	Diesel Particulate Matter
DWR:	Department of Water Resources
ECAS	Energy and Conservation Action Strategy
EIR:	Environmental Impact Report
EMFAC:	Emissions Factor Model
EPA	Environmental Protection Agency
EV	Electric Vehicle
gal/hp-hr	Gallons per Horsepower-Hour
GHG:	Greenhouse Gas
HI	Hazard Index
hp	Horsepower
HRA	Health Risk Assessment
HVAC	Heating, Ventilation, and Air Conditioning
kWh	Kilowatt-hour
lb/day	Pounds per Day
LED:	Light-emitting Diode
LOS	Level of Service
MMBtu	Million British Thermal Units
MT:	Metric Ton

MW	Megawatt
MWELO:	Model Water Efficient Landscape Ordinance
MWh	Megawatt-hour
NAAQS	National Ambient Air Quality Standard
NO2	Nitrogen Dioxide
NOx	Nitrogen Oxides
O3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment
OPR	Office of Planning and Research
PG&E:	Pacific Gas and Electric Company
PM10	Inhalable Particulate Matter
PM2.5	Fine Particulate Matter
ROG	Reactive Organic Gases
RPS:	Renewable Portfolio Standard
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SB:	Senate Bill
SO2	Sulfur Dioxide
SVAB	Sacramento Valley Air Basin
TAC	Toxic Air Contaminant
Ton/yr	Tons per Year
VMT:	vehicle miles traveled
YSAQMD	Yolo-Solano Air Quality Management District

1. INTRODUCTION

Discovery Builders, Inc. are proposing to develop 114 single-family homes in the City of Vacaville ("City"). Ramboll has been asked to prepare air quality, greenhouse gas (GHG), and energy analyses for the Vanden Estates Project ("Project" or "Proposed Project") to assist the City in preparing its California Environmental Quality Act (CEQA) documentation.

This technical report includes the following components:

- Section 1: Summary of environmental and regulatory setting
- Section 2: Criteria air pollutant and GHG construction and operational emissions inventories
- Section 3: Assessment of air quality impacts, including health risk impacts
- Section 4: Evaluation of consistency with GHG plans
- Section 5: Energy impacts assessment

This report concludes that the Project's criteria pollutant emissions, health risk impacts, GHG emissions, and energy impacts are less than significant.

1.1 Project Description and Overview

The Project site is located south of Alamo Drive, east of Vanden Rd and to the north of Alamo creek in the city of Vacaville, CA in Solano County. The project site is currently mainly vacant other than 2 single family homes. The Project would remove the existing structures and construct 114 single-family homes.

1.2 Environmental Setting

The City of Vacaville and the Project Site is located in the Sacramento Valley Air Basin (SVAB). Mountains surrounding the SVAB create a barrier to air flow, which can trap air pollutants under certain meteorological conditions. These stagnant conditions generally occur with the highest frequency during autumn and early winter. Air quality in a majority of the City is monitored and managed by the Yolo-Solano Air Quality Management District (YSAQMD). The YSAQMD is responsible for establishing programs, plans and regulations enforcing air pollution controls in order to attain all state and federal ambient air quality standards.

Air pollutants of concern in the City include ozone (O_3), carbon monoxide (CO), nitrogen oxides (NO_2 and NOx), sulfur dioxide (SO_2), and particulate matter ($PM_{2.5/10}$). Vehicle use is the primary source of pollutants in the City, which contributes both directly and indirectly to air pollution. Additional sources of air pollutants include wood smoke from residential fireplaces, construction activities, consumer productions, architectural coatings, fertilizers, asphalt paving, and agriculture operations. Listed below are relevant policies from the City of Vacaville General Plan:

Policy COS-P12.1: Cooperate with regional agencies in developing and implementing air quality management plans.

Policy COS-P12.2: Encourage community participation in air quality planning.

Policy COS-P12.3: Encourage project designs that protect and improve air quality and minimize direct and indirect air pollutant emissions by including components that reduce vehicle trips and promote energy efficiency.

Policy COS-P12.4: Require that development projects implement best management practices to reduce air pollutant emissions associated with the construction and operation of the project.

Policy COS-P12.5: Require dust control measures as a condition of approval for subdivision maps, site plans, and all grading permits.

Policy COS-P12.6: Consistent with the Yolo Solano Air Quality Management District's standards, require that any fireplaces in new and significantly renovated residential projects, or commercial projects are pellet-fueled heaters, U.S. Environmental Protection Agency (EPA) Phase II-certified wood burning heaters, or gas fireplaces.

Policy COS-P12.7: Require that sources of stationary air pollutants of concern, such as factories, be located more than 500 feet and/or downwind from residential areas and other sensitive receptors.

Policy COS-P12.8: Evaluate residential development or other projects with sensitive receptors proposed within the buffer distances identified by the California Air Resources Board's Air Quality and Land Use Handbook to ensure sensitive receptors would not be exposed to an increased cancer risk or to ground-level concentrations of non-carcinogenic toxic air contaminants. Permitted stationary air pollutant sources can be identified through the Yolo Solano Air Quality Management District.

Policy COS-P12.9: Use the results of the Health Risk Assessments required by the California Air Toxics "Hot Spots" Act to establish appropriate land use buffer zones around any new sources of toxic air pollutants that pose substantial health risks.

Policy COS-P12.10: Encourage the use of roadway materials that minimize particulate emissions.

1.3 Regulatory Framework

The majority of the City, including the Project Site is under the jurisdiction of the YSAQMD, which sets forth CEQA Guidelines[1] to evaluate air quality and GHG impacts of projects and plans proposed in its jurisdiction. YSAQMD is responsible for ensuring air quality pollutants do not create an unhealthy environment in the vicinity by achieving and maintaining healthy air quality in accordance with State and Federal standards. The Guidelines provide recommended procedures for evaluating potential AQ and GHG impacts during the environmental review process consistent with CEQA requirements, which include:

1. Evaluation of emissions of criteria air pollutants (CAP) and GHG from both construction and operational emissions (including traffic generated from the proposed Project);

   YSAQMD has established project-level thresholds of significance of 80 pounds per day for PM_{10}, violation of state ambient air quality threshold for CO, and 10 tons per year for

[1] YSAQMD, 2007. Handbook for Assessing and Mitigating Air Quality Impacts. 11 July. Available online at: https://www.ysaqmd.org/wp-content/uploads/Planning/CEQAHandbook2007.pdf

each of the precursors to O_3, which are reactive organic gases (ROG) and NOx. The thresholds apply to both construction and operational impacts.

2. Evaluation of health risk impacts (for which the thresholds are 10 in one million for cancer risk and hazard index of 1 or greater for acute or chronic impacts) for construction and operational emissions on sensitive offsite populations.

3. Evaluation of cumulative cancer risk/noncancer impacts and $PM_{2.5}$ concentrations from Project sources and all cumulative sources within a zone of influence of 1,000 feet on existing sensitive populations.

   Health effects from carcinogenic air toxics are usually described in terms of cancer risk. The YSAQMD recommends an incremental cancer risk threshold of 10 in 1 million for stationary sources. YSAQMD does not have a recommended threshold for mobile source emissions. "Incremental cancer risk" is the net increased likelihood that a person continuously exposed to concentrations of toxic air contaminants (TACs) resulting from a project over a 9-, 30-, and 70-year exposure period would contract cancer based on the use of standard Office of Environmental Health Hazard Assessment (OEHHA) risk-assessment methodology. In addition, some TACs have non-carcinogenic effects. TACs that would potentially be emitted during construction activities associated with project development would be diesel particulate matter (DPM).

The YSAQMD CEQA handbook does not propose a quantitative GHG threshold. However, the City has adopted a qualified climate action plan (Energy and Conservation Action Strategy[2]) that underwent CEQA review. In summary, the ECAS outlines a systematic pathway for the City to achieve the implemented state-level GHG mitigation goals under SB 32 and EO S-3-05, which together establish GHG emission targets of 40% and 80% below 1990 levels by 2030 and 2050, respectively. The ECAS provides GHG emission trajectories under business-as-usual (BAU) and adjusted business-as-usual (ABAU) conditions for six different GHG emission categories (i.e., residential and non-residential energy consumptions, transportation, water consumption, wastewater management, solid waste control, and off-road equipment) and provides mitigation strategies and guidelines. Therefore, the threshold of significance will be assessing whether the project is consistent with the ECAS.

The CEQA Guidelines also require an assessment of energy consumption. While there is no numeric threshold associated with energy, recent court cases and the December 2018 updates to the CEQA Guidelines[3] have shown that energy consumption should be quantified and used to evaluate potential impacts on energy resources.

[2] Energy and Conservation Action Strategy Update: Vacaville's Vision For Efficient Growth, March 2021. Available Online at: https://www.ci.vacaville.ca.us/home/showpublisheddocument/17751/637514730349170000

[3] Available at: https://resources.ca.gov/CNRALegacyFiles/ceqa/docs/2018_CEQA_FINAL_TEXT_122818.pdf.

2. EMISSIONS INVENTORIES

Construction and demolition activities are anticipated to occur from 2023 through 2025, with full buildout achieved in 2025. Operational GHG emissions and criteria air pollutant emissions are quantified for calendar year 2025 to compare to the mass emissions thresholds. This section describes how emissions were quantified.

2.1 Summary of Existing Conditions Emissions

As noted above, at this time, the Project site contains two single family homes. The existing land uses are conservatively not assumed to emit any GHGs, criteria air pollutants, or toxic air contaminants; this is conservative because in reality, there are emissions associated with the existing land uses, and those emissions would be removed and replaced by the Project emissions.

2.2 Proposed Project Construction Emissions

2.2.1 Methodology for Construction Emissions Calculations

Construction-related emissions of GHGs and CAPs were calculated using the CalEEMod® emissions calculator model (version 2020.4.0) developed for the California Air Pollution Control Officers Association.[4] **Appendix A** contains emission calculations that show how non-default values were derived for use in CalEEMod. **Appendix B** includes the CalEEMod output files.

The analysis used default assumptions from CalEEMod® unless project-specific data was provided. It was assumed that the Project construction contractors would use off-road construction equipment engines that meet Tier 4 Final emission factors.

The volume of demolished material was estimated based on aerial imagery and mapping tools in Google Earth Pro. The calculated square footage was then entered into CalEEMod to estimate the number of truck trips needed to haul debris and fugitive dust emissions. During the demolition and grading subphases, approximately 57 and 62 total one-way trips per phase are expected, respectively. Additionally, material/vendor trips are assumed to occur during the building construction subphase based on CalEEMod® default activity assumptions for a total of 12 one-way material/vendor trips per day.

2.2.2 Summary of Construction Emissions

The YSAQMD does not propose a quantitative GHG threshold for CEQA analyses. However, the City of Vacaville adopted a qualified climate action plan (Energy and Conservation Action Strategy and Updates) that underwent CEQA review. Therefore, assessing compliance with this GHG emissions reduction plan was used to evaluate significance. However, for disclosure purposes, GHG emissions were quantified and provided in this document.

Renewable Diesel: The Project would use Neste or other renewable diesel instead of conventional diesel for off-road construction equipment. Renewable diesel is made from 100 percent renewable and sustainable raw materials including cooking and vegetable oil residues and waste animal fats from the food processing industry and is classified as a

[4] CalEEMod Version 2020.4.0 was current version at the time of the Notice of Preparation. While a soft release of CalEEMod was released in 2022, because substantial work had been completed using the previous model release and CalEEMod 2022 is not yet required by YSAQMD, emission calculations were not updated with the new release.

hydrotreated vegetable oil. In the manufacturing process, the raw materials are transformed into a pure hydrocarbon fuel that can be used interchangeably with conventional diesel but provides performance benefits.[5] However, while renewable diesel would be used to the extent possible during construction, any emissions benefits from its usage were not quantified.

Sequestration: The Project would plant net new trees for all residences and as part of the streetscaping. Trees sequester carbon during their growing period of up to 20 years, as described further in the CalEEMod® Users Guide. This calculation is based on a minimum of 100 net new trees, although the actual number of trees planted may be higher. While the expected lifecycle emissions reductions are shown in the CalEEMod outputs in Appendix B, they are not reflected in the operational emissions inventories shown in this report.

Table 1 summarizes project construction emissions by year.

Table 1: Unmitigated Construction Emissions

Year [a,b]	CO_2e	ROG	NOx	PM_{10}	$PM_{2.5}$
	MT/yr	Ton/yr [lb/day]			
2023	271	0.17 (3.38)	1.65 (34.74)	0.49 (21.03)	0.25 (11.30)
2024	368	0.21 (1.60)	1.84 (14.05)	0.12 (0.92)	0.87 (0.66)
2025	237	0.93 (47.53)	1.10 (14.22)	0.07 (0.93)	0.05 (0.65)
Maximum [c]	**876 [d]**	**0.93 (47.53)**	**1.84 (34.74)**	**0.49 (21.03)**	**0.25 (11.30)**

Notes:
a. Emissions estimated using CalEEMod® version 2020.4.0.
b. The inventory includes model refinements to account for the Renewables Portfolio Standard (RPS) requirements for 2025 and updates to use the CARB's most current mobile emissions model EMFAC2021. Appendix A Table 4 shows the derivation for the electricity intensity factor, while Appendix A Table 3 shows the mobile vehicle emission factors used in the analysis.
c. The values calculated here may vary from the detailed tables due to rounding.
d. Total emissions shown for CO_2e, rather than annual maximum.

2.3 Proposed Operational Project Emissions

The Project ongoing operational emissions were estimated using CalEEMod® 2020.4.0. The operational emissions are summarized in the tables below and the supporting tables in **Appendix A**, and CalEEMod® outputs are included in **Appendix B**.

[5] Neste MY Renewable Diesel – high-performing low-carbon biofuel. Available at: https://www.neste.com/companies/products/renewable-road-transport/neste-my-renewable-diesel. Accessed: June 6, 2022.

2.3.1 Methodology for Emissions Inventories

The emissions inventories are divided by source category to cover the following sources:

1. Area Sources
2. Purchased electricity use not related to water usage[6]
3. Natural gas use
4. Water usage, including purchased electricity use
5. Waste
6. Mobile Sources.

Each source category is discussed separately below.

2.3.1.1 Area Sources

The proposed Project includes area sources such as architectural coatings, consumer products use, natural gas hearth, and landscaping equipment. The Project land uses may employ gasoline and diesel landscaping equipment, and the residences may include natural gas-fired hearths. CalEEMod®'s emissions estimates are based on emission factors for the landscaping equipment from the California Air Resources Board (CARB) OFFROAD2011 model and hearths based on typical activity in Solano County and natural gas emission factors. Consistent with YSAQMD Rule 2-40, no wood-burning appliances (i.e., fireplaces or heaters) are allowed. While 32% of the building units will not have a fireplace, 68% of the units will have natural gas fireplaces based on CalEEMod default assumptions.

The Project would install exterior electrical outlets that enable the use of electric landscaping equipment. Electric landscaping equipment would further reduce both GHG and criteria air pollutant emissions, if quantified.

2.3.1.2 Purchased Electricity Not Related to Water Use

The Project includes operational GHG emissions associated with purchased electricity for lighting, heating, plug-in appliances, electric vehicle charging, and other uses not associated with water supply, treatment, and distribution. CalEEMod® estimates emissions based on the electricity use and the carbon intensity of electricity. To estimate GHG emissions from electricity use, Pacific Gas and Electric Company (PG&E) carbon dioxide (CO_2) intensity factors were projected for 2025 in place of the default CO_2 intensity in CalEEMod®. This used the most recently available historical PG&E data on CO_2 intensity and percent renewables from 2016 through 2018 to project how the CO_2 intensity of the electricity would change in 2025. This intensity factor considers the State's Renewables Portfolio Standard (RPS) based on Senate Bill (SB) 100, which requires 35% of electricity to be from renewable sources in 2020 and 60% of electricity to be from renewable sources in 2035. The derivation of this factor is shown in **Table 4 of Appendix A**.

CalEEMod® provides default electricity intensities based on the type and size of land uses associated with the Project for its climate zone. Version 2020.4.0 incorporates the electricity use rates consistent with 2019 Title 24, Part 6 Building Energy Efficiency Standards ("Title 24"), which went into effect January 1, 2020. 2019 Title 24 also updates the baseline lighting

[6] While California building code requires the installation of solar for new construction, no modifications to CalEEMod calculations were made to account for any energy and emission reductions.

intensity for all land use subtypes to rely on high-efficiency (e.g., light-emitting diode or LED) lightbulbs. In addition, the Project would install ENERGY STAR appliances, which reduce electricity use compared to conventional appliances. This calculation assumes that the residences use ENERGY STAR dishwashers, refrigerators, and ceiling fans.

The 2019 Title 24 building code requires that any low-rise residential building, defined as a residential building with three habitable stories or less, achieve zero net electricity through improvements in energy efficiency and generation of on-site renewable electricity (e.g., solar photovoltaics) to offset the annual site electricity consumption. The Project includes single family homes only. Ramboll estimated the emissions reduction associated with zero net electricity low rise residences using the energy usage rates from CalEEMod®. This can be seen in **Appendix B**.

2.3.1.3 Natural Gas

The Project emits GHGs and criteria pollutants from on-site natural gas combustion. CalEEMod® provides default natural gas intensities based on the type and size of land uses associated with the Project for its climate zone. Version 2020.4.0 incorporates the natural gas use rates consistent with 2019 Title 24, Part 6 Building Energy Efficiency Standards ("Title 24"), which went into effect January 1, 2020.

The use of natural gas for space and water heating comprises the majority of natural gas use in single family homes. The Project would use electric space and water heating instead of natural gas. Replacing space and water heaters with electric (e.g., heat pumps for heating; or heat pump or tankless water heaters) removes the GHG emissions associated with natural gas and also reduces criteria air pollutant emissions. However, no modifications to natural gas usage were made in CalEEMod to provide a conservative estimate of emissions.

2.3.1.4 Water Use, Including Purchased Electricity

Electricity is required to supply, treat, and distribute water and wastewater, and as such, water use is a source of GHG emissions. The water use estimate for the Project is the CalEEMod® default for the Project land uses for Solano County. As with GHG emissions from purchased electricity not related to water use, Ramboll used the estimated PG&E CO_2 intensity factor for 2025, in place of the default CO_2 intensity in CalEEMod®, as discussed in Section 2.3.1.2.

CalEEMod® water use rates are based on defaults from data preceding California's recent droughts. Several regulatory requirements would effectively reduce water use, as described below.

Water Efficient/Drought Tolerant Landscaping

The California Department of Water Resources (DWR) implements the Model Water Efficient Landscape Ordinance (MWELO) to save water by efficient landscape design, installation, and maintenance. The statewide MWELO was updated in 2015 to improve landscape irrigation water savings.[7] Section 14.27.070 of the Vacaville Municipal Code adopts the current

[7] CA DWR. 2020. MWELO. Available at: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Model-Water-Efficient-Landscape-Ordinance. Accessed: June 6, 2022.

MWELO.[8] This is estimated to reduce outdoor water use by 20 percent compared to CalEEMod® defaults.[9] This reduction is included in the CalEEMod® output files in **Appendix B.**

Low-Flow Fixtures

The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CalGreen Building Standard (CalGreen) and establishes voluntary and mandatory standards pertaining to the planning and design of sustainable site development, energy efficiency, water conservation, material conservation, and interior air quality. Like Part 6 of Title 24, the CalGreen standards are periodically updated, with increasing energy savings and efficiencies associated with each code update. CalEEMod® defaults from 2008 have not been updated to incorporate the CalGreen requirements from 2010, 2013, 2016, or 2019. The Project would comply with the CalGreen Standards, which will require a 20 percent reduction in indoor potable water use through the use of water saving fixtures and or flow restrictors.[10] This reduction is shown in **Appendix B.**

2.3.1.5 Waste

Waste generated by the Project would result in GHG emissions, which was estimated using CalEEMod® using default values and incorporated a reduction due to on-site recycling and composting facilities. California Assembly Bill (AB) 341 requires that 75% of all waste generated in the state be diverted away from landfills and towards recycling or compost facilities by 2020.[11] To meet this target, the City of Vacaville's Municipal Code, Chapter 8.08.041, requires that all property owners maintain a subscription for solid and yard waste collection.[12] The waste collection is provided by Vacaville Recycling, which includes green waste collection. Acceptable green wastes include Grass, leaves, and weeds as well as tree and shrub pruning. By default, CalEEMod® assumes approximately 50% waste diversion based on historical data. This reduction is shown in **Appendix B.**

2.3.1.6 Mobile Sources

The Project would generate vehicle trips from residents, vendors, and visitors traveling to and from the site. Emissions were quantified using default values based on land use from CalEEMod. The mitigated CalEEMod® run reduced emissions due to project features that reduce vehicle miles traveled (VMT) over a default suburban development pattern. Features include an improved pedestrian and bicycle network.

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[8] City of Vacaville Municipal Code. Section 14.27.070 Prescriptive Compliance Option. Available at: https://www.codepublishing.com/CA/Vacaville/#!/Vacaville14/Vacaville1427070.html#14.27.070. Accessed: June 6, 2022.

[9] Hartin, J.S., et al. 2018. UC ANR research and education influences landscape water conservation and public policy. Available at: https://www.researchgate.net/publication/331334650_UC_ANR_research_and_education_influences_landscape_water_conservation_and_public_policy. DOI: 10.3733/ca.2018a0041. Accessed: June 6, 2022.

[10] CSBC. 2010. 2010 California Green Building Standards. 4.303.1. Available at: https://www.ladbs.org/docs/default-source/publications/misc-publications/2010-ca-green-building-standards-code.pdf?sfvrsn=11. Accessed: July 1, 2020.

[11] California State Assembly. 2011. Assembly Bill No. 341. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120AB341. Accessed: June 6, 2022.

[12] City of Vacaville Municipal Code. Section 8.08.041 Collection – Solid waste/yard waste – Owner obligations. Available at: https://www.codepublishing.com/CA/Vacaville/#!/Vacaville08/Vacaville0808.html#8.08.041. Accessed: June 6, 2022.

CalEEMod® evaluates mobile emissions using CARB's Emission Factors Model for on-road emissions, EMFAC2017. Ramboll estimated updated vehicle fleet mix and emission factors for the Project operational year 2025 using the newer version of the model, EMFAC2021. The updated vehicle fleet mixes and emission factors are presented in **Table 3 of Appendix A.**

Consistent with CALGreen requirements, the Project will install a raceway designed to accommodate a dedicated 208/240-volt branch circuit that will terminate into a listed cabinet, box, or other enclosure in proximity to the proposed location of an EV charger. It does not require installation of a pedestal or advanced capabilities (e.g., Wi-Fi, credit card reading). Gasoline and diesel cars emit GHGs, criteria air pollutants, and toxic air contaminants through fuel combustion, while electric vehicle charging results in indirect GHG emissions from fossil fuels used to generate electricity. The difference between the indirect electricity GHG emissions and the fossil fuel combustion emissions for the miles assumed to be provided by the charging stations is the emissions benefit due to this measure. However, these benefits were not estimated in this report.

2.3.2 Summary of Emissions

Table 2 summarizes the operational emissions by source category.

Table 2: Unmitigated Operational Project Emissions

Source Category [a,b]	CO_2e	ROG	NOx	PM_{10}	$PM_{2.5}$
	MT/yr	Ton/yr [lb/day]			
Area	63	0.83 (4.81)	0.06 (1.39)	0.01 (0.16)	0.01 (0.16)
Purchased Electricity	96	--	--	--	--
Natural Gas	163	0.02 (0.09)	0.14 (0.77)	0.01 (0.06)	0.01 (0.06)
Water Use	16	--	--	--	--
Waste Disposed	69	--	--	--	--
Traffic	1,188	0.44 (2.65)	0.89 (5.31)	0.72 (4.21)	0.19 (1.11)
Total [c]	**1,596**	**1.28 (7.55)**	**1.10 (7.47)**	**0.74 (4.43)**	**0.21 (1.32)**

Notes:
a. Emissions estimated using CalEEMod® version 2020.4.0. The mitigated CalEEMod® outputs incorporate benefits due to the Project's extensive bicycle and pedestrian network and no wood-burning appliances (e.g., fireplaces and heaters).
b. The inventory includes model refinements to account for the Renewables Portfolio Standard (RPS) requirements for 2025 and updates to use the CARB's most current mobile emissions model EMFAC2021. Appendix A Table 4 shows the derivation for the electricity intensity factor, while Appendix A Table 3 shows the mobile vehicle emission factors used in the analysis.

c. The values calculated here may vary from the detailed tables due to rounding.

3. AIR QUALITY IMPACT ASSESSMENT

3.1 Significance Thresholds

Consistent with Appendix G of the California CEQA Guidelines, for the impacts analyzed in this section, the Proposed Project would have a significant impact related to air quality if it were to:

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

3.2 Approach to Analysis

As stated in the CEQA Guidelines[13], the Proposed Project would result in two types of potential air quality impacts: impacts from construction activities and impacts from project operations due to increased vehicle travel, energy consumption, consumer product usage, landscaping, and coating.

Each of these types of direct impacts is, in turn, separated into impacts from CAP emissions, which are generally regional in nature, and impacts associated with exposure to $PM_{2.5}$ and TACs, which are localized health impacts expressed in terms of the probability of developing cancer per 10 in 1 million persons exposed to TAC concentrations, and non-cancer chronic and acute hazard index (HI). The assessment of CAP impacts addresses the second and third bulleted significance thresholds identified above. The assessment of localized health risk addresses the fourth bulleted significance threshold identified above.

The air quality analysis conducted for this impact assessment uses emission factors, models, and tools distributed by a variety of agencies, including CARB and the California Air Pollution Officers Association. Additionally, the analysis includes methodologies identified in the YSAQMD Handbook for Assessing and Mitigating Air Quality Impacts (June 2007).

3.2.1 Proposed Project

The Proposed Project is seeking to develop 114 single-family homes on 27 acres of relatively undeveloped land, excluding two existing residential properties. The Proposed Project is approximately 205,200[14] square feet of development. **Figure 1** shows the location of the Proposed Project and the surrounding area. **Figure 2.**

The Proposed Project site is comprised of approximately 27 acres and is roughly bounded by Vanden Road to the west and Alamo Creek to the south. The Proposed Project site is

[13] YSAQMD, 2007. Handbook for Assessing and Mitigating Air Quality Impacts. 11 July Available online at: https://www.ysaqmd.org/wp-content/uploads/Planning/CEQAHandbook2007.pdf

[14] The proposed project area is estimated based on CalEEMod

currently undeveloped, excluding two existing residential properties that would be demolished and removed.

3.3 Air Quality Plan

The applicable air quality plan is 2017 Sacramento Regional 2008 8-Hour Ozone and Further Reasonable Progress Plan ("2017 Ozone Plan"). Consistency with the 2017 Ozone Plan can be determined if the Proposed Project supports the goals of the plan, includes applicable control measures from the plan, and would not disrupt or hinder implementation of any control measures from the plan. Consistency with the 2017 Ozone Plan is the basis for determining whether the Proposed Project would conflict with or obstruct implementation of an applicable air quality plan.

3.4 Criteria Air Pollutants

As described above under "Environmental Setting," SVAB experiences low concentrations of most pollutants when compared to federal or state standards and is designated as either in attainment or unclassified for most criteria pollutants, with the exception of ground-level ozone, $PM_{2.5}$, and PM_{10}, for which these pollutants are designated as non-attainment for either the state or federal standards.

By definition, regional air pollution is largely a cumulative impact in that no single project is sufficient in size to, by itself, result in non-attainment of air quality standards. Instead, a project's individual emissions are considered to contribute to the existing, cumulative air quality conditions. According to the YSAQMD CEQA guidelines, if a proposed project would individually have a significant air quality impact, then it would also be considered to have a significant cumulative impact.[15]

Table 3 identifies quantitative CAP significance thresholds published by YSAQMD. The table is followed by a discussion of each threshold. Projects that would result in criteria pollutant emissions below these significance thresholds would not violate an air quality standard, contribute substantially to an air quality violation, or result in a cumulatively considerable net increase in CAPs within the air basin. These thresholds apply to both construction and operational emissions from a given project.

Table 3: YSAQMD Thresholds of Significance

Pollutant	Thresholds of Significance
ROG	10 tons/year
NOx	10 tons/year
PM_{10}	80 lbs/day
CO	Violation of a state ambient air quality standard for CO

Source: YSAQMD. 2007. Handbook for Assessing and Mitigating Air Quality Impacts. Available online at: https://www.ysaqmd.org/wp-content/uploads/Planning/CEQAHandbook2007.pdf [Accessed May 27, 2022]

[15] YSAQMD, *Handbook for Assessing and Mitigating Air Quality Impacts*, July 2007, Available at: https://www.ysaqmd.org/wp-content/uploads/Planning/CEQAHandbook2007.pdf [accessed May 27, 2022].

Land use development projects generate ROG, NO_x, PM_{10}, and $PM_{2.5}$ emissions as a result of increases in vehicle trips, energy use, architectural coating, and construction activities. Therefore, the identified thresholds can be applied to the construction and operational phases of land use projects. Those projects that would result in emissions below these thresholds would not be considered to contribute to an existing or projected air quality violation or result in a considerable net increase in ozone precursors or PM.

Fugitive dust emissions are typically generated during construction phases. Studies have shown that the application of best management practices (BMPs) at construction sites significantly controls fugitive dust.[16] YSAQMD has identified 11 construction dust mitigation measures to control fugitive dust emissions from construction activities.[17] The Proposed Project would incorporate these dust control measures to the extent feasible.

Construction emissions would be generated by many different construction sources, including off-road construction equipment (such as forklifts, loaders, backhoes, pavers, and cranes) and on-road trucks. The predominant source of emissions of NO_x, PM_{10}, and $PM_{2.5}$ would be off-road equipment. The predominant source of ROG emissions would be architectural coating off-gassing emissions.

Operational emissions from the Proposed Project would be generated by area sources (e.g., landscaping, consumer product usage, architectural coating), energy consumption, and vehicle trips.

3.5 Other Criteria Pollutants

The state and national ambient air quality standards for NO_2, SO_2, CO, and lead are currently being met by YSAQMD and will continue to be attained for the foreseeable future. Additionally, because of the phaseout of lead in gasoline, ambient lead concentrations are expected to continue to decline. Given the SVAB attainment status and the limited SO_2 emissions that could result from the Proposed Project, the Proposed Project would not result in a project or cumulatively considerable net increase in SO_2 and lead, and a quantitative analysis is not required (NOx emissions are analyzed as precursors to O_3).

The Proposed Project vehicle trips are compared to YSAQMD's screening thresholds to assess CO impacts. We assume that Project vehicle traffic would not cause the peak-hour level of service (LOS) on one or more streets or intersections to be reduced to an unacceptable LOS or substantially worsen an already-existing peak-hour LOS F; therefore, a CO "hot spots" analysis was not needed to determine whether the change in traffic attributable to the Project at affected intersections would have the potential to result in exceedances of the California Ambient Air Quality Standard (CAAQS) or National Ambient Air Quality Standard (NAAQS).

3.6 Local Health Risks and Hazards

In addition to CAPs, individual projects may emit TACs. These include TACs from vehicles, construction equipment, demolition, and operations. As part of the environmental review for the Proposed Project, a qualitative health risk assessment was completed following

[16] Western Regional Air Partnership, WRAP Fugitive Dust Handbook, September 7, 2006, wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf, accessed May 27, 2022.

[17] YSAQMD, *Handbook for Assessing and Mitigating Air Quality Impacts*, July 2007, p. 27.

recommendations in CARB's *Air Quality and Land Use Handbook: A Community Health Perspective*.[18]

3.7 Cumulative Impacts

As discussed above, the contribution of a project's individual air emissions to regional air quality impacts is, by its nature, a cumulative effect. Emissions from past, present, and future projects in the vicinity of the Proposed Project also have or will contribute to adverse regional air quality impacts on a cumulative basis. Typically, no single project by itself would be sufficient in size to result in non-attainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative air quality conditions.[19] As described above, the project-level thresholds for CAPs are based on levels at which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in CAPs. Therefore, if a project's emissions are below the project-level thresholds, the project would not be considered to result in a considerable contribution to cumulative regional air quality impacts.

3.8 Odor Impacts

For odors, YSAQMD recommends that potential impacts be evaluated if a potential source of objectionable odors is proposed at a location near existing sensitive receptors. Potential sources of objectionable odors include, but are not limited to:

- Wastewater treatment facilities
- Chemical manufacturing
- Sanitary landfill
- Fiberglass manufacturing
- Transfer station
- Painting/coating operations (e.g., auto body shops)
- Composting facility
- Food processing facility
- Petroleum refinery
- Feed lot/dairy
- Asphalt batch plant
- Rendering plant

If the proposed project would locate a known odor source within a mile of a sensitive receptor, then a full analysis should be undertaken.[20]

[18] CARB, *Air Quality and Land Use Handbook: A Community Health Perspective*, April 2005, https://www.arb.ca.gov/ch/handbook.pdf [Accessed May 27, 2022].

[19] YSAQMD, *Handbook for Assessing and Mitigating Air Quality Impacts*, July 2007, p. 7.

[20] YSAQMD, *Handbook for Assessing and Mitigating Air Quality Impacts*, July 2007, p. 13.

3.9 Impact Evaluation

3.9.1 Impact AQ-1

The Proposed Project would not conflict with or obstruct implementation of the applicable air quality plan. (Less than Significant)

In compliance with the State CEQA Guidelines, the analysis below evaluates whether implementation of the Project would conflict with or otherwise obstruct implementation of regional air quality plans. For air quality planning purposes, the *Sacramento Regional 2008 NAAQS 8-Hour Ozone Attainment and Reasonable Further Progress Plan* contains emissions inventories based on existing and foreseeable future land uses within its jurisdiction. If a new project is consistent with the planned land use designation that was considered in the development of an air quality management plan, the proposed project would not conflict and would not obstruct implementation of the applicable air quality management plan. Generally, a project's conformance with a local general plan that was considered in the preparation of an air quality management plan would demonstrate that the project would not conflict with or obstruct implementation of the air quality management plan.

Based on CalEEMod's estimated population from the construction of 114 single-family residences, the Project would add approximately 326 residents (per CalEEMod default assumptions) to the City of Vacaville at full buildout, which has been assumed to occur by the year 2025. This level of growth is well within the County of Solano's projections in 2021 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), also known as Plan Bay Area 2050, that 35,000 households (30,000 households in North Solano County, including the City of Vacaville)[21] will be added countywide between 2015 and 2050. Therefore, the Project would be consistent with the 2021 RTP/SCS and the population growth assumptions in the Attainment Plans.

3.9.2 Impact AQ-2a

The proposed Project's construction emissions would result in a cumulatively considerable net increase in criteria pollutants for which the air basin is in nonattainment. (Less than Significant)

During the Proposed Project's construction period, construction activities would result in emissions of ozone precursors and PM in the form of dust (fugitive dust) and exhaust (e.g., vehicle tailpipe emissions), as discussed below in more detail. Emissions of ozone precursors and PM (exhaust) are primarily a result of the combustion of fuel from on-road and off-road vehicles. However, ROGs are also emitted from activities that involve paint, other types of architectural coatings, or asphalt paving.

The Proposed Project development is expected to include site preparation, grading, building construction, paving, and architectural coatings. Minor demolition would occur from the removal to two existing residential properties. Construction activities would require the use of concrete and industrial saws, excavators, rubber tired dozers, tractors, backhoes, graders,

[21] Association of Bay Area Governments and Metropolitan Transportation Commission, *Plan Bay Area 2050, Forecasting and Modeling Report*, October 2021, https://www.planbayarea.org/sites/default/files/documents/Plan_Bay_Area_2050_Forecasting_Modeling_Report_October_2021.pdf [Accessed May 31, 2022].

scrapers, pavers, paving equipment, rollers, cranes, forklifts, generator sets, welders, and air compressors. Off-road equipment activity was estimated by CalEEMod.

3.9.2.1 Fugitive Dust

Project-related demolition, excavation, grading, and other construction activities may cause wind-blown dust that could contribute PM to the local atmosphere. Despite the established federal standards for air pollutants and ongoing implementation of state and regional air quality control plans, air pollutants continue to have impacts on human health throughout the country. Dust can be an irritant causing watering eyes or irritation to the lungs, nose, and throat. Depending on exposure, adverse health effects can occur due to PM in general as well as specific contaminants, such as lead or asbestos that may be constituents of dust.

Dust which is generated during demolition and construction activities primarily constitutes PM_{10}, with smaller amounts of $PM_{2.5}$. Even though most of the dust would settle down in or near the Proposed Project area, sensitive receptors near the Proposed Project site could still be exposed to small particulates that remain in the atmosphere. Sensitive individuals including those that may be living nearby or attending nearby daycare centers could be exposed to fugitive dust from construction sources. Although construction emissions from the Proposed Project are temporary in duration, the Project would comply with Construction dust control measures and procedures set forth by YSAQMD (Construction Dust Mitigation Measures, Table 5)[22], and repeated below.

The Project would implement the following measures to ensure that potential dust-related construction air quality impacts of the Proposed Project would be less than significant.

3.9.2.2 Construction Best Management Practices

Construction dust control measures to be implemented by the Project Sponsor during construction activities:

A. Water all active construction sites at least twice daily. Frequency should be based on the type of operation, soil, and wind exposure.

B. Haul trucks shall maintain at least 2 feet of freeboard.

C. Cover all trucks hauling dirt, sand, or loose materials.

D. Appy non-toxic binders (e.g., latex acrylic copolymer) to exposed areas after cut and fill operations and hydroseed area.

E. Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days).

F. Plant tree windbreaks on the windward perimeter of construction projects if adjacent to open land.

G. Plant vegetative ground dover in disturbed areas as soon as possible.

H. Cover inactive storage piles.

I. Sweep streets if visible soil material is carried out from the construction site.

[22] YSAQMD, *Handbook for Assessing and Mitigating Air Quality Impacts*, Table 5, Construction Dust Mitigation Measures, July 11, 2007, https://www.ysaqmd.org/wp-content/uploads/Planning/CEQAHandbook2007.pdf [accessed May 31, 2022].

J. Treat accesses to a distance of 100 feet from the paved road with 6 to 12-inch layer of wood chips or mulch.

K. Treat accesses to a distance of 100 feet from the paved road with 6-inch layer of gravel.

3.9.2.3 Criteria Air Pollutants from Construction

Construction-related emissions of CAPs were calculated using methods consistent with the CalEEMod® emissions calculator model (version 2020.4.0) developed for the California Air Pollution Control Officers Association.

3.9.2.4 Proposed Project

Table 4 presents construction-related emissions that would result from the Proposed Project, calculated in terms of average daily emissions for the construction period. The maximum year's average daily emission rate during construction of the Proposed Project is compared to significance thresholds to establish a significance determination.

Construction emissions include emissions from both off-road construction equipment and on-road construction vehicles, including haul trucks and vendor/worker trips. Construction of any single phase of the Proposed Project's construction phasing program would result in emissions of ROG, NO_x, PM_{10}, and $PM_{2.5}$ that would be below the thresholds of significance when considered alone. As shown in **Table 4**, construction-related emissions during each phase of the construction program, including the overlap of phases, would be less than significant.

Table 4: Emissions from the Proposed Project During Construction

Year	Maximum Daily Emissions (lb/day)				
	ROG	**NO_x**	**CO**	**$PM_{2.5}$ [c]**	**PM_{10} [c]**
2023	3.4	34.7	28.5	11.3	21.0
2024	1.6	14.0	17.2	0.7	0.7
2025	47.5	14.2	19.0	19.0	0.6
Maximum	47.5	34.7	28.5	11.3	21.0
Significance Threshold	*n/a*	*n/a*	*n/a*	*n/a*	*80*
Above Threshold?	n/a	n/a	n/a	n/a	No
Year	**Annual Emissions (tons/year)**				
	ROG	**NO_x**	**CO**	**$PM_{2.5}$**	**PM_{10}**
2023	0.17	1.66	1.49	0.25	0.49
2024	0.21	1.84	2.25	0.09	0.12
2025	0.93	1.10	1.45	0.05	0.07
Maximum	0.93	1.84	2.25	0.25	0.49
Significance Threshold	*10*	*10*	*n/a*	*n/a*	*n/a*
Above Threshold?	No	No	n/a	n/a	n/a

Notes:

[A] Construction emissions for each phase were estimated using CalEEMod® and activity assumptions from the Project Sponsor.

Source: Ramboll, 2022.

Specifically, **Table 4** indicates that the maximum daily emissions from Project construction would be 21 lbs/day for PM_{10}, which is below the threshold of 80 lbs/day for PM_{10}. Additionally, **Table 4** indicates that the maximum annual emissions from Project construction would be 0.9 tons/yr for ROG and 1.8 tons/yr for NO_x, which is below the threshold of 10 tons/yr for ROG and NO_x.

Therefore, criteria pollutant emissions generated from the Proposed Project during construction would be a less-than-significant air quality impact.

3.9.3 Impact AQ-2b

The proposed Project's operational emissions would result in a cumulatively considerable net increase of criteria pollutants for which the air basin is in nonattainment. (Less than Significant)

The Proposed Project would generate operational emissions from a variety of sources, including area sources (consumer products, architectural coatings, landscaping, and hearths), building energy use (natural gas), and mobile sources (daily trips).

Emissions from all sources were calculated CalEEMod® 2020.4.0, which estimates emissions based on the type and size of land uses associated with the Proposed Project. Where not specified otherwise, CalEEMod® default assumptions were used to estimate emissions. Edits to CalEEMod® default assumptions include:

- Consistent with YSAQMD wood-burning device regulations, this analysis assumed that there would be zero woodstoves and zero wood burning fireplaces installed in the residences.[23] The quantity of gas fireplaces input into CalEEMod® was assumed to be the sum of CalEEMod® default counts of wood burning fireplaces and gas fireplaces.
- The consumer products ROG emission factor for the Proposed Project was derived using methodology consistent with CalEEMod® but with updated statewide parameters. The CalEEMod® default emissions factor assumes 2008 statewide ROG inventory and building square footage. An updated ROG inventory for 2020 was taken from the CARB and 2020 population estimate based on U.S. Census Bureau's QuickFacts for Solano County was used to estimate a statewide ROG emission factor for 2020.[24,25] This derivation is shown in **Appendix A Table 2**.
- Default CalEEMod® on-road vehicle emission factors were updated, as CalEEMod® defaults incorporate on-road vehicle emission factors from the prior release of the EMFAC model, EMFAC2017. Instead, updated EMFAC2021 emission factors were estimated for

[23] SJVAPCD, Rule 4901: Wood-Burning Fireplaces and Wood Burning Heaters, June 20, 2019. Available online at: https://www.valleyair.org/rules/currntrules/r4901.pdf. Accessed: June 6, 2022.

[24] Population estimates available at: https://www.census.gov/quickfacts/fact/table/solanocountycalifornia,US/PST040221. Accessed: June 6, 2022.

[25] ROG emissions data available at: http://www.arb.ca.gov/regact/2013/cp2013/cp13isor.pdf. Accessed: June 6, 2022.

operational year 2025, as this represents the best available data. Emission factors used for the operational emissions inventory are shown in **Appendix A Table 3**.

The CalEEMod® output file for project operational emissions is included as **Appendix B**.

3.9.3.1 Proposed Project

The daily and annual increase in emissions associated with the Proposed Project are shown in **Table 5** for ROG (precursor of ozone), NO_x (precursor of ozone), PM_{10}, and $PM_{2.5}$ with results showing the contribution by source. While there are two existing residential properties, no emissions reduction was taken for the baseline to provide a conservative emissions estimate. As shown in **Table 5,** these emissions are well below the respective YSAQMD CEQA significance thresholds of 80 lbs/day for PM_{10} and 10 tons/year for ROG and NO_x.

Table 5: Emissions from the Proposed Project During Full Buildout Operation

Emissions Source	Maximum Daily Emissions (lb/day)[A,B]				
	ROG	**NO_x**	**CO**	**$PM_{2.5}$**	**PM_{10}**
Area Sources	4.81	1.39	9.94	0.16	0.16
Building Energy Sources	0.09	0.77	0.33	0.06	0.06
Mobile Sources	2.65	5.31	23.62	1.11	4.21
Total Daily Emissions (lb/day)	***7.55***	***7.47***	***33.89***	***1.32***	***4.43***
Daily Significance Threshold (lb/day)	***N/A***	***N/A***	***N/A***	***N/A***	***80***
Above Daily Threshold?	N/A	N/A	***N/A***	N/A	No
Emissions Source	**Annual Emissions (tons/yr)[A,B]**				
	ROG	**NO_x**	**CO**	**$PM_{2.5}$**	**PM_{10}**
Area Sources	0.83	0.06	0.09	0.01	0.01
Building Energy Sources	0.02	0.14	0.06	0.01	0.01
Mobile Sources	0.43	0.89	3.81	0.20	0.72
Total Daily Emissions (lb/day)	***1.28***	***1.09***	***4.73***	***0.21***	***0.74***
Annual Significance Threshold (tons/yr)	***10***	***10***	***N/A***	***N/A***	***N/A***
Above Annual Threshold?	No	No	N/A	N/A	N/A

Notes:

[A] Emissions estimated using CalEEMod® version 2020.4.0.

[B] Operational Criteria Air Pollutant (CAP) emissions were estimated for the Proposed Project assuming full project buildout in 2025.

Source: Ramboll, 2022.

Therefore, because the Proposed Project's operational emissions at full project buildout would be below the operational significance criteria, the Proposed Project would have a less-than-significant air quality impacts.

3.9.4 Impact AQ-3

Construction and operation of the Proposed Project would not generate toxic air contaminants, including DPM, at levels which would expose sensitive receptors to substantial pollutant concentrations. (Less than Significant)

Construction activities, such as site preparation, grading, building construction, paving, and architectural coating, would affect localized air quality during the construction phases of the Proposed Project. Short-term emissions from construction equipment during these site preparation activities would include directly emitted PM ($PM_{2.5}$ and PM_{10}) and TACs such as DPM. The generation of these short-term emissions could potentially expose sensitive receptors to substantial pollutant concentrations of TACs, resulting in a localized health risk. The construction period (approximately 30 months) would be short compared to the 30-year exposure period for carcinogenic risk. Additionally, because of the size of the construction project, DPM emissions would be spread over a large area. Therefore, impacts to sensitive receptors from project construction would be less than significant.

Additionally, the long-term emissions from operation of the Proposed Project such as mobile sources, as described under Impact AQ-1 and Impact AQ-2, would include PM ($PM_{2.5}$) and TACs, such as DPM and some compounds or variations of ROGs. The proposed project does not include stationary sources that would emit air pollutants or TACs, such as commercial uses that could generate emissions, large boilers, emergency generators, or manufacturing facilities or result in a substantial increase in diesel vehicles (i.e., delivery trucks). Project operations would not result in TAC generation from on-site sources during long-term operations and would not result in the creation of a significant health risk at nearby sensitive receptors.

3.9.4.1 Operational CO Hotspots

CO concentration is a direct function of motor vehicle activity (particularly during peak commuting hours) and meteorological conditions. Under specific meteorological conditions combined with high motor vehicle activity, CO concentrations may reach unhealthy levels for local sensitive land uses, such as residential areas and daycare centers. As a result, the YSAQMD recommends analysis of CO emissions at a local rather than a regional level.

As part of its CEQA Air Quality Guidelines, the YSAQMD provides a screening methodology based on peak hourly traffic volumes to evaluate potential impacts of CO emissions from mobile sources. The Proposed Project would result in a less-than-significant impact for local CO if the following criteria are met:

- A traffic study for the project indicates that the peak-hour LOS on one or more streets in the project vicinity would be reduced to an unacceptable LOS (typically LOS E or F)
- A traffic study indicates that the project would substantially worsen an already existing peak-hour LOS F on one or more streets (delay would increase by 10 seconds or more when project-generated traffic is included).

While a traffic analysis was not completed for the project, the proposed project would only add an additional 1,088 trips per day, which would not be expected to substantially change the LOS at an intersection. Furthermore, the Environmental Impact Report (EIR) for the City of Vacaville's General Plan demonstrated that peak CO concentrations in 2035 would be substantially less than the CAAQS and NAAQS at all analyzed intersections and reginal

growth would not impede continued attainment of the CO standards.[26] Therefore, the proposed project would have a less than significant impact on CO hotspots.

3.9.5 Impact AQ-4

Construction and operation of the Proposed Project would not locate sensitive receptors near existing sources of objectionable odors or construct any sources of objectionable odors. (Less than Significant)

The occurrence and severity of potential odor impacts depends on numerous factors. The nature, frequency, and intensity of the source, the wind speeds and direction, and the sensitivity of the receiving location each contribute to the intensity of the impact. While offensive odors rarely cause any physical harm, they can be unpleasant and cause distress among the public and generate citizen complaints. YSAQMD describes that odor sources of concern in its CEQA guidelines include wastewater treatment facilities, chemical manufacturing, sanitary landfills, fiberglass manufacturing, transfer stations, painting/coating operations, composing facilities, food processing facilities, petroleum refineries, feed lots/dairies, asphalt batch plants, and rendering plants. None of these source types are proposed as part of the Proposed Project, and thus the Project does not anticipate any odor impacts.

During construction, diesel exhaust from construction equipment would generate some odors. However, construction-related odors would be temporary and would not persist upon construction completion. Therefore, odor impacts from operation and construction would be less than significant.

The Proposed Project would have a less than significant impact with respect to generating odor.

3.10 Cumulative Impacts

This section discusses the cumulative impacts to air quality that could result from the Proposed Project in conjunction with past, present, and reasonably foreseeable future projects. The geographic scope of analysis for cumulative air quality construction impacts varies depending on the specific impact. For regional CAPs, the cumulative area includes the SVAB.

3.10.1 Impact C-AQ-1

The Proposed Project, in combination with past, present, and reasonably foreseeable future development in the project area, would not contribute to cumulative regional air quality impacts. (Less than Significant)

The contribution of a project's individual air emissions to regional air quality impacts is, by its nature, a cumulative effect. Emissions from past, present, and future projects in the region also have or will contribute to adverse regional air quality impacts on a cumulative basis. No single project by itself would be sufficient in size to result in non-attainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative air quality conditions.[27] As described above, the project-level thresholds for CAPs

[26] City of Vacaville, Vacaville General Plan and ECAS Draft EIR, Chapter 4.3, Air Quality. Available at: https://www.ci.vacaville.ca.us/home/showpublisheddocument/5508/636234161698230000 [Accessed June 1, 2022]

[27] YSAQMD, *Handbook for Assessing and Mitigating Air Quality Impacts*, July 11, 2017, p. 7.

are based on levels by which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in CAPs. Therefore, because the Proposed Project's emissions do not exceed the project-level thresholds, the Proposed Project would not result in a considerable contribution to cumulative regional air quality impacts. Therefore, this impact would be less than significant.

3.10.2 Impact C-AQ-2

The Proposed Project, in combination with past, present, and reasonably foreseeable future development in the project area, would not contribute to cumulative health risk impacts on sensitive receptors. (Less than Significant)

The health risk assessment (HRA) considers the cumulative contribution of existing localized health risks to sensitive receptors from sources included in the vicinity of the Proposed Project area plus the Proposed Project's sources.

Two nearby projects, Southtown Phase 3 and Morningside Vanden Meadows, would have overlapping construction schedules with the proposed project. **Figure 2** shows the relationship of these projects to the proposed project. While construction and operation of these projects would occur simultaneously, construction activities for all projects would occur over a relatively short period compared to the 30-year exposure period for cancer risk. Additionally, any new stationary sources would be required to be permitted and would be assessed for health risk during the application process. Because these are residential developments, a substantial increase in diesel vehicles would not occur. Therefore, cumulative health risk impacts would be less than significant.

4. GHG IMPACT ASSESSMENT

4.1 Standards of Significance

4.1.1 CEQA Guidelines Appendix G Thresholds

The 2009 amendments to the state CEQA Guidelines do not establish specific thresholds of significance for GHG impacts. Rather, Section 15064.4 of the CEQA Guidelines emphasizes the lead agency's discretion to determine the appropriate methodologies and thresholds of significance consistent with the manner in which other impact areas are handled in CEQA.[28] Appendix G of the CEQA Guidelines, the Environmental Checklist Form, is often used as a basis for lead agencies' selection of significance thresholds, but it does not prescribe specific thresholds. Rather, Appendix G suggests evaluating whether a project would:

1. Generate GHG emissions, either directly or indirectly, that may have a significant adverse impact on the environment; or
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Guidelines section 15064.4(b) states that in evaluating the significance of impacts from GHG emissions, the lead agency should consider the following factors, among others:

- The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting.
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of GHG emissions.

4.1.2 YSAQMD Significance Threshold

The State of California, particularly through AB 32 and SB 32, has set state-wide targets for the reduction of GHG emissions. The goals are to reduce future GHG emissions in a state that is expected to experience growth in both population and economic output.

To date, YSAQMD is in the process of identifying GHG significance thresholds for assessing the impacts of GHGs from land use projects located within its boundary.

City of Vacaville Energy Conservation and Action Strategy

The City of Vacaville Energy Conservation and Action Strategy ("ECAS"), adopted in 2021, is qualified for reducing GHG emissions pursuant to CEQA Section 15183.5(b)(1). The City of Vacaville ECAS includes a range of GHG reduction measures whose implementation would enable the City to meet its 2035 GHG emissions reduction target.

[28] CNRA. 2009. Revised Text of Proposed Guideline Amendments. Sacramento, CA. http://resources.ca.gov/ceqa/docs/FINAL_Text_of_Proposed_Amendemts.pdf. Accessed May 2022.

Pursuant to CEQA Guidelines Sections 15064(h)(3) and 15130(d), if a proposed project is consistent with the requirements of an adopted plan, such as a qualified GHG reduction plan that is prepared consistent with CEQA Guidelines Section 15183.5(b), as described in 15183.5(b)(2), the lead agency may determine that the project GHG impacts are less than significant if the project incorporates the applicable GHG reduction measures in the plan or the measures are otherwise required as mitigation measures. In this case, no further analysis is required. Qualified GHG reduction plans can be used to streamline the review of GHG impacts an individual land development project if the project is consistent with the qualified plan. If the project is not consistent with the qualified plan, further analysis is required to determine whether the project impact is significant.

4.1.3 Thresholds Used in Assessment

Achieving SB 32 and the Executive Orders' 2045 and 2050 GHG emissions reduction goals will require systemic changes in how energy is produced and consumed through all sectors of the economy (as discussed in greater detail in the impact analysis below). Because the mix of technologies, strategies, and policy choices the state will ultimately choose to implement to achieve the post-2030 goals are not readily ascertainable at this time, any accounting of future GHG emissions from an individual development project cannot yet reflect the scope and scale of reductions that may occur as the state transitions toward new regulations designed to achieve the new long-term goals. Furthermore, in absence of a state plan to achieve these long-term goals, it is difficult to identify the "fair share" of reductions to be applied at the local or project level.

Here, there is no applicable plan, policy, or regulation enacted or adopted for City for the post-2020 timeframe that meets the standards set forth in Guidelines section 15064.4(b). Therefore, the City has elected to use project-specific thresholds for the purposes of this analysis. Specifically, the Project would be deemed to have a significant adverse impact[29] related to GHG emissions if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

The threshold can be satisfied with a qualitative discussion of the Project's consistency with the City of Vacaville ECAS. This analysis discusses the goals and assesses whether the project emissions would be consistent with the trajectory needed to achieve the goals.

4.2 Approach to Analysis

This section describes the methodology that Ramboll used to develop the Proposed Project GHG emission inventory and address the significance thresholds identified above. Emissions sources include construction activities and emissions from Project operations due to electricity and natural gas use, vehicle travel, solid waste, and water supply and wastewater. The analysis conducted for this GHG impact assessment uses emission factors, models, and

[29] Greenhouse gas impacts are, by their nature, cumulative impacts because one project by itself cannot cause global climate change. These thresholds pertain to a project's contribution to cumulative impacts but are labeled "Project-Level Impacts" here to be consistent with the terminology used by YSAQMD.[30] While renewable diesel would be used when feasible, the emission calculations assumed that conventional diesel fuel would be used to be conservative.

tools distributed by a variety of agencies, including CARB, the California Air Pollution Officers Association, and the EPA. **Appendix A** contains detailed calculations for updated values in CalEEMod. **Appendix B** contains CalEEMod output reports.

The City of Vacaville ECAS was adopted to meet the State's GHG reduction targets established by SB 32 and demonstrate substantial progress towards meeting EO S-3-05. Specifically, the year 2035 was identified as the target year, which considers the statewide GHG emissions targets of 40% below 1990 levels by 2030 per SB 32 and 80% below 1990 levels by 2050 per EO S-3-05.

The projections of future GHG emissions from anticipated land use development and other sources that are included in the ECAS as described above, do not assume new GHG emissions being produced by activities at the project site. The projections are based on existing General Plan land uses, including the existing residential low density land use designation that applies to the site.

The following statement is made on page I-2 of the ECAS in the context of the ECAS relationship to CEQA and using the ECAS for streamlining CEQA analysis for projects with the ECAS:

- This ECAS will also be utilized for tiering and streamlining future development within Vacaville, pursuant to CEQA Guideline Sections 15152 and 15183.5. It serves as the CEQA threshold of significance within the city for GHG emissions, by which all applicable developments within the city will be reviewed.

Because the proposed project is consistent with the general plan land use for the project site, the analysis of project GHG impacts can be streamlined pursuant to CEQA Guidelines section 15183.5(b). Therefore, the Project has been evaluated for consistency with the GHG emissions reduction measures included in the ECAS. Most of the ECAS reduction measures are either to be implemented by the City, are not germane to individual land development projects, and/or are not within control of the applicant.

4.3 Impact Evaluation

4.3.1 Impact GHG-1

Impact GHG-1: The Project Greenhouse Gas Emissions are reported for disclosure purposes.

This analysis quantified Project emissions based on CalEEMod® default activity assumptions and updated regulatory guidance. **Table 6** summarizes the Proposed Project GHG emissions by source, including those without project design features and those with GHG emission reductions from project design features.

Table 6: Project Greenhouse Gas Emissions Summary [A,B]

Source Category	Emissions Without Project Design Features (MT CO_2e/yr)	Emissions With Project Design Features (MT CO_2e/yr)
Electricity	96	96
Building Natural Gas	163	163
Mobile Sources	1,188	1,177
Solid Waste	69	34
Water and Wastewater	16	16
Landscaping	1.4	1.4
Hearths	61	61
Construction (Amortized) [C]	29	29
Total Emissions	**1,624**	**1,578**

Notes:

[A] GHG Emissions are estimated using CalEEMod.

[B] The unmitigated scenario assumes default CalEEMod assumptions with no project design improvements. The mitigated scenario includes GHG emission reductions from project design features.

[C] Construction emissions were amortized over the assumed project lifetime of 30 years.

Source: Ramboll 2022, CalEEMod outputs.

The GHG emissions are provided for informational purposes and are not used for significance determinations.

4.3.2 Impact GHG-2

Impact GHG-2: The Project Would Be Consistent with City of Vacaville Energy Conservation and Action Strategy. (Less than Significant)

The Project has been evaluated for consistency with the GHG emissions reduction measures included in the ECAS. **Table 7** below identifies which measures are applicable to the project and summarizes the basis for consistency with the applicable measures.

Table 7: Vanden Estates Project Consistency with ECAS

ECAS Action	Descriptions	Consistency [A]
Transportation and Land Use		
LU-1	**Continue Telecommuting**. Encourage telecommuting. The city's goal is to have half of eligible employees telecommuting three days a week.	**Not applicable.** The Project does not include employment land uses.

ECAS Action	Descriptions	Consistency [A]
LU-2	**Improve Capacity for Electric Vehicles.** The city requires that all new multifamily, retail, and office developments provide 15% of required parking spaces as EV ready and 15% of required parking spaces with EV chargers. The cost of charging must be priced to provide energy and maintain the chargers. These standards will also be required for new City managed parking lots and may be adjusted if demand for EV charging increases.	**Not applicable.** The Project is not a multifamily development project and does not include new parking lots.
LU-3	**Implement Transportation Demand Management for New Development**. New projects subject to CEQA review must develop and implement transportation demand management programs. Residential developments will separate parking from leases and charge for off-street parking. Lease holders will also provide transit subsidies and carpool incentives to employees. The City will establish paid on-street and permit parking. Retail, office, and industrial projects will also offer employees cash out programs, where they can receive the cost of their parking spot in cash if they choose not to use it; a 50% transit subsidy; and a $100 per month carpool incentive.	**Consistent.** A transportation demand management program would be implemented. Leasing is not expected as part of the Project.
LU-4	**Implement Transportation Demand Management for Existing Development**. Businesses in Vacaville with more than 15 employees are required to offer cash out and commute market reductions.	**Not applicable.** The Project does not include employment land uses.
LU-5	**Improve Bus Electrification.** All urban buses should be replaced by electric buses by 2035.	**Not applicable.** This measure applies to the City, not individual residential projects.
LU-6	**Improve City Fleet.** City will inventory publicly owned vehicles and equipment and identify vehicles that will be phased out before 2030 and can be replaced with more fuel-efficient models. City will develop fuel economy standards for each type of vehicle.	**Not applicable.** This measure applies to the City, not individual residential projects.
LU-7	**Increase Land Use Diversification**. Reducing car trips by creating mixed neighborhoods where daily activities are within a quarter mile of residences. Increasing density to maximize the number of people who have access to these uses.	**Not consistent.** The Project is predominantly a single-family housing development, but a park and school would also be included. However, no commercial or retail development is proposed.
LU-8	**Transit Oriented Development**. Implement traffic calming and discourage excessive parking. Provide affordable housing near transit. The city will explore increasing the number of homes and jobs within a quarter mile of high quality transit.	**Not consistent.** No public transportation currently serves this area.
	Energy	
E-1	**Become a Marine Clean Energy (MCE) Member Community.** Join a community choice energy provider to provide cleaner energy. MCE is an option that offers customers 60% and 100% renewable options for energy consumption.	**Not applicable.** PG&E will be the provider of natural gas and electricity for the Project. However, future residents may elect to join a community choice provider.

ECAS Action	Descriptions	Consistency [A]
E-2	**Require Energy Audits for Sales of Existing Residential Units.** All residential units are required to provide an energy audit as part of their closing documents and to advertise the benefits of energy audits to all residents. Exemptions can be made for homes built within the last 10 years in order to reduce unnecessary costs.	**Not applicable.** This measure applies to existing buildings that do not meet the latest building efficiency standards, not new construction.
E-3	**Adopt an All-Electric New Construction Preferred Ordinance.** City will adopt an all-electric ordinance and enforce it through building inspections. Special exceptions will be made for industrial, hospital, and similar uses that demonstrate there is no viable electrification option for important equipment due to technological constraints.	**Not applicable.** The City has not adopted an all-electric ordinance at the time of this writing.
E-4	**Develop an Existing Building Electrification Plan.** Phase out natural gas in existing buildings by incentivizing residents to replace existing natural gas appliances, such as stoves and water heaters, with efficient electric options.	**Not applicable.** No existing buildings are included as part of the Project.
	Solid Waste	
S-1	**Implement Organic Waste Reduction Requirements.** Reduce organics to 50% below 2014 levels by 2020 and 75% below 2014 levels by 2025 through organics collection programs, contamination monitoring, education and outreach, enforcement and penalties, edible food recovery programs, organics self-haul programs, ordinances and policy changes, procurement of recovered organic materials and more.	**Not applicable.** This measure applies to the City, not individual residential projects.
	Off Road Equipment	
O-1	**Increase Renewable and Alternative Fuel for Construction.** Holistically reduce the emissions from construction equipment in Vacaville. The City will revise its construction bid process so that to be eligible for City construction contracts, a bidder must submit documentation that their fleet will reduce conventional fuel use by 20% by 2035.	**Consistent.** The Project would use renewable diesel to the extent feasible.
	Carbon Sequestration	
C-1	**Plant Trees.** Create a more all-encompassing push to add to both City-owned trees and trees on private property. Strategically place trees in line with buildings and sunlight so as to shade buildings and reduce the need to heat and cool buildings. City's goal is to plant at least 10,000 trees through initiatives such as street tree planting programs on major streets where there are major gaps, shading requirements for commercial and residential projects, and providing trees to residents.	**Consistent.** Approximately 100 street trees and yard trees would be planted as part of the Project.
C-2	**Farm Carbon.** Apply compost to public greenspaces to allow more carbon to be held by the soil. 4.57MT $CO2_e$ is anticipated to be reduced by 2035 for every acre of land spread with compost.	**Not applicable.** This measure applies to the City, not individual residential projects.

ECAS Action	Descriptions	Consistency [A]

Notes:
[A] "Not Applicable" refers to measures that are not relevant to new development and measures not within the applicant's control.

As shown in **Table 7**, the Proposed Project is consistent with most aspects of the City of Vacaville ECAS. Because many aspects of the Project's emissions inventory would benefit from further regulatory and technological advancements, the Project is not expected to obstruct the attainment of the Governor's long-term GHG reduction goal for 2050. Therefore, the Project's impacts are **less than significant** under this methodology.

5. ENERGY ASSESSMENT

5.1 Significance Thresholds

Changes to Appendix G of the State CEQA Guidelines effective in December 2018 were intended to reflect recent changes to the CEQA statutes and court decisions. In the case of energy, the topic was added to the Appendix G checklist, in addition to being discussed in Appendix F of the State CEQA Guidelines. For purposes of this analysis, consistent with the changes to Appendix G of the State CEQA Guidelines, impacts associated with energy are considered to be significant if the Proposed Project would:

1. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or
2. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

5.2 Approach to Analysis

This impact analysis evaluates the potential for the Proposed Project to result in the wasteful use of energy or wasteful use of energy resources during Proposed Project construction and operation, consistent with Public Resources Code 21100(b)(3) and Section 15126.2(b) and Appendices F and G of the State CEQA Guidelines. The analysis provides construction and operational energy use estimates for the Proposed Project and the CEQA baseline. The analysis then uses this information to evaluate whether this energy use would be considered wasteful, inefficient, or unnecessary, taking into account available energy supplies and existing use patterns, the Proposed Project's energy efficiency features, and compliance with applicable standards and policies aimed to reduce energy consumption, including California's Title 24 Energy Efficiency Standards.

This energy analysis includes quantification of electricity, natural gas, gasoline, and diesel fuel that would be required to construct and operate the Proposed Project. Construction energy use includes off-road equipment and on-road mobile sources. Sources of operational energy use include building energy use, on-road mobile sources, hearth usage, and water distribution and treatment.

The energy analysis is based on default values in CalEEMod® version 2020.4.0 and EMFAC2021, which have not been updated for the most recent executive orders, specifically Executive Order N-79-20 which bans the sale of gasoline-powered cars in California by 2035; and Executive Order B-55-18 which set as a goal carbon neutrality in California by 2045. Both of these Executive Orders, if implemented, will change the energy mix in California for future operations at the Proposed Project. However, there is insufficient information to incorporate these executive orders into this analysis; to do so would be speculative. Accordingly, this energy analysis has been conducted with the most recent available tools prepared and accepted by the regulatory agencies. CalEEMod® outputs are included as **Appendix B.**

5.2.1 Proposed Project

The Proposed Project is described in Section 1.1. **Figure 1** shows the location of the Proposed Project and the surrounding area.

Construction for the Proposed Project is expected to begin in 2023 and would be completed in 2025. Overall, the Proposed Project construction is anticipated to last approximately 30

months. The Proposed Project land use amounts and construction schedule are shown in **Appendix B**.

5.3 Construction Energy Estimates

This section describes the estimation of energy usage from construction activities within the Project area. Energy usage from these construction phases is largely attributable to fuel use from off-road construction equipment and on-road mobile trips from workers, vendors, and hauling vehicles.

The analysis used default assumptions from CalEEMod® unless project-specific data was provided. Summaries of the total estimated Proposed Project construction energy use requirements for diesel fuel and gasoline are presented in **Appendix A Table 7**, as well as below in **Table 8** under the Impact ENE-1 discussion.

5.3.1 Off-Road Equipment

Off-Road equipment is the most significant source of construction fuel usage. Section 2.2.1 describes the approach to estimate emissions from construction activities. For the purposes of the energy analysis, all equipment was assumed to be diesel-fueled[30]; electricity- or gasoline-fueled equipment would not be expected to substantially affect energy resource demands. Note that engine tier does not affect fuel consumption rates. Fuel consumption rates in gallons per horsepower-hour (gal/hp-hr) were calculated from CARB's "2017 Off-road Diesel Emission Factors" database.[31]

5.3.2 On-Road Vehicles

On-road construction vehicles such as light-duty automobiles that will be used by workers for commuting to and from the construction site and on-road trucks are assumed to be fueled according to the default EMFAC2021 fuel distribution mix. The gasoline, diesel, and natural gas fuel quantities that would be required for on-road vehicles during construction have been calculated based on fuel efficiency factors estimated for each vehicle and fuel type using EMFAC2021 fuel consumption rates and VMT. The fuel efficiency for electric vehicles was obtained from the U.S. Department of Energy and trip counts were estimated using CalEEMod® default methods. Fuel efficiency factors and on-road activity assumptions are shown in **Appendix A Table 6.** CalEEMod® defaults were also used for worker, vendor, and haul trip lengths.

Electricity required to supply, treat, and transport water to the Proposed Project site for dust control purposes is assumed to be negligible and is thus not calculated in this analysis.

5.4 Operational Energy Estimates

The Proposed Project would consume energy from a variety of sources, including area sources (landscaping and hearths), building energy use (electricity), mobile sources (daily trips), and water sources (delivery and treatment).

[30] While renewable diesel would be used when feasible, the emission calculations assumed that conventional diesel fuel would be used to be conservative.

[31] CARB, 2022. 2017 Off-road Diesel Emission Factors. Available: https://arb.ca.gov/emfac/emissions-inventory [Accessed June 7, 2022].

Summaries of the total estimated Proposed Project operational energy use requirements for electricity, gasoline, diesel fuel, and gasoline are presented in **Appendix A Table 13**, as well as below in **Table 9** under the Impact ENE-1 discussion.

5.4.1 Area Source Energy Use

Landscaping energy usage was estimated using CalEEMod® default emissions for the Proposed Project and a standard 10.21 kilogram of CO_2 per gallon of diesel emission factor from EPA's "Emission Factors for Greenhouse Gas Inventories" publication[32]. Landscaping equipment was assumed to be all diesel. Energy usage from landscaping sources is estimated in **Appendix A Table 8**.

Hearth energy usage were also estimated using CalEEMod® default emission factors and activity. However, consistent with YSAQMD District Rule 2.40 Wood Burning Appliances, this analysis assumed that there would be zero woodstoves and zero wood burning fireplaces installed in the residences.[33] The quantity of gas fireplaces input into CalEEMod® was assumed to be the sum of CalEEMod® default counts of wood burning fireplaces and gas fireplaces. Natural gas consumption from hearth usage is estimated in **Appendix A Table 9**.

5.4.2 Building Energy Use

Building electricity and natural gas usage rates for the Proposed Project residences are presented in **Appendix A Table 10**. Building electricity and natural gas usage rates for the Proposed Project are updated from CalEEMod® default assumptions to account for updated regulatory requirements. The CalEEMod® default energy consumption profiles account for 2016 Title 24 Building Energy Efficiency Standards. Because the Proposed Project would be developed after January 1, 2023, energy use rates for the Proposed Project would not account for further improvements from 2022 Title 24 standards. The proposed project would be consistent with the 2019 Title 24 standards, which requires all new low-rise residences to achieve "zero net electricity" through improvements in energy efficiency and generation of on-site renewable electricity (e.g., solar photovoltaics) to offset the annual site electricity consumption. As a result, the Proposed Project is anticipated to generate as much electricity as consumed. Sources of natural gas combustion assumed in CalEEMod would be from hearths and cooking. Additionally, while the project would not have emissions from space and water heating, natural gas consumption was still assumed from these sources to provide a conservative estimation of energy use. The only potential source of natural gas usage consumption and generation for the Proposed Project operations are summarized in **Appendix A Table 13**.

5.4.3 Water Supply, Treatment, and Distribution Energy Use

Additional electricity use is required to supply, treat, and distribute potable water and to treat the resulting wastewater. These calculations are presented in **Appendix A Table 11**. Site level water usage and electricity usage rates were estimated based on CalEEMod® default assumptions. The Project would be required to comply with the water efficiency regulations within CALGreen, including MWELO regulations. To comply with these regulations, a 20 percent reduction was applied to CalEEMod® default estimates of indoor

[32] EPA. 2022. Emission Factors for Greenhouse Gas Inventories. Available at: https://www.epa.gov/system/files/documents/2022-04/ghg_emission_factors_hub.pdf [Accessed June 7, 2022].

[33] YSAQMD, District Rule 2.40: Wood-Burning Appliances, December 2004. Available online at: https://www.ysaqmd.org/wp-content/uploads/2020/05/2.40.pdf [Accessed June 7, 2022].

(potable) and outdoor water use rates. The energy use rates shown in **Appendix A Table 11** account for this reduction.

5.4.4 Mobile Energy Use

Mobile fuel usage for the Proposed Project is summarized in **Appendix A Table 12**. Fuel usage is evaluated using CalEEMod® default trip lengths and trip types. Gasoline, diesel, natural gas, and electricity use rates were calculated based on CalEEMod® default trip rates and trip lengths, and fuel efficiency rates derived from EMFAC2021 and the U.S. Department of Energy. Fuel efficiency for gasoline, diesel, and natural gas fueled vehicles was calculated from EMFAC2021 daily VMT and fuel consumption data, averaged across all vehicle categories for operational year 2025. Fuel efficiency for electric vehicles was obtained from U.S. Department of Energy data.

5.5 Impact Evaluation

5.5.1 Impact ENE-1:

5.5.1.1 Construction and operation of the Project could result in potentially significant environmental impact due to the wasteful, inefficient, and/ or unnecessary use of energy. (Criterion 1.). (*Less than Significant*)

Construction Energy Use

Construction of the Proposed Project would require the use of fuels (primarily gasoline and diesel) for the operation of construction equipment and vehicles to perform a variety of activities, including excavation, hauling, paving, and vendor and construction worker travel.

Table 8 presents total and annual average estimated construction energy consumption by energy source for the Proposed Project.

Total energy consumption would occur over different calendar years and would fluctuate depending on the type of construction activity underway during any particular time period. Construction is expected to take place in 2023 through 2025 for the Proposed Project. Gasoline and diesel fuel would be the primary energy source for vehicles driven by construction crews and to power the large trucks used to deliver and retrieve construction equipment, materials, and debris. Total gasoline and diesel fuel usage by the transportation sector in Solano County was 169 million gallons and 54 million gallons, respectively, in 2020.[34] Proposed construction fuel usage would represent approximately 0.1% of the county's transportation sector diesel and gasoline fuel usage. Off-road construction equipment also consumes fuel while idling.

CARB implemented The Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, which limits idling to five minutes at any one location. This was done to save fuel because CARB estimated that heavy-duty vehicles (off-road equipment) can consume up to one gallon of diesel fuel per hour of idling, which can total to 1,500 gallons of diesel fuel per year per vehicle. By implementing this rule, idling is greatly reduced, and the use of diesel fuel is reduced. The Proposed Project would be compliant with this ATCM. This ATCM has led to fuel savings of approximately 121 million gallons per year statewide since

[34] CARB, 2022. EMFAC Emissions Inventory: Solano County, Calendar Year 2021. Sum of Onroad Emissions. Available at: https://arb.ca.gov/emfac/emissions-inventory/, accessed June 2022.

full implementation.[35] Project construction would also include negligible natural gas and electricity consumption rates from on-road vehicles.

Table 8: Proposed Project Construction Energy Resource Use

Energy Use Type[A,B]	Gasoline (gallons)	Diesel (gallons)	Natural Gas (MMBtu)	Electricity (MWh)
Off-Road Construction Equipment (2023)	--	86,644	--	--
On-Road Construction Trips (2023)	1,043	478	0.48	0.25
Off-Road Construction Equipment (2024)	--	59,930	--	--
On-Road Construction Trips (2024)	5,158	1,808	0.25	1.23
Off-Road Construction Equipment (2025)	--	60,382	--	--
On-Road Construction Trips (2025)	3,284	1,126	0.22	0.99
Total Usage	**9,485**	**210,368**	**0.94**	**2.47**

Notes:

[A] On-road mobile source fuel use is based on vehicle miles traveled (VMT) for all years of construction and fleet-average fuel consumption in gallons per mile from EMFAC2021 for calendar years 2023 through 2025 in Solano County.

[B] Off-road diesel fuel usage based on a fuel usage rate of 0.057 gallons of diesel per horsepower (hp)-hour for equipment up to 100 HP and 0.052 gallons of diesel per horsepower (hp)-hour for equipment greater than 100 HP, consistent with diesel conversion factors provided in CARB 2017 Off-road Diesel Emission Factors database[36].

Source: Ramboll, 2022. **Appendix A Table 5** to **Table 7**.

Operational Energy Use

Proposed Project operations would require long-term consumption of energy in the form of electricity, natural gas, gasoline, and diesel fuel. The electricity, natural gas, and water usage that would be required for operation of the proposed buildings have been estimated based on Proposed Project specific building area estimates, 2019 Title 24 requirements, and CalEEMod® default factors, as discussed above. Electricity would be used as the primary power source for the proposed residential units, including to operate the heating, ventilation, and air conditioning (HVAC) systems. In addition, water use for buildings would require the consumption of electricity to supply and distribute potable water to the buildings and to treat

[35] CARB, 2004. Staff Report: Initial Statement of Reasons for Proposed Rulemaking; Airborne Toxic Control Measure To Limit Diesel-Fueled Commercial Motor Vehicle Idling. https://ww3.arb.ca.gov/regact/idling/isor.pdf, accessed October 2020.

[36] CARB, 2017b. 2017 Off-road Diesel Emission Factors. https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road, accessed October 2020.

wastewater generated at the buildings. Natural gas use for the buildings would primarily be associated with cooking and hearths.

Mobile source fuel use associated with operation of the Proposed Project has been estimated based on VMT and the fleet-average fuel consumption (in gallons per mile) from EMFAC2021 Electricity demand for electric vehicles is based on VMT estimated for the Proposed Project, and estimated electric vehicle (EV) energy economy (in Kilowatt-hours [kWh] per mile), assuming 30 kWh/100 miles for the Proposed Project. This is a conservative assumption as EV fuel efficiency is expected to increase in future years, resulting in decreased electricity demand[37]. Furthermore, based on State targets and current trends, EV penetration may increase beyond EMFAC defaults, which would increase electricity consumption and decrease fossil fuel consumption relative to what is presented in **Table 9** below.

The annual energy use requirements estimated for full buildout operations of the Proposed Project are summarized in **Table 9** by energy use type.

Based on the energy use analysis, the Proposed Project would use energy necessary for on-site construction activities. The Proposed Project operational fuel consumption represents an increase relative to the existing site; however, the Proposed Project would implement measures to reduce energy consumption such as energy efficient lighting and building design and rooftop solar panels. Furthermore, **Section 5.5.1.2** analyzes the factors identified in Appendix F of the CEQA Guidelines relating to whether a project would result in the wasteful, inefficient, or unnecessary consumption of fuel or energy, and concludes the Proposed Project avoids wasteful, inefficient, or unnecessary consumption of fuel or energy. As a result, the Proposed Project construction and operation will not result in the wasteful, inefficient or unnecessary consumption of energy and the impacts would be **less than significant.**

Table 9: Proposed Project Operational Energy Use (Annual)

Energy Use Type	Gasoline Usage (gal)	Diesel Usage (gal)	Natural Gas Usage (MMBtu)	Electricity Usage (MWh)
Building Electricity Consumed				893
Building Electricity Generated	--	--	--	893
Building Natural Gas			3,036	
Mobile Sources	131,228	291		52
Water and Wastewater				57
Landscaping		135		
Hearths			1,144	
Total Usage	131,228	426	4,180	108

[37] US Department of Energy (DOE). Fuel Economy Guide. Electric. Available at: https://www.fueleconomy.gov/feg/evsbs.shtml. Accessed September 2020.

Notes:

[A] Building electricity as shown represents the annual average electricity consumption. However, as described in Section 5.4.2, 2019 Title 24 requires low-rise residences to produce as much on-site renewable electricity as they consume, so the net electricity use in this category is expected to be zero on an annual basis.

MMBtu = million British Thermal Unit; MWh = Megawatt-hour

SOURCE: Ramboll, 2022. **Appendix A Table 13**

5.5.1.2 Analysis of Factors Identified in CEQA Guidelines Appendix F

Appendix F of the CEQA Guidelines identifies factors relating to whether a project would result in the wasteful, inefficient, or unnecessary consumption of fuel or energy, and conversely whether the project would fail to incorporate renewable energy or energy efficiency measures into building design, equipment use, transportation or other project features. The Appendix F factors are addressed below and used as guidance to evaluate the energy impact of the Proposed Project relative to the identified significance criteria.

Appendix F.II.C.1: Energy Requirements and Energy Use Efficiencies
CEQA Guidelines Appendix F, Section II.C.1, includes the following impact guidance factor:

The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal. If appropriate the energy intensiveness of materials may be discussed.

The energy estimates in this evaluation include electricity and natural gas, and fuels used for construction and operation of the Proposed Project. These energy use requirements are summarized in **Table 8** for the construction activities and in **Table 9** for Proposed Project operations. As shown in these tables, the amounts of electricity, diesel, and gasoline consumed during the construction and operational of the Proposed Project would be less than 0.5 percent of Solano County consumption of each of these fuels.

Appendix F.II.C.2: Local and Regional Energy Supplies
CEQA Guidelines Appendix F, Section II.C.2, includes the following impact guidance factor:

The effects of the project on local and regional energy supplies and on requirements for additional capacity.

As discussed above, the Proposed Project would result in the consumption of electricity, natural gas, gasoline, and diesel associated with mobile vehicle sources, building energy uses, boiler use, emergency generator operations, and construction activities. The Proposed Project site is currently supplied both electricity and natural gas by PG&E. PG&E has established contracts and commitments to ensure there is adequate electricity generation and natural gas capacity to meet its current and future energy loads. Total energy use requirements are shown in **Table 8** for construction activities and in **Table 9** for the Proposed Project operations.

Electricity
To put the Proposed Project's operational electricity requirements in context, in 2020 the total generated electricity for Solano County was 3,321 Gigawatt-hours (GWh).[38] The California Energy Commission (CEC) estimates that state-wide energy demand will increase

[38] CEC, 2020c. *Electricity Consumption by County*. Available at: http://www.ecdms.energy.ca.gov/elecbycounty.aspx, accessed May 2022.

to 321,300 GWh in 2030 based on the mid baseline forecast.[39] As shown in **Table 9**, the Proposed Project's anticipated long-term operational electricity usage is approximately 108 Megawatt-Hour [MWh] per year. This small increase represents less than 0.004% of the total 2020 Solano County electricity usage. There will be no electricity usage associated with Proposed Project off-road construction activities and negligible electricity usage (2.47 MWh) associated with Proposed Project on-road construction activities.

Based on a comparison to the state-wide and Solano County annual energy demand and the projected demand, the Proposed Project-related increase in electricity consumption would not cause adverse effects on local and regional energy supplies or require additional generation capacity beyond the state-wide planned increase to accommodate projected energy demand growth. The Proposed Project's building electricity use can be considered efficient due to compliance with statewide regulations such as California Energy Efficiency Standards and California Green Building Standards Code (Title 24, Parts 6 and 11, respectively). In addition, the Proposed Project's operational electricity demand estimates conservatively exclude a number of likely energy savings features, such as: future revisions to Title 24 energy standards, construction of energy efficient buildings, and installation of solar panels, which would further reduce electricity demand.

Natural Gas

There would be no natural gas consumption associated with Proposed Project off-road construction activities and negligible natural gas consumption (0.94 MMBtu) associated with on-road construction activities. The Proposed Project's annual operational natural gas consumption is estimated to be approximately 4,180 MMBtu at full buildout in 2025 (**see Table 9**). In comparison, Solano County natural gas demand was 2,173,561.7 MMBtu in 2020.[40] The increase in natural gas usage for the Proposed Project operations is less than 0.2% of Solano County natural gas consumption. The Proposed Project's estimated natural gas consumption rate is not substantial compared to the 2020 countywide consumption and would not cause adverse effects on local and regional energy supplies or require additional transmission capacity beyond the state-wide planned increase in consumption.

Transportation Fuels

Off-road construction equipment and on-road vehicles would consume a total of 210,368 gallons of diesel fuel over the course of the Proposed Project construction. On-road worker vehicles would consume a total of 9,485 gallons of gasoline over the course of the Proposed Project construction (see **Table 8**). For the Proposed Project, construction diesel consumption is less than 0.40% of 2020 Solano County diesel consumption. Gasoline consumption is less than 0.2% of 2020 Solano County gasoline consumption.

During operations, it is estimated that there will be an increase in consumption of diesel fuel for the Proposed Project of 426 gallons per year. There will be a net annual increase in gasoline consumption for the Proposed Project of 131,228 gallons per year. For the Proposed Project, operational traffic and landscaping diesel consumption is less than 0.001% of 2020 Solano County diesel consumption. Operational traffic gasoline consumption is less than 0.08% of 2020 Solano County gasoline consumption. In future years as the fleet becomes

[39] CEC, 2020a. *Final 2019 Integrated Energy Policy Report*. Available at: https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2019-integrated-energy-policy-report/2019-iepr, docketed February 2020, accessed May 2022.

[40] CEC, 2020b. 2020 *Gas Consumption by County*. http://www.ecdms.energy.ca.gov/gasbycounty.aspx, accessed May 2022.

more electrified, this consumption is anticipated to decrease, and electricity consumption will increase.

Appendix F.II.C.3: Peak and Base Period Demands
CEQA Guidelines Appendix F, Section II.C.3, includes the following impact guidance factor:

The effects of the project on peak and base period demands for electricity and other forms of energy.

Peak and Base Period Demand
Peak period electrical demand is the short period of time during which electrical power is needed when electricity is in highest demand. Base period electrical load is the minimum amount of electrical demand needed over a 24-hour time period. Wasteful, inefficient, or unnecessary consumption or use of energy during the peak period of electrical demand has greater potential to cause adverse environmental effects compared to during the base period because of the higher demand during the peak period. The Proposed Project would not have a substantial impact on the peak and base period demands for electricity or other forms of energy. The Proposed Project's base energy consumption compared to regional and statewide energy consumption is discussed above. Further details and reasoning on the peak demand are described below.

In 2021, California's peak grid demand was 43,982 megawatts (MW). On that same peak day, PG&E reached a maximum demand of 20,118 MW.[41] In comparison, the Proposed Project's annual electricity usage rate of 108 MWh for the Proposed Project in 2025 corresponds to average hourly electricity demand of 0.012 MW (assuming 8,760 hours per year of operations). The maximum peak demand is anticipated to be no more than twice the hourly average usage, corresponding to 0.024 MW.[42] This also conservatively excludes improvements in demand response due to future updates to the Title 24 energy standards. These future updates would further reduce peak demand through performance standards that are based on the time dependent valuation of energy, which utilizes the value of the electricity or natural gas used during every hour of the year to incentivize load shifting off of the peak use periods.

The overall energy use requirements would not be substantial relative to the current total sales of transportation fuels in Solano County. Operational energy requirements for the Proposed Project result in a negligible net increase compared to Solano County electricity consumption rates. Additionally, the Proposed Project peak demand represents approximately 0.00006% of PG&E's peak demand, respectively, and with proper planning of the PG&E power generation inventory, would have a minor effect on PG&E's system-wide peak demands. As a result, the Proposed Project construction and operation will not result in energy demand substantially affecting local and regional energy supplies and capacity and the impacts would be less than significant.

Appendix F.II.C.4: Existing Energy Standards
CEQA Guidelines Appendix, Section II.C.4, includes the following impact guidance factor:

[41] California Independent System Operator (Cal ISO), 2022. 2021-2022 Transmission Plan, March 17, 2022. http://www.caiso.com/Documents/ISOBoardApproved-2021-2022TransmissionPlan.pdf, accessed May 2022.

[42] Since the peak energy demand for the Proposed Project was not available, Ramboll used a factor of 2 to estimate the peak demand based on historic CAISO peak-to-average demand ratio. Peak-to-average electricity demand ratio rising in California. https://www.eia.gov/todayinenergy/detail.php?id=15051#tabs_SpotPriceSlider-7, accessed October 2020.

The degree to which the project complies with existing energy standards.

This factor is further discussed in section 5.5.3.

Appendix F.II.C.5: Energy Resources
CEQA Guidelines Appendix F, Section II.C.5, includes the following impact guidance factor:

The effects of the project on energy resources.

The Proposed Project's energy use, including electricity, natural gas, gasoline, and diesel consumption, would primarily be associated with construction activities, vehicle travel, and building operations. Total energy use requirements are shown in **Table 8** for construction activities and in **Table 9** for the operational activities. Refer to **Section 5.5.2** for the effects that the Proposed Project would have on and energy conservation plans. The Proposed Project will limit idling of construction vehicles through YSAQMD'S Construction Equipment Exhaust Mitigation. Despite an increase in total VMT due to the new residences, total gasoline and diesel fuel consumption are expected to decrease over time due to the use of vehicles that meet increasingly stringent fuel efficiency standards. The construction of new buildings that comply with the stringent current Title 24 Energy Efficiency Standards, CalGreen, and appliance efficiency standards, will result in high energy efficiency relative to existing residences in the region. These developments will implement the efficient use of energy. The Proposed Project's use of energy would not have a substantial adverse effect on statewide or regional energy resources relative to wasteful, inefficient, or unnecessary use of energy.

Appendix F.II.C.6: Transportation Energy Use
CEQA Guidelines Appendix F, Section II.C.6, includes the following impact guidance factor:

The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

The Proposed Project's transportation energy use requirements in terms of gasoline, diesel, natural gas, and electricity quantities for construction and operation of the Proposed Project are presented in **Table 8** and **Table 9**, respectively. SB 743 requires the Office of Planning and Research (OPR) to identify metrics for identifying and mitigating transportation impacts within CEQA. OPR has identified net VMT as well as VMT per capita and per employee as metrics for land use project transportation analyses. The quantification of VMT associated with Proposed Project operations, which is used to quantify the total operational transportation-related energy use requirements, is discussed in detail in the Transportation section.

Based on the above analysis, the Proposed Project avoids wasteful, inefficient, or unnecessary consumption of fuel or energy.

5.5.2 Impact ENE-2:

Construction and operation of the Project could conflict with or obstruct adopted energy conservation plans or violate energy efficiency standards. (Criterion 3). (*Less than Significant*)

Discussion of whether construction and operation of the Proposed Project would result in a conflict with adopted energy conservation plans or violate energy efficiency standards are discussed below relative to construction vehicles and equipment, building efficiency, and transportation.

Appendix F.II.C.4: Existing Energy Standards

CEQA Guidelines Appendix, Section II.C.4, includes the following impact guidance factor:

The degree to which the project complies with existing energy standards.

The Proposed Project would comply with existing energy standards, including state and local standards designed to minimize use of fuel in construction vehicles and ensure that buildings employ strict energy efficiency techniques as described above. For a full list of relevant state and local standards, see Section 1.3. The Proposed Project would construct new housing compliant with the most recent Title 24 standards.

Construction Vehicles and Equipment
Proposed Project construction would require use of on-road trucks for soil and debris hauling and material deliveries, and off-road equipment such as excavators, cranes, forklifts, and pavers. The Proposed Project would comply with state and local requirements designed to minimize idling and associated emissions, which also minimizes use of fuel. In accordance with YSAQMD's Construction Equipment Exhaust Mitigation, mitigation of construction equipment may include idling times for heavy duty trucks and vehicles limited to a maximum of 5 minutes.[43] In accordance with CARB emissions standards, all construction equipment with a model year of 2012 or later will comply with the engine standards of 13 California Code of Regulations Section 2449.

Building Efficiency
The Proposed Project's anticipated electricity and natural gas use in buildings are discussed above. New building construction is subject to California's Title 24 by law, as discussed in **Section 5.4.2**, above. California's Title 24 reduces energy use in residential and commercial buildings through progressive updates to both the Green Building Standards Code (Title 24, Part 11) and the Energy Efficiency Standards (Title 24, Part 6). Provisions added to Title 24 over the years include consideration and possible incorporation of new energy efficiency technologies and methods for building features such as space conditioning, water heating, lighting, as well as construction waste diversion goals. Additionally, some standards focus on larger energy saving concepts such as reducing loads at peak periods and seasons, improving the quality of energy-saving installations, and performing energy system inspections. Past updates to the Title 24 standards have proven very effective in reducing building energy use, with the 2013 update to the energy efficiency standards estimated to reduce energy consumption in residential buildings by 25% and energy consumption in commercial buildings by 30%, relative to the 2008 standards.[44]

Transportation
The Proposed Project's anticipated transportation fuel usage are discussed above. As mentioned previously, fuel efficiency continues to improve over time and will help reduce fuel usage.

Based on the above analysis, the Proposed Project is expected to have a less than significant impact.

[43] YSAQMD, 2007. Handbook for Assessing and Mitigating Air Quality Impacts. July 2007. , accessed June 2022.

[44] CEC, 2012. Energy Commission Approves More Efficient Buildings for California's Future. https://planning.lacity.org/eir/CrossroadsHwd/deir/files/references/C17.pdf, accessed October 2020.

5.6 Cumulative Impacts

Impact ENE-1.CU: The Project, combined with cumulative development in the Project vicinity and citywide, could result in significant cumulative energy impacts. (Less than Significant)

Geographic Context

The geographic scope of potential cumulative effects with respect to energy resources includes PG&E's electric grid and natural gas transmission system that would serve the Proposed Project, areas from which transportation fuels would be provided, publicly available fuel sources in the vicinity of the Proposed Project site, and the cumulative projects nearby.

Cumulative Impact and Project Contribution

There is no significant cumulative condition to which the Proposed Project could contribute related to the use of large amounts of fuel or energy in a wasteful or inefficient manner. The CEC is planning to meet 2050 statewide energy demands in a low-carbon and efficient manner.[45] Given the relatively small percentage of the Proposed Project's fuel and energy use compared to existing fuel and energy use in the region, the Proposed Project's less-than-significant incremental impacts related to the use of fuel or energy in a wasteful or inefficient manner are not expected to combine with the incremental impacts of other projects to cause an adverse cumulative impact. Moreover, the estimated consumption rates are not substantial compared to the 2020 countywide consumption. The Proposed Project's incremental cumulative impact relating to the consumption of energy would be less than significant.

Proposed Project-related transportation fuel impacts could overlap with the transportation needs (including fuel needs) of previously approved past projects, as well as other present or future projects that occur during the Proposed Project's construction and operation. However, there is no significant cumulative condition to which the Proposed Project could contribute. In addition, implementation of sustainability features would help avoid wasteful or inefficient use of energy during construction. VMT associated with operations of the Proposed Project would be reduced based on the features described above, and transportation fuel demand would continue to be reduced through increased vehicle fuel efficiency and electrification. Therefore, the Proposed Project's incremental impact associated with its energy use would result in less-than-significant cumulative impacts.

The nearby cumulative projects could require increased peak and base energy demands and, therefore, could cause or contribute to adverse cumulative conditions. However, the cumulative projects would be subject to the same applicable federal, state, and local energy efficiency requirements (e.g., the State's Title 24 requirements) that would be required of the Proposed Project, which would result in efficient energy use during their construction and operation. As discussed in **Section 5.5.2**, the Proposed Project's small increase in electricity usage is negligible compared to Solano County and statewide demand and will not cause adverse effects and would not constitute a considerable contribution under CEQA. Furthermore, peak demand for the Proposed Project is expected to be approximately 0.00006% of PG&E's peak demand during 2020. These estimates do not account for the Proposed Project's energy saving features and are conservative. Thus, adverse Proposed

[45] CEC. 2019. Building a Healthier and More Robust Future: 2050 Low-Carbon Energy Scenarios for California. Available at: https://ww2.energy.ca.gov/2019publications/CEC-500-2019-033/CEC-500-2019-033.pdf. Accessed: October 2020.

Project-related impacts to electricity demand would be negligible, would not contribute any considerable impact peak or base power demands during construction, operation, or maintenance. It is not expected there would be a significant cumulative impact and, even if a statewide impact from cumulative development did occur, the Proposed Project's less-than-considerable incremental contribution to cumulative peak and base demands would not result in a significant impact.

Conclusion

Therefore, potential energy-related impacts that would result from construction and operation of development of the Proposed Project will have a less than significant cumulative impact.

6. SUMMARY AND IMPLEMENTATION

This report concludes that the Project's operational criteria pollutant emissions, health risk impacts, and GHG emissions are less than significant. In addition, the impacts from energy usage are less than significant.

APPENDIX A
SUPPORTING CALCULATIONS

Table 1
Silt Loading Emission Factors
Vanden Estates
Vacaville, California

Entrained Roadway Dust Constants for Solano County		
Roadway Category	**Silt Loading[1] (g/m^2)**	**Travel Fraction[1]**
Freeway	0.015	20%
Major	0.032	50%
Collector	0.032	15%
Local	0.32	15%
Weighted Silt Loading Factor	0.072	100%

Notes:

1. Travel fraction by roadway category and silt loading are from the ARB's Entrained Road Travel Emission Inventory Source Methodology, Tables 2 and 4, respectively.

Abbreviations:

ARB - Air Resources Board

g - gram(s)

m - meter

References:

California Air Resources Board. 2021. Miscellaneous Process Methodology 7.9, Entrained Road Travel, Paved Road Dust. March. Available online at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf

Table 2
Consumer Products Emission Factor Update
Vanden Estates
Vacaville, California

Year[1]	Consumer Products VOC Inventory (tons/day)[2]	Solano County Population[3]	Total Building Square Footage[4]	Consumer Products VOC Emission Factor (lb/square foot/day)
2010	2.75	413,344	287,351,836	1.91E-05
2020	3.03	453,491	315,261,553	1.92E-05

Notes:

1. 2010 data are used because total building square footage was available only for 2010. Building square footage for 2020 was estimated by multiplying 2010 building square footage with the ratio of population in 2020 to that in 2010.
2. VOC inventory for Solano County (in both Sacramento Valley and San Francisco Bay Area Air Basins) obtained from CARB's emission inventory for Consumer Products under Solvent Evaporation for the respective years.
3. Population estimates obtained from US Census Bureau's QuickFacts for Solano County for the respective years.
4. Total building square footage for 2010 obtained from FEMA HAZUS-MH software.

References:

California Air Resources Board. Almanac Emission Projection Data. Available online at https://www.arb.ca.gov/app/emsinv/emssumcat.php. Accessed November 2021.

US Census Bureau QuickFacts. Available online at https://www.census.gov/quickfacts/fact/table/solanocountycalifornia,US/PST040221. Accessed June 2022.

US Federal Emergency Management Agency's Hazus software (HAZUS-MH), Version 5.1. Available online at https://msc.fema.gov/portal/resources/hazus.

Abbreviations:

CARB - California Air Resources Board

lb - pound

VOC - Volatile Organic Compound

Table 3
2025 Mobile Vehicle Emission Factors Inputs
Vanden Estates
Vacaville, CA

Season	Variable	Vehicle Type[1]												
		LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
A	Fleet Mix (%)	0.52	0.036	0.20	0.13	0.031	0.0078	0.010	0.052	0.0016	0.0010	0.0039	6.7E-04	1.1E-03
	Pollutant	**Emission Factor (g/mile or g/trip[2])**												
A	CH4_IDLEX	0	0	0	0	0.0046	0.0026	0.012	0.12	0.0108	0	0	0.039	0
A	CH4_RUNEX	0.0021	0.0055	0.0025	0.0034	0.0093	0.0076	0.009	0.031	0.013	0.98	0.18	0.07	0.0104
A	CH4_STREX	0.069	0.115	0.083	0.107	0.020	0.0097	0.0088	0.0E+00	0.022	0.0196	0.20	0.0026	0.026
A	CO_IDLEX	0	0	0	0	0.18	0.13	0.68	5.9	0.83	0	0	0.9	0
A	CO_RUNEX	0.62	1.24	0.73	0.85	0.92	0.58	0.37	0.27	0.68	11.9	15	1.06	0.92
A	CO_STREX	3.1	5.8	3.7	4.2	1.8	0.9	1.04	0.0004	2.3	2.0	8.5	0.41	2.3
A	CO2_NBIO_IDLEX	0	0	0	0	9.1	15	165	920	130	0	0	171	0
A	CO2_NBIO_RUNEX	260	332	342	417	763	821	1,236	1,533	1,635	1180	193	1070	1,692
A	CO2_NBIO_STREX	67	88	87	106	15	7.7	8.5	0.007	19	18.1	53	1.8	22
A	NOX_IDLEX	0	0	0	0	0.073	0.115	0.93	4.7	0.54	0	0	1.6	0
A	NOX_RUNEX	0.039	0.120	0.063	0.093	1.05	1.07	1.05	1.6	1.19	0.26	0.65	3.7	1.6
A	NOX_STREX	0.25	0.42	0.33	0.46	0.38	0.19	1.4	2.7	0.93	0.168	0.16	0.42	0.32
A	PM10_IDLEX	0	0	0	0	9.3E-04	0.0015	1.7E-03	0.0020	4.7E-04	0	0	1.6E-03	0
A	PM10_PMBW	0.0053	0.0067	0.0064	0.0066	0.078	0.091	0.045	0.077	0.055	0.11	0.012	0.045	0.045
A	PM10_PMTW	0.0080	0.0080	0.0080	0.0080	0.0098	0.011	0.012	0.036	0.012	0.027	0.0040	0.011	0.013
A	PM10_RUNEX	1.2E-03	0.0017	0.0012	0.0013	0.023	0.030	0.0108	0.028	0.021	0.0037	0.0018	0.0191	0.035
A	PM10_STREX	0.0020	0.0031	0.0021	0.0022	2.0E-04	7.3E-05	9.9E-05	0.0E+00	1.6E-04	1.3E-04	0.0034	2.2E-05	2.6E-04
A	PM25_IDLEX	0	0	0	0	8.9E-04	0.0015	1.7E-03	0.0020	4.5E-04	0	0	1.6E-03	0
A	PM25_PMBW	0.0019	0.0024	0.0023	0.0023	0.027	0.032	0.016	0.027	0.019	0.038	0.0042	0.016	0.016
A	PM25_PMTW	0.0020	0.0020	0.0020	0.0020	0.0025	0.0027	0.0030	0.0089	0.0030	0.0068	0.0010	0.0028	0.0033
A	PM25_RUNEX	1.1E-03	0.0016	1.1E-03	1.2E-03	0.022	0.028	0.0103	0.027	0.020	0.0035	0.0017	0.0183	0.033
A	PM25_STREX	0.0018	0.0028	0.0019	0.0020	1.8E-04	6.7E-05	9.1E-05	0.0E+00	1.5E-04	1.2E-04	0.0032	2.0E-05	2.4E-04
A	ROG_DIURN	0.33	0.72	0.33	0.45	0.119	0.052	0.026	5.7E-05	0.092	0.029	2.4	0.025	32
A	ROG_HTSK	0.092	0.19	0.088	0.114	0.030	0.013	0.0063	1.6E-05	0.021	0.0096	3.6	0.0063	8.0
A	ROG_IDLEX	0	0	0	0	0.020	0.014	0.026	0.39	0.066	0	0	0.08	0
A	ROG_RESTL	0	0	0	0	0	0	0	0	0	0	0	0	0
A	ROG_RUNEX	0.0078	0.024	0.0097	0.0142	0.120	0.137	0.035	0.015	0.062	0.048	1.2	0.082	0.075
A	ROG_RUNLS	0.026	0.070	0.028	0.041	0.060	0.024	0.0143	1.7E-05	0.024	1.0E-03	1.4	0.010	0.0020
A	ROG_STREX	0.31	0.60	0.38	0.54	0.097	0.047	0.048	0.0E+00	0.110	0.084	1.5	0.015	0.107
A	SO2_IDLEX	0	0	0	0	8.8E-05	1.4E-04	0.0015	0.0084	1.2E-03	0	0	0.0016	0
A	SO2_RUNEX	0.0026	0.0033	0.0034	0.0041	0.0074	0.0079	0.012	0.014	0.016	0.0069	0.0019	0.0100	0.017
A	SO2_STREX	6.6E-04	8.7E-04	8.6E-04	1.1E-03	1.5E-04	7.6E-05	8.4E-05	0.0E+00	1.9E-04	1.8E-04	5.2E-04	1.8E-05	2.2E-04
A	TOG_DIURN	0.33	0.72	0.33	0.45	0.119	0.052	0.026	5.7E-05	0.092	0.029	2.4	0.025	32
A	TOG_HTSK	0.092	0.19	0.088	0.114	0.030	0.013	0.0063	1.6E-05	0.021	0.0096	3.6	0.0063	8.0
A	TOG_IDLEX	0	0	0	0	0.028	0.019	0.041	0.55	0.085	0	0	0.14	0
A	TOG_RESTL	0	0	0	0	0	0	0	0	0	0	0	0	0
A	TOG_RUNEX	0	0	0	0	0	0	0	0	0	1	1	0	0
A	TOG_RUNLS	0	0	0	0	0	0	0	0	0	0	1	0	0
A	TOG_STREX	0	1	0	1	0	0	0	0	0	0	2	0	0
A	N2O_IDLEX	0.0000	0.000	0.000	0.000	0.001	0.00	0.025	0.146	0.019	0.00	0.0	0.02	0.000
A	N2O_RUNEX	0.004	0.009	0.006	0.008	0.051	0.091	0.1519	2.4E-01	0.141	1.8E-01	0.0	0.153	0.0668
A	N2O_STREX	0.03	0.04	0.04	0.04	0.030	0.015	0.006	1.0E-06	0.020	0.018	0.0	0.001	0.03

Season	Variable	Vehicle Type[1]												
		LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
S	CH4_IDLEX	0	0	0	0	0.0047	0.0026	0.012	0.12	0.0110	0	0	0.039	0
S	CH4_RUNEX	0.0022	0.0059	0.0027	0.0036	0.0095	0.0076	0.009	0.031	0.013	0.98	0.18	0.07	0.0107
S	CH4_STREX	0.058	0.096	0.070	0.090	0.019	0.0092	0.0083	0.0E+00	0.020	0.0175	0.17	0.0022	0.024
S	CO_IDLEX	0	0	0	0	0.18	0.13	0.62	5.8	0.82	0	0	0.8	0
S	CO_RUNEX	0.84	1.67	0.99	1.15	0.94	0.59	0.37	0.27	0.70	11.9	15	1.08	0.95
S	CO_STREX	2.4	4.5	2.9	3.3	1.7	0.9	0.95	0.0004	2.0	1.6	7.3	0.29	2.1
S	CO2_NBIO_IDLEX	0	0	0	0	9.1	15	164	909	129	0	0	175	0
S	CO2_NBIO_RUNEX	280	355	360	435	763	821	1,236	1,533	1,635	1180	193	1070	1,692
S	CO2_NBIO_STREX	65	85	84	104	15	7.6	8.4	0.007	19	17.5	50	1.6	22
S	NOX_IDLEX	0	0	0	0	0.073	0.115	0.89	4.4	0.52	0	0	1.6	0
S	NOX_RUNEX	0.033	0.102	0.053	0.079	0.99	1.02	0.99	1.5	1.13	0.26	0.56	3.6	1.5
S	NOX_STREX	0.22	0.38	0.30	0.41	0.35	0.18	1.4	2.7	0.91	0.156	0.14	0.42	0.30
S	PM10_IDLEX	0	0	0	0	9.3E-04	0.0015	1.5E-03	0.0018	4.1E-04	0	0	1.4E-03	0
S	PM10_PMBW	0.0053	0.0067	0.0064	0.0066	0.078	0.091	0.045	0.077	0.055	0.11	0.012	0.045	0.045
S	PM10_PMTW	0.0080	0.0080	0.0080	0.0080	0.0098	0.011	0.012	0.036	0.012	0.027	0.0040	0.011	0.013
S	PM10_RUNEX	1.2E-03	0.0017	0.0012	0.0013	0.023	0.030	0.0108	0.028	0.021	0.0037	0.0018	0.0191	0.035
S	PM10_STREX	0.0020	0.0031	0.0021	0.0022	2.0E-04	7.3E-05	9.9E-05	0.0E+00	1.6E-04	1.3E-04	0.0034	2.2E-05	2.6E-04
S	PM25_IDLEX	0	0	0	0	8.9E-04	0.0015	1.4E-03	0.0017	3.9E-04	0	0	1.3E-03	0
S	PM25_PMBW	0.0019	0.0024	0.0023	0.0023	0.027	0.032	0.016	0.027	0.019	0.038	0.0042	0.016	0.016
S	PM25_PMTW	0.0020	0.0020	0.0020	0.0020	0.0025	0.0027	0.0030	0.0089	0.0030	0.0068	0.0010	0.0028	0.0033
S	PM25_RUNEX	1.1E-03	0.0016	1.1E-03	1.2E-03	0.022	0.028	0.0103	0.027	0.020	0.0035	0.0017	0.0183	0.033
S	PM25_STREX	0.0018	0.0028	0.0019	0.0020	1.8E-04	6.7E-05	9.1E-05	0.0E+00	1.5E-04	1.2E-04	0.0032	2.0E-05	2.4E-04
S	ROG_DIURN	0.44	0.99	0.43	0.58	0.158	0.069	0.038	9.8E-05	0.125	0.046	3.9	0.038	43
S	ROG_HTSK	0.100	0.21	0.096	0.124	0.033	0.014	0.0069	1.8E-05	0.023	0.0105	3.8	0.0070	8.7
S	ROG_IDLEX	0	0	0	0	0.020	0.014	0.026	0.41	0.069	0	0	0.08	0
S	ROG_RESTL	0	0	0	0	0	0	0	0	0	0	0	0	0
S	ROG_RUNEX	0.0082	0.025	0.0102	0.0149	0.121	0.137	0.036	0.015	0.063	0.048	1.2	0.083	0.077
S	ROG_RUNLS	0.027	0.073	0.028	0.042	0.062	0.024	0.0148	1.8E-05	0.024	1.1E-03	1.4	0.010	0.0020
S	ROG_STREX	0.26	0.49	0.32	0.45	0.091	0.044	0.045	0.0E+00	0.102	0.074	1.3	0.013	0.099
S	SO2_IDLEX	0	0	0	0	8.8E-05	1.4E-04	0.0015	0.0083	1.2E-03	0	0	0.0016	0
S	SO2_RUNEX	0.0028	0.0035	0.0036	0.0043	0.0074	0.0079	0.012	0.014	0.016	0.0069	0.0019	0.0100	0.017
S	SO2_STREX	6.4E-04	8.4E-04	8.3E-04	1.0E-03	1.5E-04	7.5E-05	8.3E-05	0.0E+00	1.8E-04	1.7E-04	5.0E-04	1.6E-05	2.2E-04
S	TOG_DIURN	0.44	0.99	0.43	0.58	0.158	0.069	0.038	9.8E-05	0.125	0.046	3.9	0.038	43
S	TOG_HTSK	0.100	0.21	0.096	0.124	0.033	0.014	0.0069	1.8E-05	0.023	0.0105	3.8	0.0070	8.7
S	TOG_IDLEX	0	0	0	0	0.028	0.019	0.041	0.57	0.088	0	0	0.14	0
S	TOG_RESTL	0	0	0	0	0	0	0	0	0	0	0	0	0
S	TOG_RUNEX	0	0	0	0	0	0	0	0	0	1	1	0	0
S	TOG_RUNLS	0	0	0	0	0	0	0	0	0	0	1	0	0
S	TOG_STREX	0	1	0	0	0	0	0	0	0	0	1	0	0
S	N2O_IDLEX	0.0000	0.000	0.000	0.000	0.001	0.00	0.025	0.145	0.019	0.00	0.0	0.03	0.000
S	N2O_RUNEX	0.004	0.008	0.005	0.007	0.050	0.091	0.1515	2.4E-01	0.140	1.8E-01	0.0	0.153	0.0653
S	N2O_STREX	0.03	0.04	0.04	0.04	0.029	0.015	0.006	1.0E-06	0.019	0.017	0.0	0.001	0.03

Season	Variable	Vehicle Type[1]												
		LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
W	CH4_IDLEX	0	0	0	0	0.0046	0.0026	0.012	0.12	0.0107	0	0	0.039	0
W	CH4_RUNEX	0.0020	0.0052	0.0024	0.0032	0.0091	0.0075	0.009	0.031	0.012	0.98	0.19	0.07	0.0101
W	CH4_STREX	0.080	0.135	0.097	0.125	0.021	0.0103	0.0094	0.0E+00	0.023	0.0219	0.25	0.0031	0.028
W	CO_IDLEX	0	0	0	0	0.18	0.13	0.75	6.0	0.85	0	0	0.9	0
W	CO_RUNEX	0.59	1.17	0.69	0.80	0.90	0.57	0.36	0.27	0.66	11.8	16	1.04	0.89
W	CO_STREX	3.8	7.2	4.5	5.2	2.0	1.0	1.16	0.0004	2.5	2.4	10.3	0.55	2.6
W	CO2_NBIO_IDLEX	0	0	0	0	9.1	15	166	936	132	0	0	165	0
W	CO2_NBIO_RUNEX	253	325	332	406	763	821	1,236	1,533	1,635	1180	195	1070	1,692
W	CO2_NBIO_STREX	67	90	87	107	15	7.9	8.7	0.007	19	18.8	57	2.0	23
W	NOX_IDLEX	0	0	0	0	0.073	0.115	0.95	4.9	0.57	0	0	1.5	0
W	NOX_RUNEX	0.044	0.137	0.071	0.106	1.08	1.10	1.07	1.6	1.22	0.26	0.71	3.8	1.6
W	NOX_STREX	0.27	0.47	0.37	0.51	0.41	0.20	1.4	2.7	0.95	0.181	0.17	0.43	0.35
W	PM10_IDLEX	0	0	0	0	9.3E-04	0.0015	2.1E-03	0.0024	5.7E-04	0	0	2.0E-03	0
W	PM10_PMBW	0.0053	0.0067	0.0064	0.0066	0.078	0.091	0.045	0.077	0.055	0.11	0.012	0.045	0.045
W	PM10_PMTW	0.0080	0.0080	0.0080	0.0080	0.0098	0.011	0.012	0.036	0.012	0.027	0.0040	0.011	0.013
W	PM10_RUNEX	1.2E-03	0.0017	0.0012	0.0013	0.023	0.030	0.0108	0.028	0.021	0.0037	0.0018	0.0191	0.035
W	PM10_STREX	0.0020	0.0031	0.0021	0.0022	2.0E-04	7.3E-05	9.9E-05	0.0E+00	1.6E-04	1.3E-04	0.0034	2.2E-05	2.6E-04
W	PM25_IDLEX	0	0	0	0	8.9E-04	0.0015	2.0E-03	0.0023	5.4E-04	0	0	1.9E-03	0
W	PM25_PMBW	0.0019	0.0024	0.0023	0.0023	0.027	0.032	0.016	0.027	0.019	0.038	0.0042	0.016	0.016
W	PM25_PMTW	0.0020	0.0020	0.0020	0.0020	0.0025	0.0027	0.0030	0.0089	0.0030	0.0068	0.0010	0.0028	0.0033
W	PM25_RUNEX	1.1E-03	0.0016	1.1E-03	1.2E-03	0.022	0.028	0.0103	0.027	0.020	0.0035	0.0017	0.0183	0.033
W	PM25_STREX	0.0018	0.0028	0.0019	0.0020	1.8E-04	6.7E-05	9.1E-05	0.0E+00	1.5E-04	1.2E-04	0.0032	2.0E-05	2.4E-04
W	ROG_DIURN	0.29	0.63	0.30	0.42	0.107	0.047	0.023	4.6E-05	0.084	0.025	2.0	0.022	28
W	ROG_HTSK	0.082	0.17	0.079	0.102	0.027	0.012	0.0056	1.4E-05	0.019	0.0086	3.2	0.0056	7.1
W	ROG_IDLEX	0	0	0	0	0.020	0.014	0.026	0.36	0.063	0	0	0.08	0
W	ROG_RESTL	0	0	0	0	0	0	0	0	0	0	0	0	0
W	ROG_RUNEX	0.0076	0.023	0.0094	0.0138	0.119	0.137	0.035	0.015	0.061	0.048	1.3	0.081	0.073
W	ROG_RUNLS	0.026	0.072	0.028	0.041	0.062	0.024	0.0146	1.8E-05	0.024	1.1E-03	1.5	0.011	0.0020
W	ROG_STREX	0.37	0.72	0.45	0.65	0.104	0.050	0.051	0.0E+00	0.118	0.094	1.9	0.018	0.115
W	SO2_IDLEX	0	0	0	0	8.8E-05	1.4E-04	0.0016	0.0086	1.2E-03	0	0	0.0015	0
W	SO2_RUNEX	0.0025	0.0032	0.0033	0.0040	0.0074	0.0079	0.012	0.014	0.016	0.0069	0.0019	0.0100	0.017
W	SO2_STREX	6.7E-04	8.9E-04	8.6E-04	1.1E-03	1.5E-04	7.8E-05	8.6E-05	0.0E+00	1.9E-04	1.9E-04	5.7E-04	2.0E-05	2.2E-04
W	TOG_DIURN	0.29	0.63	0.30	0.42	0.107	0.047	0.023	4.6E-05	0.084	0.025	2.0	0.022	28
W	TOG_HTSK	0.082	0.17	0.079	0.102	0.027	0.012	0.0056	1.4E-05	0.019	0.0086	3.2	0.0056	7.1
W	TOG_IDLEX	0	0	0	0	0.028	0.019	0.042	0.51	0.082	0	0	0.14	0
W	TOG_RESTL	0	0	0	0	0	0	0	0	0	0	0	0	0
W	TOG_RUNEX	0	0	0	0	0	0	0	0	0	1	2	0	0
W	TOG_RUNLS	0	0	0	0	0	0	0	0	0	0	1	0	0
W	TOG_STREX	0	1	0	1	0	0	0	0	0	0	2	0	0
W	N2O_IDLEX	0.0000	0.000	0.000	0.000	0.001	0.00	0.026	0.149	0.019	0.00	0.0	0.02	0.000
W	N2O_RUNEX	0.005	0.010	0.006	0.009	0.051	0.091	0.1521	2.4E-01	0.141	1.8E-01	0.0	0.154	0.0678
W	N2O_STREX	0.03	0.04	0.04	0.05	0.032	0.016	0.007	1.0E-06	0.021	0.019	0.0	0.002	0.04

Notes:

1. Emission factors for each fleet mix are based on EMFAC2021 for the Bay Area Air Quality Management District.
2. RUNEX emission factors are in units of g/mile. IDLEX and STREX emission factors are in units of g/trip.

Season	Variable	Vehicle Type[1]												
		LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH

Abbreviations:

A - Annual
CARB - California Air Resources Board
CH_4 - methane
CO_2 NBIO - carbon dioxide, non-biogenic
EMFAC - On-Road Emission Factor Model
g- gram
HHD - heavy-heavy duty trucks
IDLEX - idle exhaust emissions
LDA - light-duty automobiles
LDT - light-duty trucks
LHD1 - light-heavy-duty trucks, 8,501-10,000 lbs
LHD2 - light-heavy-duty trucks, 10,001-14,000 lbs
MCY - motorcycles
MHD - medium-heavy duty trucks
OBUS - other buses
RUNEX - running exhaust emissions
SAFE - Safer Affordable Fuel-Efficient Vehicles
SBUS - school buses
STREX - start exhaust tailpipe emisions
UBUS - urban buses

References:

California Air Resources Board. EMFAC2021. Available online at: https://arb.ca.gov/emfac/emissions-inventory

Table 4
Energy Usage Emission Factors
Vanden Estates
Vacaville, California

Historical Electricity Intensity - PG&E

Annual Electricity Data	2016	2017	2018	Average[1]	Units
CO_2 Intensity Factor per Total Energy Delivered[2]	294	210	206	237	lbs CO_2/MWh delivered
% of Total Energy From RPS-Eligible Renewables[3]	33%	33%	39%	35%	-
CO_2 Intensity Factor per Total Non-RPS-Eligible Energy[4]	437	314	338	364	lbs CO_2/MWh delivered

Estimated Intensity Factor for Total Energy Delivered by PG&E[5]

Model Year	2016	2017	2018	Average[5]	Units
2025 (48%)	284	204	219	236	lbs CO_2/MWh delivered

Greenhouse Gas Energy Emission Factors

Greenhouse Gas	CO_2	CH_4	N_2O	CO_2e	Units
Global Warming Potential[6]	1	25	298	-	-
2023 Electricity Use Emission Factor[7]	236	0.029	0.0062	238	lb/MWh
	1.1E-01	1.3E-05	2.8E-06	1.1E-01	MT/MWh
Natural Gas Use Emission Factor[8]	118	0.0023	0.0022	118	lb/MMBTU
	0.0053	0.0000	0.0000	0.0054	MT/therm

Criteria Air Pollutant Energy Emission Factors[9]

Land Use Type	ROG	NOx	PM_{10}	$PM_{2.5}$	Units
Residential	0.011	0.092	0.0075	0.0075	lb/MMBtu

Notes:

1. Total CO_2 emission factor from The Climate Registry.
2. Percent of total energy from eligible renewables is from the PG&E 2016, 2017, and 2018 Corporate Responsibility Reports.
3. This average uses the most recent three years of data.
4. The emissions metric presented here is calculated based on the total CO_2 intensity factor divided by the percent of energy delivered from non-RPS-eligible renewable sources. This CO_2 intensity factor includes both fossil fuel and carbon-free sources of energy, such as largescale hydro and nuclear. Diablo Canyon Nuclear Plant, which accounts for a portion of the carbon-free energy in this CO_2 intensity factor, is planned to be closed by 2024-2025. According to SB 1090 (approved 9/2018), "The [California Public Utilities] commission shall ensure that integrated resource plans are designed to avoid any increase in emissions of greenhouse gases as a result of the retirement of the Diablo Canyon Units 1 and 2 powerplant." This was incorporated into CPUC section 712.7(2)(b). Based on this information, the total Non-RPS-Eligible energy CO_2 intensity factor was assumed to remain constant.
5. The average percentage of energy from renewables for 2016-2018 is greater than the 2020 RPS of 33% as required by SB100. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100. Thus, it is assumed that the 2016-2018 average CO2 and CO2e intensity factors remain constant through 2020, at which point the carbon intensity then decreases each year to comply with the future RPS requirements.
6. Global Warming Potentials (GWP) are based on the IPCC Fourth Assessment Report.
7. We assume the 2023 electricity use emission factors remains the same as 2020.
8. Natural Gas Use emission factors from Table 8.2 of CalEEMod User's Guide Appendix D.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
CPUC - California Public Utilities Commission
eGRID - Emissions & Generation Resource Integrated Database
GWP - global warming potential
IPCC AR4 - Intergovernmental Panel on Climate Change Fourth Assessment Report
lb - pound(s)
MMBtu - million British Thermal Units
MT - metric ton(s)
MWh - megawatt-hour
N_2O - nitrous oxide
NOx - nitrogen oxides
PG&E - Pacific Gas & Electric
PM - particulate matter
ROG - reactive organic gases
RPS - Renewable Portolio Standard
SB - Senate Bill

References:

The Climate Registry. Available at: https://www.theclimateregistry.org/our-members/cris-public-reports/.

California Air Pollution Control Officers Association (CAPCOA). 2020. California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online

IPCC. 2007. AR4 Climate Change 2007: The Physical Science Basis. Available online at: https://www.ipcc.ch/report/ar4/wg1/.

PGE 2016 Corporate Responsibility Report. Available at: https://www.pgecorp.com/corp_responsibility/reports/2016/.

PGE 2017 Corporate Responsibility Report. Available at: https://www.pgecorp.com/corp_responsibility/reports/2017/.

PGE 2018 Corporate Responsibility Report. Available at: https://www.pgecorp.com/corp_responsibility/reports/2018/.

Diablo Canyon Decommissioning Engagement Panel. Available at: https://www.pge.com/en_US/safety/how-the-system-works/diablo-canyon-power-plant/diablo-canyon-power-plant/engagement-panel.page.

SB-100 California Renewables Portfolio Standard Program. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100.

USEPA. 2019. eGRID2019 Summary Tables. Available at: https://www.epa.gov/egrid/egrid-2019-summary-tables.

Conversions:

2000	lb/ton
1.102312	ton/MT
99976.1	BTU/therm
1.00E+06	BTU/MMBTU
1.00E-01	MMBTU/therm

	PGE	
CO2 Intensity (lb/MWhr)	1	
CH4 Intensity (lb/MWhr)	25	0.029
N2O Intensity (lb/MWhr)	298	0.00617

Table 5
Proposed Project Construction Off-Road Equipment Energy Use
Vanden Estates
Vacaville, California

Year	Construction Activity	Equipment	CalEEMod Equipment[1]	Number[1]	Horsepower[1]	Equipment-Days[2]	Days of Usage Per Piece of Equipment[3]	Number of Days[1]	Hours per Day[1]	Utilization[4]	Load Factor[1]	Fuel Usage[5] (gal diesel)
2023	Demolition	Concrete/Industrial Saws	Concrete/Industrial Saws	1	81	30	5.00	30	8	100.0%	0.73	814
		Excavators	Excavators	3	158	30	5.00	30	8	100.0%	0.38	2,232
		Rubber Tired Dozers	Rubber Tired Dozers	2	247	30	5.00	30	8	100.0%	0.40	2,448
	Site Preparation	Rubber Tired Dozers	Rubber Tired Dozers	3	247	20	5.00	20	8	100.0%	0.40	2,448
		Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	4	97	20	5.00	20	8	100.0%	0.37	1,318
	Grading	Excavators	Excavators	2	158	45	5.00	45	8	100.0%	0.38	2,232
		Graders	Graders	1	187	45	5.00	45	8	100.0%	0.41	1,425
		Rubber Tired Dozers	Rubber Tired Dozers	1	247	45	5.00	45	8	100.0%	0.40	1,836
		Scrapers	Scrapers	2	367	45	5.00	45	8	100.0%	0.48	6,548
		Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	97	45	5.00	45	8	100.0%	0.37	1,483
	Paving	Pavers	Pavers	2	130	35	5.00	35	8	100.0%	0.42	1,578
		Paving Equipment	Paving Equipment	2	132	35	5.00	35	8	100.0%	0.36	1,374
		Rollers	Rollers	2	80	35	5.00	35	8	100.0%	0.38	977
	Building Construction	Cranes	Cranes	1	231	440	5.00	440	7	100.0%	0.29	10,652
		Forklifts	Forklifts	3	89	440	5.00	440	8	100.0%	0.20	10,788
		Generator Sets	Generator Sets	1	84	440	5.00	440	8	100.0%	0.74	12,558
		Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	3	97	440	5.00	440	8	100.0%	0.37	21,751
		Welders	Welders	1	46	440	5.00	440	8	100.0%	0.45	4,182
2024	Building Construction	Cranes	Cranes	1	231	440	5.00	440	7	100.0%	0.29	10,652
		Forklifts	Forklifts	3	89	440	5.00	440	8	100.0%	0.20	10,788
		Generator Sets	Generator Sets	1	84	440	5.00	440	8	100.0%	0.74	12,558
		Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	3	97	440	5.00	440	8	100.0%	0.37	21,751
		Welders	Welders	1	46	440	5.00	440	8	100.0%	0.45	4,182
2025	Building Construction	Cranes	Cranes	1	231	440	5.00	440	7	100.0%	0.29	10,652
		Forklifts	Forklifts	3	89	440	5.00	440	8	100.0%	0.20	10,788
		Generator Sets	Generator Sets	1	84	440	5.00	440	8	100.0%	0.74	12,558
		Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	3	97	440	5.00	440	8	100.0%	0.37	21,751
		Welders	Welders	1	46	440	5.00	440	8	100.0%	0.45	4,182
	Architectural Coating	Air Compressors	Air Compressors	1	78	35	5.00	35	6	100.0%	0.48	451
Total Construction Off-Road Energy Use in 2023												**86,644**
Total Construction Off-Road Energy Use in 2024												**59,930**
Total Construction Off-Road Energy Use in 2025												**60,382**

Notes:

1. The construction equipment assumptions, number of construction equipment and equipment horsepower are based on CalEEMod® Appendix D, based on the project site acreage. Note that for the graders used during Grading and the air compressors used during Architectural Coating, the number of pieces of equipment were adjusted from CalEEMod® defaults per the methodology described in footnote 4.
2. Equipment-Days were provided by the Project Developer. Note that for the Building Construction activity, which occurs over two calendar years, total equipment-days provided by the Project Developer were allocated to each year based on the percentage of work days occurring in that year.
3. Days of usage per piece of equipment was calculated by dividing equipment-days by number of pieces of equipment. This calculation is simply meant to ensure the total equipment fuel use per construction activity are accurate when using CalEEMod methods.
4. Utilization was calculated by dividing days of usage per piece of equipment by the length of the construction activity as shown in the above table. In cases where the CalEEMod default quantity of equipment would have resulted in a utilization of greater than 100%, the quantity of equipment was adjusted to the nearest whole number such that utilization would be less than or equal to 100%. This calculation is simply meant to ensure the total equipment fuel use per construction activity are accurate when using CalEEMod methods.
5. Fuel use from off-road construction equipment is estimated using data from CARB 2017 Off-road Diesel Emission Factors database, which cites average brake-specific fuel consumption (BSFC) of 0.408 lb/hp-hr for equipment less than or equal to 100 HP and 0.367 lb/hp-hr for equipment greater than 100 HP, and a diesel density of 7.109 lb/gal. This results in diesel consumption rates of 0.057 gal/hp-hr and 0.052 gal/hp-hr for equipment up to 100 HP and greater than 100 HP, respectively. Fuel usage was calculated with the following equation:

   Fuel Usage = Σ(N * HP * LF * Day * Hr * U * F)

   N: number of Equipment Pieces
   HP: equipment horsepower
   LF: Load Factor
   Day: duration of equipment usage
   Hr: hours per day of equipment usage
   U: Utilization
   F: Fuel Consumption Rate

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CARB - California Air Resources Board
gal - gallons
hp - horsepower
hr - hour
lb - pound

References:

California Air Resources Board. 2017 Off-road Diesel Emission Factors. Accessed September 2020. Available online at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road

Table 6
Proposed Project Construction On-Road Activity Assumptions and Energy Use
Vanden Estates
Vacaville, California

Project Construction Onroad Data

Construction Area	Construction Activity	Year	Trips (one way trips/activity)		
			Worker Trips	Vendor Trips	Hauling Trips
Project Site	Demolition	2023	15	--	57
	Site Preparation	2023	18	--	--
	Grading	2023	20	--	62
	Building Construction	2023	41	12	--
		2024	41	12	--
		2025	41	12	--
	Paving	2023	15	--	--
	Architectural Coating	2025	8	--	--

EMFAC2021 Onroad Data by Vehicle Category

Vehicle Category	Year	Fuel Consumption				VMT			
		Gasoline	Diesel	Natural Gas	Electricity	Gasoline	Diesel	Natural Gas	Electricity
		gal/day	gal/day	DGE/day	kWh/day	miles/day			
LDA	2023	76,437	187	0	39,066,005	2,216,476	7,880	0	101,186
	2024	75,191	170	0	48,383,759	2,223,522	7,229	0	125,320
	2025	73,517	153	0	58,043,562	2,220,249	6,557	0	150,340
LDT1	2023	7,719	1	0	176,890	187,808	30	0	458
	2024	7,407	1	0	210,209	183,150	26	0	544
	2025	7,069	1	0	258,030	177,872	23	0	668
LDT2	2023	39,831	110	0	1,292,042	936,591	3,474	0	3,347
	2024	39,863	112	0	1,881,196	960,713	3,599	0	4,873
	2025	39,608	112	0	2,532,163	978,985	3,702	0	6,559
MHDT	2023	1,999	2,559	2	3,551	9,406	21,477	15	3
	2024	2,007	2,563	3	152,880	9,595	21,600	20	134
	2025	2,009	2,554	4	405,382	9,747	21,653	29	359
HHDT	2023	11	67,656	628	311,660	37	406,718	3,268	171
	2024	11	67,369	646	1,646,532	37	411,015	3,369	900
	2025	9	66,878	662	3,666,872	32	414,978	3,460	2,005

EMFAC2021 Onroad Data by Fleet Type

Fleet Type	Year	Fuel Consumption				VMT			
		Gasoline	Diesel	Natural Gas	Electricity	Gasoline	Diesel	Natural Gas	Electricity
		gal/day	gal/day	DGE/day	kWh/day	miles/day			
Worker	2023	123,987	298	--	40,534,937	3,340,875	11,384	--	104,990
	2024	122,461	283	--	50,475,165	3,367,384	10,854	--	130,737
	2025	120,194	266	--	60,833,755	3,377,107	10,283	--	157,567
Vendor	2023	1,999	2,559	2	3,551	9,406	21,477	15	3
	2024	2,007	2,563	3	152,880	9,595	21,600	20	134
	2025	2,009	2,554	4	405,382	9,747	21,653	29	359
Hauling	2023	11	67,656	628	311,660	37	406,718	3,268	171
	2024	11	67,369	646	1,646,532	37	411,015	3,369	900
	2025	9	66,878	662	3,666,872	32	414,978	3,460	2,005

Fuel Efficiency Data by Fleet Type

Scenario	Year	Fuel Efficiency				VMT by Vehicle Fuel Type			
		Gasoline	Diesel	Natural Gas	Electricity	Gasoline	Diesel	Natural Gas	Electricity
		mi/gal	mi/gal	mi/DGE	mi/kWh	Percentage (%)			
Worker	2023	26.9	38.2	--	3.3	97%	0.33%	--	3.0%
	2024	27.5	38.4	--	3.3	96%	0.31%	--	3.7%
	2025	28.1	38.6	--	3.3	95%	0.29%	--	4.4%
Vendor	2023	4.7	8.4	7.3	3.3	30%	70%	0.05%	0.011%
	2024	4.8	8.4	7.5	3.3	31%	69%	0.07%	0.43%
	2025	4.9	8.5	7.6	3.3	31%	68%	0.09%	1.1%
Hauling	2023	3.2	6.0	5.2	3.3	0.009%	99%	0.80%	0.04%
	2024	3.3	6.1	5.2	3.3	0.009%	99%	0.81%	0.22%
	2025	3.5	6.2	5.2	3.3	0.008%	99%	0.82%	0.48%

Fuel Consumption

Scenario	Year	Trip Rate (trips/year)	Trip Length (mi/trip)	Annual VMT (mi/yr)	Fuel Consumption			
					Gallons of Gasoline	Gallons of Diesel	MMBTU of Natural Gas	MWh of Electricity
Worker	2023	2,727	10	27,270	978	2	--	0.25
	2024	10,742	10	107,420	3,749	9	--	1.20
	2025	7,086	10	70,860	2,403	5	--	0.94
Vendor	2023	144	7	1,008	65	83	0.008	0.00003
	2024	3,144	7	22,008	1,409	1,799	0.25	0.03
	2025	1,992	7	13,944	881	1,121	0.22	0.05
Hauling	2023	119	20	2,380	0.07	393	0.47	0.0003
	2024	--	--	--	--	--	--	--
	2025	--	--	--	--	--	--	--
Total Construction On-Road Energy Use in 2023					**1,043**	**478**	**0.48**	**0.25**
Total Construction On-Road Energy Use in 2024					**5,158**	**1,808**	**0.25**	**1.23**
Total Construction On-Road Energy Use in 2025					**3,284**	**1,126**	**0.22**	**0.99**

Abbreviations:

CNG - compressed natural gas
DEG - diesel equivalent gallons
gal - gallons
kWh - kilowatt-hour
mi - mile
MMBTU - million British Thermal Units
MWh - megawatt-hour
VMT - vehicle miles traveled

References:

US Department of Energy (DOE), Fuel Economy Guide. Electric. Available at: https://www.fueleconomy.gov/feg/evsbs.shtml. Accessed September 2020.

DOE. 2017. Alternative Fuels Data Center, Gasoline and Diesel Gallon Equivalency Methodology, Compressed Natural Gas. Available online at: https://afdc.energy.gov/fuels/equivalency_methodology.html. Accessed May 2019.

Table 7
Proposed Project Construction Energy Resource Use
Vanden Estates
Vacaville, California

Year	Source[1,2]	Gasoline Usage (gal)	Diesel Usage (gal)	Natural Gas Usage (MMBtu)	Electricity Usage (MWh)
2023	Off-Road Construction Equipment	--	86,644	--	--
	On-Road Construction Trips	1,043	478	0.48	0.25
2024	Off-Road Construction Equipment	--	59,930	--	--
	On-Road Construction Trips	5,158	1,808	0.25	1.23
2025	Off-Road Construction Equipment	--	60,382	--	--
	On-Road Construction Trips	3,284	1,126	0.22	0.99
Total		9,485	210,368	0.94	2.47

Notes:

1. Off-Road fuel usage is calculated in Table EN-1
2. On-Road fuel usage is calculated in Table EN-2

Abbreviations:

gal - gallons
kWh - kilowatt hour
MMBtu - million British Thermal Units

Table 8
Estimated Energy Consumption from Landscaping Equipment
Vanden Estates
Vacaville, California

Scenario	Landscaping CO_2 Emissions[1]	Emission Factor[2]		Landscaping Fuel Usage
	MT/yr	kg CO_2/gal diesel	gal diesel/MT CO_2	gal diesel/yr
All	1.4	10.21	98	135

Notes:

1. Landscaping emissions were estimated using CalEEMod® 2020.4.0.
2. Landscaping diesel fuel use was estimated using the kilogram of CO_2 per gallon of diesel emission factor from EPA's Emission Factors for Greenhouse Gas Inventories publication.

Abbreviations:

CO_2 - carbon dioxide
gal - gallons
kg - kilograms
MT - metric tons
yr - year

References:

CAPCOA. 2020. CALifornia Emissions Estimator MODel (CalEEMod). 2020.4.0. Available at: http://www.aqmd.gov/caleemod/home
EPA. 2022. Emission Factors for Greenhouse Gas Inventories. Available at: https://www.epa.gov/system/files/documents/2022-04/ghg_emission_factors_hub.pdf

Table 9
Estimated Energy Consumption from Hearth Usage
Vanden Estates
Vacaville, California

Hearth Inputs:

Inputs	Value	Unit
Units with Fireplaces (Gas)[1,2]	78	#
Units with No Fireplaces[1]	36	#
Fireplace Usage[1]	3.0	hrs/day
	82	days/yr
Average Heating Rate[3]	60,000	Btu/hr

Project Energy Usage from Hearths

Land Use	Natural Gas Consumption (MMBtu/yr)
	1144

Notes:

1. CalEEMod® Appendix D Table 5.1 provides the number of fireplaces installed in Project homes and average annual usage information.
2. Per BAAQMD Regulation 6, Rule 3, there are no wood-burning devices installed in new homes. As a result, the number of wood fireplaces assumed by CalEEMod® are assumed to be natural gas.
3. According to Appendix A, CalEEMod® assumes an average heating rate for gas-fired fireplaces in homes of 60,000 Btu/hr.

Abbreviations

BAAQMD - Bay Area Air Quality Management District
Btu - British Thermal Units
hrs - hours
MMBtu - million British Thermal Units
yr - year

References:

Table 10
Estimated Energy Consumption from Building Energy Use
Vanden Estates
Vacaville, California

Energy Usage[1,2]						
Land Use		Electricity			Natural Gas	
		Title 24	Non Title 24	Lighting	Title 24	Non Title 24
Project Description	CalEEMod Type	MWh/yr			MMBtu/yr	
Single Family Housing		8	702	183	2,676	360
Total Energy Consumption (+)		893			3,036	
Total Energy Generation (-)		-893			--	

Notes:

1. Energy usage is based on CalEEMod defaults (adjusted for 2019 Title 24) for the land uses specified in the "CalEEMod Type" column.

2. 2019 Title 24 requires all new low-rise residences to achieve "zero net electricity" through improvements in energy efficiency and generation of on-site renewable electricity (e.g., solar photovoltaics) to offset the annual site electricity consumption. As a result, the electricity shown on this table will be still be consumed and grid-supplied electricity will be needed for certain hours of the year, but on an annual basis this amount of electricity is expected to be generated on-site.

References:

Table 11
Estimated Electricity Consumption from Water Supply, Treatment, and Distribution
Vanden Estates
Vacaville, California

Water Usage[1]

Land Use	CalEEMod® Land Use Subtype	Indoor Water (million gal/year)	Outdoor Water (million gal/year)
Single Family Housing		7.4	4.7

Water Electricity Intensity[2]

County	Electricity Intensity for Water Uses (kWh/million gal)		
	Supply	Treat	Distribute
Solano	2,117	111	1,272

Wastewater Electricity Intensity[2]

County	Wastewater Treatment (kWh/million gal)
Solano	1,911

Water Electricity Usage[3]

Scenario	Electricity Usage (MWh/year)
Solano	57

Notes:

1. Water usage rates are from Table 9.1 of Appendix D of the CalEEMod® User's Guide. A 20% reduction was then applied to both indoor and outdoor water use, consistent with CALGreen and MWELO requirements.
2. Water Electricity Intensity from Table 9.2 of Appendix D of the CalEEMod® User's Guide.
3. Indoor water use is assumed to be processed as wastewater. Outdoor water use is assumed to not be processed as wastewater.

Abbreviations:

CalEEMod® - California Emissions Estimator Model

CALGreen - 2013 California Green Building Standards Code

gal - gallon

kWh - kilowatt-hours

MWELO - 2009 Model Water Efficiency Landscape Ordinance

References:

CalEEMod® Version 2020.4.0. Available Online at: http://www.caleemod.com

1 acre-foot =	325851.4333	gal
1 acre-foot =	0.325851433	million gal
1 year =	365	days

Table 12
Estimated Energy Consumption from Mobile Sources
Vanden Estates
Vacaville, California

Project Operations Traffic Data

Project Land Use	CalEEMod Land Use	Year	Weekday	Saturday	Sunday	Average Trips Rates	
						trips/day	trips/yr
Single Family Housing		2025	1,076	1,088	975	1,063	387,039
							--

EMFAC2021 Onroad Data by Fleet Type

Fleet Type	Year	Fuel Consumption				VMT			
		Gasoline	Diesel	Natural Gas	Electricity	Gasoline	Diesel	Natural Gas	Electricity
		gal/day	gal/day	DGE/day	--	miles/day			
Light-Duty	2025	120,194	266	0	60,833,755	3,377,107	10,283	--	157,567

Fuel Efficiency Data by Fleet Type

Scenario	Year	Fuel Efficiency				VMT by Vehicle Fuel Type			
		Gasoline	Diesel	Natural Gas	Electricity	Gasoline	Diesel	Natural Gas	Electricity
		mi/gal	mi/gal	mi/DGE	mi/kWh	Percentage (%)			
	2025	28	39	--	3.3	95%	0.3%	--	4.4%

Fuel Consumption

Land Use	Year	Trip Rate (trips/year)	Trip Length (mi/trip)	Annual VMT (mi/yr)	Fuel Consumption			
					Gallons of Gasoline	Gallons of Diesel	MMBTU of Natural Gas	MWh of Electricity
Single Family Housing	2025	387,039	10	3,870,391	131,228	291	--	51.6
Project Operational Mobile Energy Use					**131,228**	**291**	**--**	**51.6**

Abbreviations:

CNG - compressed natural gas
DGE - diesel equivalent gallons
gal - gallons
kWh - kilowatt-hour
mi - mile
MMBTU - million British Thermal Units
MWh - megawatt-hour
VMT - vehicle miles traveled

References:

US Department of Energy (DOE), Fuel Economy Guide. Electric. Available at: https://www.fueleconomy.gov/feg/evsbs.shtml. Accessed September 2020.

DOE. 2017. Alternative Fuels Data Center, Gasoline and Diesel Gallon Equivalency Methodology, Compressed Natural Gas. Available online at: https://afdc.energy.gov/fuels/equivalency_methodology.html. Accessed May 2019.

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Table 13
Proposed Project Operational Energy Resource Use
Vanden Estates
Vacaville, California

Source[1,2]	Annual Energy Consumption			
	Gasoline Usage (gal)	Diesel Usage (gal)	Natural Gas Usage (MMBtu)	Electricity Usage (MWh)
Building Electricity Consumed (+)	--	--	--	893
Building Electricity Generated (-)	--	--	--	-893
Building Natural Gas	--	--	3,036	--
Mobile Sources	131,228	291	--	52
Water and Wastewater	--	--	--	57
Landscaping	--	135	--	--
Hearths	--	--	1,144	--
Total	**131,228**	**426**	**4,180**	**108**

Notes:

1. Detailed operational energy calculations by source are included in Tables 8 through 12.
2. Electric vehicle charging outlets recommended as a GHG mitigation measure would be expected to reduce gasoline, diesel, and natural gas usage while slightly increasing electricity usage. Conservatively, no credit has been taken.

Abbreviations:

gal - gallons

MMBTU - million British Thermal Units

MWh - megawatt-hour

References:

APPENDIX B
CALEEMOD® OUTPUT FILES

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Discovery Builders- Vanden Estates

Solano-Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	114.00	Dwelling Unit	26.70	205,200.00	326

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	56
Climate Zone	4			**Operational Year**	2025
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	236	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 Intensity factor is based on 2015-2017 PG&E Historical Data.

Land Use - Client's information

Construction Phase - Client's input
Note: Architectural coating is flagged: This phase is supposed to take place concurrently with the building construction. For now we selected the last 2 monthos of building construction time for the schedule of this task.

Trips and VMT - For Grading: CalEEMod estimate based on material imported

On-road Fugitive Dust - Updated silt loading factor for Solano County from the CARB 2021 Miscellaneous Process Methodology 7.9 for Entrained Road Travel, Paved Road Dust

Demolition - Based on estimation of building size (sq.ft)

Grading - Conservative assumption for 500CY of material import during grading phase
Total graded acres provided by the client

Architectural Coating - Update valus for Solano-Sacramento county (start date after 2021)

Vehicle Emission Factors - EMFAC 2021

Vehicle Emission Factors - EMFAC 2021

Vehicle Emission Factors - EMFAC 2021

Road Dust - Updated silt loading factorfor Solano County from the CARB 2021 Miscellaneous Process methodology 7.9 for entrained road travel, paved road dust.

Woodstoves - no wood-burning devices assumed
Gas and # No Fireplace was copied from the Data Request

Consumer Products - An updated 2020 VOC emission inventory from CARB and population estimates based on CA DOF demographic projections were used to estimate a Solano County VOC EF for 2020.

Area Coating - Updated for Solano-Sacramento county

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation - Cleint is committed to use Tier 4 construction equipment for this project based on the data request.

Mobile Land Use Mitigation -

Area Mitigation - VOC EF for Sacramento-Solano county is used here. No mitigated EF has been considered for now

Water Mitigation -

Waste Mitigation -

Fleet Mix - EMFAC 2021

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConsumerProducts	ROG_EF	2.14E-05	1.92E-05
tblFireplaces	NumberGas	0.00	77.52
tblFireplaces	NumberNoFireplace	78.66	36.48
tblFireplaces	NumberWood	35.34	0.00
tblFleetMix	HHD	0.02	0.05
tblFleetMix	LDA	0.56	0.52
tblFleetMix	LDT1	0.05	0.04
tblFleetMix	LDT2	0.17	0.20
tblFleetMix	LHD1	0.03	0.03
tblFleetMix	LHD2	6.6300e-003	7.7920e-003
tblFleetMix	MCY	0.03	3.8620e-003
tblFleetMix	MDV	0.13	0.13
tblFleetMix	MH	4.3970e-003	1.1020e-003
tblFleetMix	MHD	7.8490e-003	0.01
tblFleetMix	OBUS	1.0250e-003	1.6350e-003
tblFleetMix	SBUS	7.9400e-004	6.6800e-004
tblFleetMix	UBUS	3.9200e-004	1.0420e-003
tblGrading	MaterialImported	0.00	500.00
tblLandUse	LotAcreage	37.01	26.70
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblProjectCharacteristics	CO2IntensityFactor	203.98	236
tblRoadDust	RoadSiltLoading	0.1	0.07

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblSequestration	NumberOfNewTrees	0.00	100.00
tblTripsAndVMT	HaulingTripNumber	63.00	62.00
tblVehicleEF	HHD	0.03	0.12
tblVehicleEF	HHD	6.9130e-003	0.03
tblVehicleEF	HHD	7.86	5.92
tblVehicleEF	HHD	0.26	0.27
tblVehicleEF	HHD	3.0140e-003	3.9100e-004
tblVehicleEF	HHD	1,251.03	920.39
tblVehicleEF	HHD	1,304.74	1,533.36
tblVehicleEF	HHD	0.03	6.6350e-003
tblVehicleEF	HHD	0.20	0.15
tblVehicleEF	HHD	0.21	0.24
tblVehicleEF	HHD	0.00	1.0000e-006
tblVehicleEF	HHD	6.38	4.71
tblVehicleEF	HHD	2.44	1.62
tblVehicleEF	HHD	2.33	2.69
tblVehicleEF	HHD	2.5110e-003	2.0430e-003
tblVehicleEF	HHD	0.06	0.08
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	2.4030e-003	1.9510e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.9480e-003	8.9280e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	1.0000e-006	5.7000e-005
tblVehicleEF	HHD	5.0000e-005	1.6000e-005
tblVehicleEF	HHD	0.53	0.39
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.02	0.01

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	HHD	2.1000e-005	1.7000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.01	8.4300e-003
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.0000e-006	5.7000e-005
tblVehicleEF	HHD	5.0000e-005	1.6000e-005
tblVehicleEF	HHD	0.61	0.55
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.03	0.05
tblVehicleEF	HHD	2.1000e-005	1.7000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.03	0.12
tblVehicleEF	HHD	6.9140e-003	0.03
tblVehicleEF	HHD	7.76	5.85
tblVehicleEF	HHD	0.26	0.27
tblVehicleEF	HHD	2.7580e-003	3.5800e-004
tblVehicleEF	HHD	1,235.16	909.44
tblVehicleEF	HHD	1,304.74	1,533.36
tblVehicleEF	HHD	0.03	6.5830e-003
tblVehicleEF	HHD	0.19	0.14
tblVehicleEF	HHD	0.21	0.24
tblVehicleEF	HHD	0.00	1.0000e-006
tblVehicleEF	HHD	6.07	4.38
tblVehicleEF	HHD	2.32	1.54
tblVehicleEF	HHD	2.33	2.69
tblVehicleEF	HHD	2.2200e-003	1.8120e-003
tblVehicleEF	HHD	0.06	0.08
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.03	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	HHD	2.1240e-003	1.7300e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.9480e-003	8.9280e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	3.0000e-006	9.8000e-005
tblVehicleEF	HHD	5.6000e-005	1.8000e-005
tblVehicleEF	HHD	0.56	0.41
tblVehicleEF	HHD	2.0000e-006	0.00
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	2.1000e-005	1.8000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.01	8.3260e-003
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	3.0000e-006	9.8000e-005
tblVehicleEF	HHD	5.6000e-005	1.8000e-005
tblVehicleEF	HHD	0.64	0.57
tblVehicleEF	HHD	2.0000e-006	0.00
tblVehicleEF	HHD	0.03	0.05
tblVehicleEF	HHD	2.1000e-005	1.8000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.02	0.12
tblVehicleEF	HHD	6.9120e-003	0.03
tblVehicleEF	HHD	8.00	6.03
tblVehicleEF	HHD	0.26	0.27
tblVehicleEF	HHD	3.3350e-003	4.3500e-004
tblVehicleEF	HHD	1,272.94	935.51
tblVehicleEF	HHD	1,304.74	1,533.36
tblVehicleEF	HHD	0.03	6.7050e-003
tblVehicleEF	HHD	0.20	0.15

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	HHD	0.21	0.24
tblVehicleEF	HHD	0.00	1.0000e-006
tblVehicleEF	HHD	6.80	4.90
tblVehicleEF	HHD	2.49	1.65
tblVehicleEF	HHD	2.33	2.69
tblVehicleEF	HHD	2.9130e-003	2.3610e-003
tblVehicleEF	HHD	0.06	0.08
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	2.7870e-003	2.2550e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.9480e-003	8.9280e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	0.00	4.6000e-005
tblVehicleEF	HHD	5.2000e-005	1.4000e-005
tblVehicleEF	HHD	0.49	0.36
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	2.3000e-005	1.8000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.01	8.5730e-003
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	0.00	4.6000e-005
tblVehicleEF	HHD	5.2000e-005	1.4000e-005
tblVehicleEF	HHD	0.56	0.51
tblVehicleEF	HHD	0.03	0.05
tblVehicleEF	HHD	2.3000e-005	1.8000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	LDA	1.7540e-003	2.0580e-003
tblVehicleEF	LDA	0.04	0.07

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDA	0.48	0.62
tblVehicleEF	LDA	2.08	3.06
tblVehicleEF	LDA	242.09	260.36
tblVehicleEF	LDA	49.60	66.51
tblVehicleEF	LDA	4.0820e-003	4.4340e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.03	0.04
tblVehicleEF	LDA	0.17	0.25
tblVehicleEF	LDA	0.04	5.3420e-003
tblVehicleEF	LDA	1.3250e-003	1.1650e-003
tblVehicleEF	LDA	1.6690e-003	1.9740e-003
tblVehicleEF	LDA	0.02	1.8700e-003
tblVehicleEF	LDA	1.2200e-003	1.0720e-003
tblVehicleEF	LDA	1.5350e-003	1.8150e-003
tblVehicleEF	LDA	0.04	0.33
tblVehicleEF	LDA	0.09	0.09
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	6.4600e-003	7.7710e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.19	0.31
tblVehicleEF	LDA	2.3950e-003	2.5740e-003
tblVehicleEF	LDA	4.9100e-004	6.5800e-004
tblVehicleEF	LDA	0.04	0.33
tblVehicleEF	LDA	0.09	0.09
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	9.3900e-003	0.01
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.21	0.34
tblVehicleEF	LDA	2.0050e-003	2.2110e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.58	0.84
tblVehicleEF	LDA	1.64	2.41
tblVehicleEF	LDA	262.25	279.90
tblVehicleEF	LDA	48.79	64.82
tblVehicleEF	LDA	3.8030e-003	3.9240e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	0.15	0.22
tblVehicleEF	LDA	0.04	5.3420e-003
tblVehicleEF	LDA	1.3250e-003	1.1650e-003
tblVehicleEF	LDA	1.6690e-003	1.9740e-003
tblVehicleEF	LDA	0.02	1.8700e-003
tblVehicleEF	LDA	1.2200e-003	1.0720e-003
tblVehicleEF	LDA	1.5350e-003	1.8150e-003
tblVehicleEF	LDA	0.09	0.44
tblVehicleEF	LDA	0.10	0.10
tblVehicleEF	LDA	0.08	0.00
tblVehicleEF	LDA	7.2670e-003	8.2010e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.16	0.26
tblVehicleEF	LDA	2.5940e-003	2.7670e-003
tblVehicleEF	LDA	4.8300e-004	6.4100e-004
tblVehicleEF	LDA	0.09	0.44
tblVehicleEF	LDA	0.10	0.10
tblVehicleEF	LDA	0.08	0.00
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.17	0.28

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDA	1.6580e-003	1.9700e-003
tblVehicleEF	LDA	0.05	0.08
tblVehicleEF	LDA	0.47	0.59
tblVehicleEF	LDA	2.57	3.79
tblVehicleEF	LDA	237.99	253.47
tblVehicleEF	LDA	50.50	67.40
tblVehicleEF	LDA	4.3990e-003	4.8460e-003
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	0.03	0.04
tblVehicleEF	LDA	0.19	0.27
tblVehicleEF	LDA	0.04	5.3420e-003
tblVehicleEF	LDA	1.3250e-003	1.1650e-003
tblVehicleEF	LDA	1.6690e-003	1.9740e-003
tblVehicleEF	LDA	0.02	1.8700e-003
tblVehicleEF	LDA	1.2200e-003	1.0720e-003
tblVehicleEF	LDA	1.5350e-003	1.8150e-003
tblVehicleEF	LDA	0.01	0.29
tblVehicleEF	LDA	0.09	0.08
tblVehicleEF	LDA	9.4810e-003	0.00
tblVehicleEF	LDA	6.2090e-003	7.5700e-003
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	0.23	0.37
tblVehicleEF	LDA	2.3540e-003	2.5060e-003
tblVehicleEF	LDA	5.0000e-004	6.6600e-004
tblVehicleEF	LDA	0.01	0.29
tblVehicleEF	LDA	0.09	0.08
tblVehicleEF	LDA	9.4810e-003	0.00
tblVehicleEF	LDA	9.0230e-003	0.01
tblVehicleEF	LDA	0.03	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDA	0.25	0.40
tblVehicleEF	LDT1	3.3770e-003	5.4510e-003
tblVehicleEF	LDT1	0.06	0.12
tblVehicleEF	LDT1	0.75	1.24
tblVehicleEF	LDT1	2.26	5.81
tblVehicleEF	LDT1	288.86	332.04
tblVehicleEF	LDT1	60.23	87.96
tblVehicleEF	LDT1	5.6760e-003	9.1250e-003
tblVehicleEF	LDT1	0.03	0.04
tblVehicleEF	LDT1	0.06	0.12
tblVehicleEF	LDT1	0.23	0.42
tblVehicleEF	LDT1	0.04	6.7270e-003
tblVehicleEF	LDT1	1.5920e-003	1.7280e-003
tblVehicleEF	LDT1	2.1490e-003	3.0870e-003
tblVehicleEF	LDT1	0.02	2.3540e-003
tblVehicleEF	LDT1	1.4650e-003	1.5890e-003
tblVehicleEF	LDT1	1.9760e-003	2.8390e-003
tblVehicleEF	LDT1	0.09	0.72
tblVehicleEF	LDT1	0.18	0.19
tblVehicleEF	LDT1	0.07	0.00
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	0.08	0.07
tblVehicleEF	LDT1	0.30	0.60
tblVehicleEF	LDT1	2.8580e-003	3.2830e-003
tblVehicleEF	LDT1	5.9600e-004	8.7000e-004
tblVehicleEF	LDT1	0.09	0.72
tblVehicleEF	LDT1	0.18	0.19
tblVehicleEF	LDT1	0.07	0.00
tblVehicleEF	LDT1	0.02	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT1	0.08	0.07
tblVehicleEF	LDT1	0.33	0.66
tblVehicleEF	LDT1	3.8360e-003	5.8520e-003
tblVehicleEF	LDT1	0.05	0.10
tblVehicleEF	LDT1	0.89	1.67
tblVehicleEF	LDT1	1.79	4.53
tblVehicleEF	LDT1	309.72	355.25
tblVehicleEF	LDT1	59.29	85.19
tblVehicleEF	LDT1	5.2320e-003	8.0630e-003
tblVehicleEF	LDT1	0.02	0.04
tblVehicleEF	LDT1	0.06	0.10
tblVehicleEF	LDT1	0.20	0.38
tblVehicleEF	LDT1	0.04	6.7270e-003
tblVehicleEF	LDT1	1.5920e-003	1.7280e-003
tblVehicleEF	LDT1	2.1490e-003	3.0870e-003
tblVehicleEF	LDT1	0.02	2.3540e-003
tblVehicleEF	LDT1	1.4650e-003	1.5890e-003
tblVehicleEF	LDT1	1.9760e-003	2.8390e-003
tblVehicleEF	LDT1	0.22	0.99
tblVehicleEF	LDT1	0.21	0.21
tblVehicleEF	LDT1	0.17	0.00
tblVehicleEF	LDT1	0.02	0.03
tblVehicleEF	LDT1	0.08	0.07
tblVehicleEF	LDT1	0.25	0.49
tblVehicleEF	LDT1	3.0650e-003	3.5120e-003
tblVehicleEF	LDT1	5.8700e-004	8.4200e-004
tblVehicleEF	LDT1	0.22	0.99
tblVehicleEF	LDT1	0.21	0.21
tblVehicleEF	LDT1	0.17	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT1	0.02	0.04
tblVehicleEF	LDT1	0.08	0.07
tblVehicleEF	LDT1	0.27	0.54
tblVehicleEF	LDT1	3.2020e-003	5.2300e-003
tblVehicleEF	LDT1	0.07	0.13
tblVehicleEF	LDT1	0.73	1.17
tblVehicleEF	LDT1	2.81	7.25
tblVehicleEF	LDT1	284.59	324.78
tblVehicleEF	LDT1	61.29	90.26
tblVehicleEF	LDT1	6.1600e-003	9.9890e-003
tblVehicleEF	LDT1	0.03	0.04
tblVehicleEF	LDT1	0.07	0.14
tblVehicleEF	LDT1	0.26	0.47
tblVehicleEF	LDT1	0.04	6.7270e-003
tblVehicleEF	LDT1	1.5920e-003	1.7280e-003
tblVehicleEF	LDT1	2.1490e-003	3.0870e-003
tblVehicleEF	LDT1	0.02	2.3540e-003
tblVehicleEF	LDT1	1.4650e-003	1.5890e-003
tblVehicleEF	LDT1	1.9760e-003	2.8390e-003
tblVehicleEF	LDT1	0.03	0.63
tblVehicleEF	LDT1	0.18	0.17
tblVehicleEF	LDT1	0.02	0.00
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	0.10	0.07
tblVehicleEF	LDT1	0.36	0.72
tblVehicleEF	LDT1	2.8160e-003	3.2110e-003
tblVehicleEF	LDT1	6.0700e-004	8.9200e-004
tblVehicleEF	LDT1	0.03	0.63
tblVehicleEF	LDT1	0.18	0.17

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT1	0.02	0.00
tblVehicleEF	LDT1	0.02	0.03
tblVehicleEF	LDT1	0.10	0.07
tblVehicleEF	LDT1	0.39	0.78
tblVehicleEF	LDT2	2.6710e-003	2.5210e-003
tblVehicleEF	LDT2	0.06	0.08
tblVehicleEF	LDT2	0.63	0.73
tblVehicleEF	LDT2	2.66	3.66
tblVehicleEF	LDT2	305.28	342.36
tblVehicleEF	LDT2	63.97	86.77
tblVehicleEF	LDT2	5.3240e-003	5.8360e-003
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.05	0.06
tblVehicleEF	LDT2	0.24	0.33
tblVehicleEF	LDT2	0.04	6.4360e-003
tblVehicleEF	LDT2	1.3420e-003	1.2270e-003
tblVehicleEF	LDT2	1.6860e-003	2.0640e-003
tblVehicleEF	LDT2	0.02	2.2530e-003
tblVehicleEF	LDT2	1.2350e-003	1.1290e-003
tblVehicleEF	LDT2	1.5500e-003	1.8980e-003
tblVehicleEF	LDT2	0.06	0.33
tblVehicleEF	LDT2	0.12	0.09
tblVehicleEF	LDT2	0.06	0.00
tblVehicleEF	LDT2	0.01	9.6590e-003
tblVehicleEF	LDT2	0.06	0.03
tblVehicleEF	LDT2	0.28	0.38
tblVehicleEF	LDT2	3.0200e-003	3.3840e-003
tblVehicleEF	LDT2	6.3300e-004	8.5800e-004
tblVehicleEF	LDT2	0.06	0.33

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT2	0.12	0.09
tblVehicleEF	LDT2	0.06	0.00
tblVehicleEF	LDT2	0.02	0.01
tblVehicleEF	LDT2	0.06	0.03
tblVehicleEF	LDT2	0.30	0.42
tblVehicleEF	LDT2	3.0470e-003	2.7100e-003
tblVehicleEF	LDT2	0.05	0.07
tblVehicleEF	LDT2	0.76	0.99
tblVehicleEF	LDT2	2.10	2.87
tblVehicleEF	LDT2	325.26	360.07
tblVehicleEF	LDT2	62.91	84.18
tblVehicleEF	LDT2	4.9390e-003	5.1690e-003
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.05	0.05
tblVehicleEF	LDT2	0.22	0.30
tblVehicleEF	LDT2	0.04	6.4360e-003
tblVehicleEF	LDT2	1.3420e-003	1.2270e-003
tblVehicleEF	LDT2	1.6860e-003	2.0640e-003
tblVehicleEF	LDT2	0.02	2.2530e-003
tblVehicleEF	LDT2	1.2350e-003	1.1290e-003
tblVehicleEF	LDT2	1.5500e-003	1.8980e-003
tblVehicleEF	LDT2	0.15	0.43
tblVehicleEF	LDT2	0.14	0.10
tblVehicleEF	LDT2	0.13	0.00
tblVehicleEF	LDT2	0.01	0.01
tblVehicleEF	LDT2	0.05	0.03
tblVehicleEF	LDT2	0.23	0.32
tblVehicleEF	LDT2	3.2180e-003	3.5590e-003
tblVehicleEF	LDT2	6.2300e-004	8.3200e-004

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT2	0.15	0.43
tblVehicleEF	LDT2	0.14	0.10
tblVehicleEF	LDT2	0.13	0.00
tblVehicleEF	LDT2	0.02	0.01
tblVehicleEF	LDT2	0.05	0.03
tblVehicleEF	LDT2	0.25	0.35
tblVehicleEF	LDT2	2.5250e-003	2.4120e-003
tblVehicleEF	LDT2	0.07	0.10
tblVehicleEF	LDT2	0.62	0.69
tblVehicleEF	LDT2	3.30	4.54
tblVehicleEF	LDT2	301.19	331.94
tblVehicleEF	LDT2	65.15	87.29
tblVehicleEF	LDT2	5.7500e-003	6.3700e-003
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.06	0.07
tblVehicleEF	LDT2	0.27	0.37
tblVehicleEF	LDT2	0.04	6.4360e-003
tblVehicleEF	LDT2	1.3420e-003	1.2270e-003
tblVehicleEF	LDT2	1.6860e-003	2.0640e-003
tblVehicleEF	LDT2	0.02	2.2530e-003
tblVehicleEF	LDT2	1.2350e-003	1.1290e-003
tblVehicleEF	LDT2	1.5500e-003	1.8980e-003
tblVehicleEF	LDT2	0.02	0.30
tblVehicleEF	LDT2	0.12	0.08
tblVehicleEF	LDT2	0.02	0.00
tblVehicleEF	LDT2	9.9950e-003	9.4070e-003
tblVehicleEF	LDT2	0.07	0.03
tblVehicleEF	LDT2	0.33	0.45
tblVehicleEF	LDT2	2.9800e-003	3.2810e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT2	6.4500e-004	8.6300e-004
tblVehicleEF	LDT2	0.02	0.30
tblVehicleEF	LDT2	0.12	0.08
tblVehicleEF	LDT2	0.02	0.00
tblVehicleEF	LDT2	0.01	0.01
tblVehicleEF	LDT2	0.07	0.03
tblVehicleEF	LDT2	0.36	0.50
tblVehicleEF	LHD1	4.3180e-003	4.6310e-003
tblVehicleEF	LHD1	8.9910e-003	9.2870e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.17	0.18
tblVehicleEF	LHD1	0.86	0.92
tblVehicleEF	LHD1	0.94	1.80
tblVehicleEF	LHD1	9.24	9.12
tblVehicleEF	LHD1	755.58	763.23
tblVehicleEF	LHD1	9.93	14.97
tblVehicleEF	LHD1	8.9500e-004	8.2400e-004
tblVehicleEF	LHD1	0.05	0.05
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	1.14	1.05
tblVehicleEF	LHD1	0.27	0.38
tblVehicleEF	LHD1	1.0310e-003	9.2500e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.8020e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.2400e-004	2.0100e-004
tblVehicleEF	LHD1	9.8700e-004	8.8500e-004
tblVehicleEF	LHD1	0.03	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD1	2.5140e-003	2.4510e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.0600e-004	1.8400e-004
tblVehicleEF	LHD1	1.9890e-003	0.12
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	9.9700e-004	0.00
tblVehicleEF	LHD1	0.11	0.12
tblVehicleEF	LHD1	0.22	0.06
tblVehicleEF	LHD1	0.06	0.10
tblVehicleEF	LHD1	8.9000e-005	8.8000e-005
tblVehicleEF	LHD1	7.3540e-003	7.4280e-003
tblVehicleEF	LHD1	9.8000e-005	1.4800e-004
tblVehicleEF	LHD1	1.9890e-003	0.12
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	9.9700e-004	0.00
tblVehicleEF	LHD1	0.14	0.14
tblVehicleEF	LHD1	0.22	0.06
tblVehicleEF	LHD1	0.07	0.11
tblVehicleEF	LHD1	4.3310e-003	4.6520e-003
tblVehicleEF	LHD1	9.1680e-003	9.4660e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.17	0.18
tblVehicleEF	LHD1	0.87	0.94
tblVehicleEF	LHD1	0.87	1.66
tblVehicleEF	LHD1	9.24	9.12
tblVehicleEF	LHD1	755.60	763.27
tblVehicleEF	LHD1	9.80	14.74

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD1	8.9700e-004	8.2700e-004
tblVehicleEF	LHD1	0.05	0.05
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	1.08	0.99
tblVehicleEF	LHD1	0.25	0.35
tblVehicleEF	LHD1	1.0310e-003	9.2500e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.8020e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.2400e-004	2.0100e-004
tblVehicleEF	LHD1	9.8700e-004	8.8500e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5140e-003	2.4510e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.0600e-004	1.8400e-004
tblVehicleEF	LHD1	4.6780e-003	0.16
tblVehicleEF	LHD1	0.09	0.03
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.3130e-003	0.00
tblVehicleEF	LHD1	0.11	0.12
tblVehicleEF	LHD1	0.22	0.06
tblVehicleEF	LHD1	0.06	0.09
tblVehicleEF	LHD1	8.9000e-005	8.8000e-005
tblVehicleEF	LHD1	7.3540e-003	7.4280e-003
tblVehicleEF	LHD1	9.7000e-005	1.4600e-004
tblVehicleEF	LHD1	4.6780e-003	0.16
tblVehicleEF	LHD1	0.09	0.03
tblVehicleEF	LHD1	0.03	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD1	2.3130e-003	0.00
tblVehicleEF	LHD1	0.14	0.15
tblVehicleEF	LHD1	0.22	0.06
tblVehicleEF	LHD1	0.07	0.10
tblVehicleEF	LHD1	4.3030e-003	4.6080e-003
tblVehicleEF	LHD1	8.8020e-003	9.0980e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.17	0.18
tblVehicleEF	LHD1	0.84	0.90
tblVehicleEF	LHD1	1.03	1.97
tblVehicleEF	LHD1	9.24	9.12
tblVehicleEF	LHD1	755.55	763.19
tblVehicleEF	LHD1	10.09	15.27
tblVehicleEF	LHD1	8.9200e-004	8.2100e-004
tblVehicleEF	LHD1	0.05	0.05
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	1.17	1.08
tblVehicleEF	LHD1	0.29	0.41
tblVehicleEF	LHD1	1.0310e-003	9.2500e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.8020e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.2400e-004	2.0100e-004
tblVehicleEF	LHD1	9.8700e-004	8.8500e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5140e-003	2.4510e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.0600e-004	1.8400e-004

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD1	5.9200e-004	0.11
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.8600e-004	0.00
tblVehicleEF	LHD1	0.11	0.12
tblVehicleEF	LHD1	0.25	0.06
tblVehicleEF	LHD1	0.07	0.10
tblVehicleEF	LHD1	8.9000e-005	8.8000e-005
tblVehicleEF	LHD1	7.3530e-003	7.4270e-003
tblVehicleEF	LHD1	1.0000e-004	1.5100e-004
tblVehicleEF	LHD1	5.9200e-004	0.11
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.8600e-004	0.00
tblVehicleEF	LHD1	0.13	0.14
tblVehicleEF	LHD1	0.25	0.06
tblVehicleEF	LHD1	0.08	0.11
tblVehicleEF	LHD2	2.6620e-003	2.5970e-003
tblVehicleEF	LHD2	6.8360e-003	7.5600e-003
tblVehicleEF	LHD2	6.5040e-003	9.7140e-003
tblVehicleEF	LHD2	0.13	0.13
tblVehicleEF	LHD2	0.66	0.58
tblVehicleEF	LHD2	0.48	0.94
tblVehicleEF	LHD2	14.63	14.60
tblVehicleEF	LHD2	743.33	820.97
tblVehicleEF	LHD2	6.35	7.70
tblVehicleEF	LHD2	1.9270e-003	1.9220e-003
tblVehicleEF	LHD2	0.07	0.09
tblVehicleEF	LHD2	0.01	0.02

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD2	0.11	0.12
tblVehicleEF	LHD2	1.08	1.07
tblVehicleEF	LHD2	0.15	0.19
tblVehicleEF	LHD2	1.5350e-003	1.5290e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.7000e-005	7.3000e-005
tblVehicleEF	LHD2	1.4680e-003	1.4630e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.7330e-003	2.7300e-003
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	8.9000e-005	6.7000e-005
tblVehicleEF	LHD2	7.8200e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.2500e-004	0.00
tblVehicleEF	LHD2	0.12	0.14
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	7.1590e-003	7.8850e-003
tblVehicleEF	LHD2	6.3000e-005	7.6000e-005
tblVehicleEF	LHD2	7.8200e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	4.2500e-004	0.00
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.03	0.05

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD2	2.6700e-003	2.6080e-003
tblVehicleEF	LHD2	6.8870e-003	7.6120e-003
tblVehicleEF	LHD2	6.1330e-003	9.1710e-003
tblVehicleEF	LHD2	0.13	0.13
tblVehicleEF	LHD2	0.66	0.59
tblVehicleEF	LHD2	0.45	0.87
tblVehicleEF	LHD2	14.63	14.60
tblVehicleEF	LHD2	743.34	820.98
tblVehicleEF	LHD2	6.29	7.58
tblVehicleEF	LHD2	1.9290e-003	1.9230e-003
tblVehicleEF	LHD2	0.07	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.11	0.12
tblVehicleEF	LHD2	1.03	1.02
tblVehicleEF	LHD2	0.14	0.18
tblVehicleEF	LHD2	1.5350e-003	1.5290e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.7000e-005	7.3000e-005
tblVehicleEF	LHD2	1.4680e-003	1.4630e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.7330e-003	2.7300e-003
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	8.9000e-005	6.7000e-005
tblVehicleEF	LHD2	1.8070e-003	0.07
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	9.6400e-004	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD2	0.12	0.14
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.03	0.04
tblVehicleEF	LHD2	7.1590e-003	7.8850e-003
tblVehicleEF	LHD2	6.2000e-005	7.5000e-005
tblVehicleEF	LHD2	1.8070e-003	0.07
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	9.6400e-004	0.00
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	2.6540e-003	2.5850e-003
tblVehicleEF	LHD2	6.7800e-003	7.5040e-003
tblVehicleEF	LHD2	6.9320e-003	0.01
tblVehicleEF	LHD2	0.13	0.13
tblVehicleEF	LHD2	0.65	0.57
tblVehicleEF	LHD2	0.53	1.03
tblVehicleEF	LHD2	14.63	14.60
tblVehicleEF	LHD2	743.32	820.95
tblVehicleEF	LHD2	6.43	7.86
tblVehicleEF	LHD2	1.9250e-003	1.9200e-003
tblVehicleEF	LHD2	0.07	0.09
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	0.11	0.12
tblVehicleEF	LHD2	1.10	1.10
tblVehicleEF	LHD2	0.16	0.20
tblVehicleEF	LHD2	1.5350e-003	1.5290e-003
tblVehicleEF	LHD2	0.09	0.09

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.7000e-005	7.3000e-005
tblVehicleEF	LHD2	1.4680e-003	1.4630e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.7330e-003	2.7300e-003
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	8.9000e-005	6.7000e-005
tblVehicleEF	LHD2	2.5600e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	1.3200e-004	0.00
tblVehicleEF	LHD2	0.12	0.14
tblVehicleEF	LHD2	0.08	0.02
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	7.1590e-003	7.8850e-003
tblVehicleEF	LHD2	6.4000e-005	7.8000e-005
tblVehicleEF	LHD2	2.5600e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	1.3200e-004	0.00
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.08	0.02
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	MCY	0.36	0.18
tblVehicleEF	MCY	0.26	0.20
tblVehicleEF	MCY	21.80	14.81
tblVehicleEF	MCY	9.11	8.47
tblVehicleEF	MCY	222.79	192.97

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MCY	61.99	53.02
tblVehicleEF	MCY	0.07	0.04
tblVehicleEF	MCY	0.02	9.0630e-003
tblVehicleEF	MCY	1.20	0.65
tblVehicleEF	MCY	0.27	0.16
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	2.0990e-003	1.8220e-003
tblVehicleEF	MCY	2.9200e-003	3.3960e-003
tblVehicleEF	MCY	5.0400e-003	4.2000e-003
tblVehicleEF	MCY	1.9630e-003	1.7070e-003
tblVehicleEF	MCY	2.7480e-003	3.1970e-003
tblVehicleEF	MCY	1.04	2.43
tblVehicleEF	MCY	0.82	3.58
tblVehicleEF	MCY	0.56	0.00
tblVehicleEF	MCY	2.43	1.23
tblVehicleEF	MCY	0.47	1.36
tblVehicleEF	MCY	1.98	1.52
tblVehicleEF	MCY	2.2050e-003	1.9080e-003
tblVehicleEF	MCY	6.1300e-004	5.2400e-004
tblVehicleEF	MCY	1.04	2.43
tblVehicleEF	MCY	0.82	3.58
tblVehicleEF	MCY	0.56	0.00
tblVehicleEF	MCY	3.00	1.46
tblVehicleEF	MCY	0.47	1.36
tblVehicleEF	MCY	2.16	1.66
tblVehicleEF	MCY	0.35	0.18
tblVehicleEF	MCY	0.22	0.17
tblVehicleEF	MCY	21.23	14.66
tblVehicleEF	MCY	7.93	7.31

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MCY	221.57	192.61
tblVehicleEF	MCY	58.97	50.28
tblVehicleEF	MCY	0.06	0.04
tblVehicleEF	MCY	0.01	8.6480e-003
tblVehicleEF	MCY	1.03	0.56
tblVehicleEF	MCY	0.25	0.14
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	2.0990e-003	1.8220e-003
tblVehicleEF	MCY	2.9200e-003	3.3960e-003
tblVehicleEF	MCY	5.0400e-003	4.2000e-003
tblVehicleEF	MCY	1.9630e-003	1.7070e-003
tblVehicleEF	MCY	2.7480e-003	3.1970e-003
tblVehicleEF	MCY	2.73	3.89
tblVehicleEF	MCY	1.18	3.79
tblVehicleEF	MCY	1.67	0.00
tblVehicleEF	MCY	2.35	1.19
tblVehicleEF	MCY	0.45	1.40
tblVehicleEF	MCY	1.64	1.26
tblVehicleEF	MCY	2.1930e-003	1.9040e-003
tblVehicleEF	MCY	5.8400e-004	4.9700e-004
tblVehicleEF	MCY	2.73	3.89
tblVehicleEF	MCY	1.18	3.79
tblVehicleEF	MCY	1.67	0.00
tblVehicleEF	MCY	2.90	1.42
tblVehicleEF	MCY	0.45	1.40
tblVehicleEF	MCY	1.78	1.36
tblVehicleEF	MCY	0.37	0.19
tblVehicleEF	MCY	0.32	0.25
tblVehicleEF	MCY	24.34	15.83

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MCY	11.05	10.30
tblVehicleEF	MCY	227.35	194.79
tblVehicleEF	MCY	66.65	57.15
tblVehicleEF	MCY	0.07	0.05
tblVehicleEF	MCY	0.02	9.6640e-003
tblVehicleEF	MCY	1.31	0.71
tblVehicleEF	MCY	0.30	0.17
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	2.0990e-003	1.8220e-003
tblVehicleEF	MCY	2.9200e-003	3.3960e-003
tblVehicleEF	MCY	5.0400e-003	4.2000e-003
tblVehicleEF	MCY	1.9630e-003	1.7070e-003
tblVehicleEF	MCY	2.7480e-003	3.1970e-003
tblVehicleEF	MCY	0.18	1.99
tblVehicleEF	MCY	0.87	3.23
tblVehicleEF	MCY	0.11	0.00
tblVehicleEF	MCY	2.58	1.29
tblVehicleEF	MCY	0.56	1.47
tblVehicleEF	MCY	2.46	1.90
tblVehicleEF	MCY	2.2500e-003	1.9260e-003
tblVehicleEF	MCY	6.6000e-004	5.6500e-004
tblVehicleEF	MCY	0.18	1.99
tblVehicleEF	MCY	0.87	3.23
tblVehicleEF	MCY	0.11	0.00
tblVehicleEF	MCY	3.18	1.53
tblVehicleEF	MCY	0.56	1.47
tblVehicleEF	MCY	2.68	2.06
tblVehicleEF	MDV	3.2150e-003	3.3870e-003
tblVehicleEF	MDV	0.07	0.11

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MDV	0.69	0.85
tblVehicleEF	MDV	3.02	4.16
tblVehicleEF	MDV	376.27	417.27
tblVehicleEF	MDV	79.53	106.39
tblVehicleEF	MDV	7.3500e-003	8.2110e-003
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.31	0.46
tblVehicleEF	MDV	0.04	6.5950e-003
tblVehicleEF	MDV	1.4030e-003	1.3070e-003
tblVehicleEF	MDV	1.7530e-003	2.1690e-003
tblVehicleEF	MDV	0.02	2.3080e-003
tblVehicleEF	MDV	1.2940e-003	1.2050e-003
tblVehicleEF	MDV	1.6120e-003	1.9940e-003
tblVehicleEF	MDV	0.08	0.45
tblVehicleEF	MDV	0.16	0.11
tblVehicleEF	MDV	0.08	0.00
tblVehicleEF	MDV	0.01	0.01
tblVehicleEF	MDV	0.07	0.04
tblVehicleEF	MDV	0.37	0.54
tblVehicleEF	MDV	3.7190e-003	4.1220e-003
tblVehicleEF	MDV	7.8700e-004	1.0520e-003
tblVehicleEF	MDV	0.08	0.45
tblVehicleEF	MDV	0.16	0.11
tblVehicleEF	MDV	0.08	0.00
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	0.07	0.04
tblVehicleEF	MDV	0.40	0.60
tblVehicleEF	MDV	3.6710e-003	3.6450e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MDV	0.06	0.09
tblVehicleEF	MDV	0.83	1.15
tblVehicleEF	MDV	2.37	3.27
tblVehicleEF	MDV	396.81	435.09
tblVehicleEF	MDV	78.29	103.57
tblVehicleEF	MDV	6.9040e-003	7.3580e-003
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	0.06	0.08
tblVehicleEF	MDV	0.28	0.41
tblVehicleEF	MDV	0.04	6.5950e-003
tblVehicleEF	MDV	1.4030e-003	1.3070e-003
tblVehicleEF	MDV	1.7530e-003	2.1690e-003
tblVehicleEF	MDV	0.02	2.3080e-003
tblVehicleEF	MDV	1.2940e-003	1.2050e-003
tblVehicleEF	MDV	1.6120e-003	1.9940e-003
tblVehicleEF	MDV	0.19	0.58
tblVehicleEF	MDV	0.17	0.12
tblVehicleEF	MDV	0.17	0.00
tblVehicleEF	MDV	0.01	0.01
tblVehicleEF	MDV	0.06	0.04
tblVehicleEF	MDV	0.30	0.45
tblVehicleEF	MDV	3.9220e-003	4.2990e-003
tblVehicleEF	MDV	7.7500e-004	1.0240e-003
tblVehicleEF	MDV	0.19	0.58
tblVehicleEF	MDV	0.17	0.12
tblVehicleEF	MDV	0.17	0.00
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	0.06	0.04
tblVehicleEF	MDV	0.33	0.49

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MDV	3.0420e-003	3.2440e-003
tblVehicleEF	MDV	0.09	0.13
tblVehicleEF	MDV	0.67	0.80
tblVehicleEF	MDV	3.75	5.18
tblVehicleEF	MDV	372.07	406.21
tblVehicleEF	MDV	80.92	107.27
tblVehicleEF	MDV	7.8440e-003	8.8830e-003
tblVehicleEF	MDV	0.03	0.05
tblVehicleEF	MDV	0.07	0.11
tblVehicleEF	MDV	0.35	0.51
tblVehicleEF	MDV	0.04	6.5950e-003
tblVehicleEF	MDV	1.4030e-003	1.3070e-003
tblVehicleEF	MDV	1.7530e-003	2.1690e-003
tblVehicleEF	MDV	0.02	2.3080e-003
tblVehicleEF	MDV	1.2940e-003	1.2050e-003
tblVehicleEF	MDV	1.6120e-003	1.9940e-003
tblVehicleEF	MDV	0.03	0.42
tblVehicleEF	MDV	0.16	0.10
tblVehicleEF	MDV	0.02	0.00
tblVehicleEF	MDV	0.01	0.01
tblVehicleEF	MDV	0.08	0.04
tblVehicleEF	MDV	0.44	0.65
tblVehicleEF	MDV	3.6780e-003	4.0130e-003
tblVehicleEF	MDV	8.0100e-004	1.0600e-003
tblVehicleEF	MDV	0.03	0.42
tblVehicleEF	MDV	0.16	0.10
tblVehicleEF	MDV	0.02	0.00
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	0.08	0.04

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MDV	0.48	0.71
tblVehicleEF	MH	9.7180e-003	0.01
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.89	0.92
tblVehicleEF	MH	1.95	2.30
tblVehicleEF	MH	1,528.93	1,691.97
tblVehicleEF	MH	17.93	22.23
tblVehicleEF	MH	0.06	0.07
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.62	1.60
tblVehicleEF	MH	0.25	0.32
tblVehicleEF	MH	0.13	0.04
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.2100e-004	2.6200e-004
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	3.2920e-003	3.2950e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.0300e-004	2.4100e-004
tblVehicleEF	MH	0.66	31.79
tblVehicleEF	MH	0.06	7.96
tblVehicleEF	MH	0.25	0.00
tblVehicleEF	MH	0.07	0.07
tblVehicleEF	MH	0.01	1.9600e-003
tblVehicleEF	MH	0.09	0.11
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	1.7700e-004	2.2000e-004
tblVehicleEF	MH	0.66	31.79
tblVehicleEF	MH	0.06	7.96

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MH	0.25	0.00
tblVehicleEF	MH	0.09	0.10
tblVehicleEF	MH	0.01	1.9600e-003
tblVehicleEF	MH	0.10	0.12
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	0.92	0.95
tblVehicleEF	MH	1.76	2.08
tblVehicleEF	MH	1,528.98	1,692.02
tblVehicleEF	MH	17.61	21.85
tblVehicleEF	MH	0.06	0.07
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.53	1.50
tblVehicleEF	MH	0.24	0.30
tblVehicleEF	MH	0.13	0.04
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.2100e-004	2.6200e-004
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	3.2920e-003	3.2950e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.0300e-004	2.4100e-004
tblVehicleEF	MH	1.55	42.60
tblVehicleEF	MH	0.06	8.74
tblVehicleEF	MH	0.58	0.00
tblVehicleEF	MH	0.07	0.08
tblVehicleEF	MH	0.01	2.0200e-003
tblVehicleEF	MH	0.08	0.10
tblVehicleEF	MH	0.02	0.02

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MH	1.7400e-004	2.1600e-004
tblVehicleEF	MH	1.55	42.60
tblVehicleEF	MH	0.06	8.74
tblVehicleEF	MH	0.58	0.00
tblVehicleEF	MH	0.09	0.10
tblVehicleEF	MH	0.01	2.0200e-003
tblVehicleEF	MH	0.09	0.11
tblVehicleEF	MH	9.4290e-003	0.01
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.86	0.89
tblVehicleEF	MH	2.17	2.57
tblVehicleEF	MH	1,528.87	1,691.91
tblVehicleEF	MH	18.31	22.68
tblVehicleEF	MH	0.06	0.07
tblVehicleEF	MH	0.03	0.04
tblVehicleEF	MH	1.67	1.65
tblVehicleEF	MH	0.28	0.35
tblVehicleEF	MH	0.13	0.04
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.2100e-004	2.6200e-004
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	3.2920e-003	3.2950e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.0300e-004	2.4100e-004
tblVehicleEF	MH	0.21	28.39
tblVehicleEF	MH	0.06	7.08
tblVehicleEF	MH	0.08	0.00
tblVehicleEF	MH	0.07	0.07

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MH	0.01	2.0060e-003
tblVehicleEF	MH	0.10	0.11
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	1.8100e-004	2.2400e-004
tblVehicleEF	MH	0.21	28.39
tblVehicleEF	MH	0.06	7.08
tblVehicleEF	MH	0.08	0.00
tblVehicleEF	MH	0.09	0.09
tblVehicleEF	MH	0.01	2.0060e-003
tblVehicleEF	MH	0.11	0.13
tblVehicleEF	MHD	4.0240e-003	0.01
tblVehicleEF	MHD	2.2450e-003	8.7630e-003
tblVehicleEF	MHD	0.01	8.8210e-003
tblVehicleEF	MHD	0.41	0.68
tblVehicleEF	MHD	0.29	0.37
tblVehicleEF	MHD	1.17	1.04
tblVehicleEF	MHD	75.13	165.19
tblVehicleEF	MHD	1,122.68	1,235.68
tblVehicleEF	MHD	10.09	8.51
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.13	0.15
tblVehicleEF	MHD	8.2430e-003	6.1930e-003
tblVehicleEF	MHD	0.45	0.93
tblVehicleEF	MHD	1.52	1.05
tblVehicleEF	MHD	1.66	1.41
tblVehicleEF	MHD	3.9300e-004	1.7480e-003
tblVehicleEF	MHD	0.13	0.05
tblVehicleEF	MHD	7.4700e-003	0.01
tblVehicleEF	MHD	1.2000e-004	9.9000e-005

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MHD	3.7600e-004	1.6720e-003
tblVehicleEF	MHD	0.06	0.02
tblVehicleEF	MHD	7.1380e-003	0.01
tblVehicleEF	MHD	1.1100e-004	9.1000e-005
tblVehicleEF	MHD	4.3800e-004	0.03
tblVehicleEF	MHD	0.02	6.2740e-003
tblVehicleEF	MHD	0.02	0.03
tblVehicleEF	MHD	2.3400e-004	0.00
tblVehicleEF	MHD	0.02	0.04
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.05	0.05
tblVehicleEF	MHD	7.1300e-004	1.5410e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	1.0000e-004	8.4000e-005
tblVehicleEF	MHD	4.3800e-004	0.03
tblVehicleEF	MHD	0.02	6.2740e-003
tblVehicleEF	MHD	0.03	0.04
tblVehicleEF	MHD	2.3400e-004	0.00
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.06	0.05
tblVehicleEF	MHD	3.7880e-003	0.01
tblVehicleEF	MHD	2.3090e-003	8.8550e-003
tblVehicleEF	MHD	9.7330e-003	8.2890e-003
tblVehicleEF	MHD	0.34	0.62
tblVehicleEF	MHD	0.30	0.37
tblVehicleEF	MHD	1.07	0.95
tblVehicleEF	MHD	75.32	164.37
tblVehicleEF	MHD	1,122.69	1,235.69

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MHD	9.92	8.36
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.13	0.15
tblVehicleEF	MHD	7.9270e-003	5.9550e-003
tblVehicleEF	MHD	0.45	0.89
tblVehicleEF	MHD	1.45	0.99
tblVehicleEF	MHD	1.66	1.40
tblVehicleEF	MHD	3.3400e-004	1.4830e-003
tblVehicleEF	MHD	0.13	0.05
tblVehicleEF	MHD	7.4700e-003	0.01
tblVehicleEF	MHD	1.2000e-004	9.9000e-005
tblVehicleEF	MHD	3.2000e-004	1.4180e-003
tblVehicleEF	MHD	0.06	0.02
tblVehicleEF	MHD	7.1380e-003	0.01
tblVehicleEF	MHD	1.1100e-004	9.1000e-005
tblVehicleEF	MHD	1.0370e-003	0.04
tblVehicleEF	MHD	0.02	6.9000e-003
tblVehicleEF	MHD	0.02	0.03
tblVehicleEF	MHD	5.5500e-004	0.00
tblVehicleEF	MHD	0.02	0.04
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.05	0.04
tblVehicleEF	MHD	7.1500e-004	1.5330e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	9.8000e-005	8.3000e-005
tblVehicleEF	MHD	1.0370e-003	0.04
tblVehicleEF	MHD	0.02	6.9000e-003
tblVehicleEF	MHD	0.03	0.04
tblVehicleEF	MHD	5.5500e-004	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.05	0.05
tblVehicleEF	MHD	4.2520e-003	0.01
tblVehicleEF	MHD	2.1780e-003	8.6690e-003
tblVehicleEF	MHD	0.01	9.4290e-003
tblVehicleEF	MHD	0.48	0.75
tblVehicleEF	MHD	0.28	0.36
tblVehicleEF	MHD	1.30	1.16
tblVehicleEF	MHD	75.00	166.42
tblVehicleEF	MHD	1,122.66	1,235.66
tblVehicleEF	MHD	10.30	8.70
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.13	0.15
tblVehicleEF	MHD	8.7060e-003	6.5400e-003
tblVehicleEF	MHD	0.46	0.95
tblVehicleEF	MHD	1.55	1.07
tblVehicleEF	MHD	1.67	1.42
tblVehicleEF	MHD	4.7300e-004	2.1130e-003
tblVehicleEF	MHD	0.13	0.05
tblVehicleEF	MHD	7.4700e-003	0.01
tblVehicleEF	MHD	1.2000e-004	9.9000e-005
tblVehicleEF	MHD	4.5300e-004	2.0220e-003
tblVehicleEF	MHD	0.06	0.02
tblVehicleEF	MHD	7.1380e-003	0.01
tblVehicleEF	MHD	1.1100e-004	9.1000e-005
tblVehicleEF	MHD	1.3500e-004	0.02
tblVehicleEF	MHD	0.02	5.5970e-003
tblVehicleEF	MHD	0.02	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MHD	6.8000e-005	0.00
tblVehicleEF	MHD	0.02	0.03
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.06	0.05
tblVehicleEF	MHD	7.1200e-004	1.5520e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	1.0200e-004	8.6000e-005
tblVehicleEF	MHD	1.3500e-004	0.02
tblVehicleEF	MHD	0.02	5.5970e-003
tblVehicleEF	MHD	0.03	0.04
tblVehicleEF	MHD	6.8000e-005	0.00
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	OBUS	8.1900e-003	0.01
tblVehicleEF	OBUS	4.2030e-003	0.01
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.93	0.83
tblVehicleEF	OBUS	0.48	0.68
tblVehicleEF	OBUS	1.81	2.25
tblVehicleEF	OBUS	149.52	130.05
tblVehicleEF	OBUS	1,350.91	1,634.57
tblVehicleEF	OBUS	15.02	18.99
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.13	0.14
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.65	0.54
tblVehicleEF	OBUS	1.35	1.19
tblVehicleEF	OBUS	1.12	0.93

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	OBUS	2.2400e-004	4.7400e-004
tblVehicleEF	OBUS	0.13	0.05
tblVehicleEF	OBUS	9.4470e-003	0.02
tblVehicleEF	OBUS	1.4200e-004	1.6100e-004
tblVehicleEF	OBUS	2.1400e-004	4.5400e-004
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	9.0260e-003	0.02
tblVehicleEF	OBUS	1.3000e-004	1.4800e-004
tblVehicleEF	OBUS	1.3920e-003	0.09
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.07	0.07
tblVehicleEF	OBUS	6.1700e-004	0.00
tblVehicleEF	OBUS	0.03	0.06
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.09	0.11
tblVehicleEF	OBUS	1.4170e-003	1.2300e-003
tblVehicleEF	OBUS	0.01	0.02
tblVehicleEF	OBUS	1.4900e-004	1.8800e-004
tblVehicleEF	OBUS	1.3920e-003	0.09
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.09	0.09
tblVehicleEF	OBUS	6.1700e-004	0.00
tblVehicleEF	OBUS	0.04	0.08
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.10	0.12
tblVehicleEF	OBUS	8.3480e-003	0.01
tblVehicleEF	OBUS	4.3520e-003	0.01
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.92	0.82

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	OBUS	0.50	0.70
tblVehicleEF	OBUS	1.64	2.04
tblVehicleEF	OBUS	147.67	128.67
tblVehicleEF	OBUS	1,350.93	1,634.61
tblVehicleEF	OBUS	14.73	18.62
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.13	0.14
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.62	0.52
tblVehicleEF	OBUS	1.29	1.13
tblVehicleEF	OBUS	1.11	0.91
tblVehicleEF	OBUS	1.9900e-004	4.0900e-004
tblVehicleEF	OBUS	0.13	0.05
tblVehicleEF	OBUS	9.4470e-003	0.02
tblVehicleEF	OBUS	1.4200e-004	1.6100e-004
tblVehicleEF	OBUS	1.9000e-004	3.9100e-004
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	9.0260e-003	0.02
tblVehicleEF	OBUS	1.3000e-004	1.4800e-004
tblVehicleEF	OBUS	3.1410e-003	0.13
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.07	0.07
tblVehicleEF	OBUS	1.3670e-003	0.00
tblVehicleEF	OBUS	0.03	0.06
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.08	0.10
tblVehicleEF	OBUS	1.4000e-003	1.2170e-003
tblVehicleEF	OBUS	0.01	0.02
tblVehicleEF	OBUS	1.4600e-004	1.8400e-004

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	OBUS	3.1410e-003	0.13
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.09	0.09
tblVehicleEF	OBUS	1.3670e-003	0.00
tblVehicleEF	OBUS	0.04	0.09
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.09	0.11
tblVehicleEF	OBUS	7.9790e-003	0.01
tblVehicleEF	OBUS	4.0530e-003	0.01
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.95	0.85
tblVehicleEF	OBUS	0.47	0.66
tblVehicleEF	OBUS	2.02	2.51
tblVehicleEF	OBUS	152.08	131.95
tblVehicleEF	OBUS	1,350.88	1,634.54
tblVehicleEF	OBUS	15.37	19.42
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.13	0.14
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.69	0.57
tblVehicleEF	OBUS	1.38	1.22
tblVehicleEF	OBUS	1.13	0.95
tblVehicleEF	OBUS	2.5800e-004	5.6500e-004
tblVehicleEF	OBUS	0.13	0.05
tblVehicleEF	OBUS	9.4470e-003	0.02
tblVehicleEF	OBUS	1.4200e-004	1.6100e-004
tblVehicleEF	OBUS	2.4700e-004	5.4000e-004
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	9.0260e-003	0.02

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	OBUS	1.3000e-004	1.4800e-004
tblVehicleEF	OBUS	5.1500e-004	0.08
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.07	0.06
tblVehicleEF	OBUS	2.1100e-004	0.00
tblVehicleEF	OBUS	0.03	0.06
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.09	0.12
tblVehicleEF	OBUS	1.4420e-003	1.2480e-003
tblVehicleEF	OBUS	0.01	0.02
tblVehicleEF	OBUS	1.5200e-004	1.9200e-004
tblVehicleEF	OBUS	5.1500e-004	0.08
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.08	0.08
tblVehicleEF	OBUS	2.1100e-004	0.00
tblVehicleEF	OBUS	0.04	0.08
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.10	0.13
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.4590e-003	0.07
tblVehicleEF	SBUS	3.1480e-003	2.6400e-003
tblVehicleEF	SBUS	1.58	0.85
tblVehicleEF	SBUS	0.50	1.06
tblVehicleEF	SBUS	0.50	0.41
tblVehicleEF	SBUS	328.90	170.78
tblVehicleEF	SBUS	1,038.46	1,070.29
tblVehicleEF	SBUS	2.48	1.78
tblVehicleEF	SBUS	0.05	0.02
tblVehicleEF	SBUS	0.14	0.15

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	SBUS	2.5140e-003	1.4920e-003
tblVehicleEF	SBUS	3.44	1.60
tblVehicleEF	SBUS	4.93	3.73
tblVehicleEF	SBUS	0.95	0.42
tblVehicleEF	SBUS	3.5330e-003	1.6290e-003
tblVehicleEF	SBUS	0.74	0.04
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.7000e-005	2.2000e-005
tblVehicleEF	SBUS	3.3800e-003	1.5580e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.7770e-003	2.7840e-003
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.4000e-005	2.0000e-005
tblVehicleEF	SBUS	5.1900e-004	0.03
tblVehicleEF	SBUS	4.8580e-003	6.3000e-003
tblVehicleEF	SBUS	0.16	0.08
tblVehicleEF	SBUS	1.8100e-004	0.00
tblVehicleEF	SBUS	0.09	0.08
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.02
tblVehicleEF	SBUS	3.1210e-003	1.5650e-003
tblVehicleEF	SBUS	9.8910e-003	9.9740e-003
tblVehicleEF	SBUS	2.5000e-005	1.8000e-005
tblVehicleEF	SBUS	5.1900e-004	0.03
tblVehicleEF	SBUS	4.8580e-003	6.3000e-003
tblVehicleEF	SBUS	0.22	0.14
tblVehicleEF	SBUS	1.8100e-004	0.00
tblVehicleEF	SBUS	0.10	0.17

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.02
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.5630e-003	0.07
tblVehicleEF	SBUS	2.6100e-003	2.1960e-003
tblVehicleEF	SBUS	1.55	0.83
tblVehicleEF	SBUS	0.51	1.08
tblVehicleEF	SBUS	0.36	0.29
tblVehicleEF	SBUS	337.22	174.74
tblVehicleEF	SBUS	1,038.48	1,070.32
tblVehicleEF	SBUS	2.25	1.59
tblVehicleEF	SBUS	0.05	0.03
tblVehicleEF	SBUS	0.14	0.15
tblVehicleEF	SBUS	2.3960e-003	1.4210e-003
tblVehicleEF	SBUS	3.52	1.62
tblVehicleEF	SBUS	4.70	3.56
tblVehicleEF	SBUS	0.95	0.42
tblVehicleEF	SBUS	2.9860e-003	1.3810e-003
tblVehicleEF	SBUS	0.74	0.04
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.7000e-005	2.2000e-005
tblVehicleEF	SBUS	2.8570e-003	1.3210e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.7770e-003	2.7840e-003
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.4000e-005	2.0000e-005
tblVehicleEF	SBUS	1.2390e-003	0.04
tblVehicleEF	SBUS	5.3210e-003	6.9580e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	SBUS	0.16	0.08
tblVehicleEF	SBUS	4.5100e-004	0.00
tblVehicleEF	SBUS	0.09	0.08
tblVehicleEF	SBUS	9.0710e-003	0.01
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	3.2000e-003	1.6020e-003
tblVehicleEF	SBUS	9.8920e-003	9.9750e-003
tblVehicleEF	SBUS	2.2000e-005	1.6000e-005
tblVehicleEF	SBUS	1.2390e-003	0.04
tblVehicleEF	SBUS	5.3210e-003	6.9580e-003
tblVehicleEF	SBUS	0.22	0.14
tblVehicleEF	SBUS	4.5100e-004	0.00
tblVehicleEF	SBUS	0.10	0.17
tblVehicleEF	SBUS	9.0710e-003	0.01
tblVehicleEF	SBUS	0.02	0.01
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.3520e-003	0.07
tblVehicleEF	SBUS	3.7300e-003	3.1180e-003
tblVehicleEF	SBUS	1.63	0.88
tblVehicleEF	SBUS	0.49	1.04
tblVehicleEF	SBUS	0.68	0.55
tblVehicleEF	SBUS	317.41	165.32
tblVehicleEF	SBUS	1,038.44	1,070.25
tblVehicleEF	SBUS	2.77	2.01
tblVehicleEF	SBUS	0.05	0.02
tblVehicleEF	SBUS	0.14	0.15
tblVehicleEF	SBUS	2.6650e-003	1.5820e-003
tblVehicleEF	SBUS	3.35	1.55
tblVehicleEF	SBUS	5.02	3.81

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	SBUS	0.95	0.43
tblVehicleEF	SBUS	4.2870e-003	1.9710e-003
tblVehicleEF	SBUS	0.74	0.04
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.7000e-005	2.2000e-005
tblVehicleEF	SBUS	4.1020e-003	1.8850e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.7770e-003	2.7840e-003
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.4000e-005	2.0000e-005
tblVehicleEF	SBUS	1.4800e-004	0.02
tblVehicleEF	SBUS	4.9080e-003	5.6280e-003
tblVehicleEF	SBUS	0.16	0.08
tblVehicleEF	SBUS	5.9000e-005	0.00
tblVehicleEF	SBUS	0.09	0.08
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.02
tblVehicleEF	SBUS	3.0130e-003	1.5130e-003
tblVehicleEF	SBUS	9.8910e-003	9.9740e-003
tblVehicleEF	SBUS	2.7000e-005	2.0000e-005
tblVehicleEF	SBUS	1.4800e-004	0.02
tblVehicleEF	SBUS	4.9080e-003	5.6280e-003
tblVehicleEF	SBUS	0.22	0.14
tblVehicleEF	SBUS	5.9000e-005	0.00
tblVehicleEF	SBUS	0.10	0.17
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.02
tblVehicleEF	UBUS	1.13	0.98

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	UBUS	0.03	0.02
tblVehicleEF	UBUS	8.40	11.85
tblVehicleEF	UBUS	1.64	1.98
tblVehicleEF	UBUS	1,550.86	1,179.65
tblVehicleEF	UBUS	17.95	18.09
tblVehicleEF	UBUS	0.21	0.18
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.60	0.26
tblVehicleEF	UBUS	0.19	0.17
tblVehicleEF	UBUS	0.09	0.11
tblVehicleEF	UBUS	0.03	0.03
tblVehicleEF	UBUS	4.5070e-003	3.6910e-003
tblVehicleEF	UBUS	1.2800e-004	1.3400e-004
tblVehicleEF	UBUS	0.04	0.04
tblVehicleEF	UBUS	6.5920e-003	6.8280e-003
tblVehicleEF	UBUS	4.3010e-003	3.5250e-003
tblVehicleEF	UBUS	1.1700e-004	1.2300e-004
tblVehicleEF	UBUS	1.3120e-003	0.03
tblVehicleEF	UBUS	0.02	9.5940e-003
tblVehicleEF	UBUS	8.0200e-004	0.00
tblVehicleEF	UBUS	0.02	0.05
tblVehicleEF	UBUS	4.6980e-003	1.0410e-003
tblVehicleEF	UBUS	0.11	0.08
tblVehicleEF	UBUS	0.01	6.8920e-003
tblVehicleEF	UBUS	1.7800e-004	1.7900e-004
tblVehicleEF	UBUS	1.3120e-003	0.03
tblVehicleEF	UBUS	0.02	9.5940e-003
tblVehicleEF	UBUS	8.0200e-004	0.00
tblVehicleEF	UBUS	1.16	1.04

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	UBUS	4.6980e-003	1.0410e-003
tblVehicleEF	UBUS	0.12	0.09
tblVehicleEF	UBUS	1.13	0.98
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	8.40	11.85
tblVehicleEF	UBUS	1.32	1.62
tblVehicleEF	UBUS	1,550.87	1,179.65
tblVehicleEF	UBUS	17.40	17.49
tblVehicleEF	UBUS	0.21	0.18
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.60	0.26
tblVehicleEF	UBUS	0.17	0.16
tblVehicleEF	UBUS	0.09	0.11
tblVehicleEF	UBUS	0.03	0.03
tblVehicleEF	UBUS	4.5070e-003	3.6910e-003
tblVehicleEF	UBUS	1.2800e-004	1.3400e-004
tblVehicleEF	UBUS	0.04	0.04
tblVehicleEF	UBUS	6.5920e-003	6.8280e-003
tblVehicleEF	UBUS	4.3010e-003	3.5250e-003
tblVehicleEF	UBUS	1.1700e-004	1.2300e-004
tblVehicleEF	UBUS	3.0120e-003	0.05
tblVehicleEF	UBUS	0.02	0.01
tblVehicleEF	UBUS	1.7820e-003	0.00
tblVehicleEF	UBUS	0.02	0.05
tblVehicleEF	UBUS	4.2890e-003	1.0790e-003
tblVehicleEF	UBUS	0.10	0.07
tblVehicleEF	UBUS	0.01	6.8920e-003
tblVehicleEF	UBUS	1.7200e-004	1.7300e-004
tblVehicleEF	UBUS	3.0120e-003	0.05

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	UBUS	0.02	0.01
tblVehicleEF	UBUS	1.7820e-003	0.00
tblVehicleEF	UBUS	1.16	1.04
tblVehicleEF	UBUS	4.2890e-003	1.0790e-003
tblVehicleEF	UBUS	0.10	0.08
tblVehicleEF	UBUS	1.13	0.98
tblVehicleEF	UBUS	0.03	0.02
tblVehicleEF	UBUS	8.40	11.85
tblVehicleEF	UBUS	2.04	2.43
tblVehicleEF	UBUS	1,550.86	1,179.65
tblVehicleEF	UBUS	18.64	18.83
tblVehicleEF	UBUS	0.21	0.18
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.61	0.26
tblVehicleEF	UBUS	0.20	0.18
tblVehicleEF	UBUS	0.09	0.11
tblVehicleEF	UBUS	0.03	0.03
tblVehicleEF	UBUS	4.5070e-003	3.6910e-003
tblVehicleEF	UBUS	1.2800e-004	1.3400e-004
tblVehicleEF	UBUS	0.04	0.04
tblVehicleEF	UBUS	6.5920e-003	6.8280e-003
tblVehicleEF	UBUS	4.3010e-003	3.5250e-003
tblVehicleEF	UBUS	1.1700e-004	1.2300e-004
tblVehicleEF	UBUS	5.2000e-004	0.02
tblVehicleEF	UBUS	0.02	8.5770e-003
tblVehicleEF	UBUS	2.9600e-004	0.00
tblVehicleEF	UBUS	0.02	0.05
tblVehicleEF	UBUS	5.9740e-003	1.0770e-003
tblVehicleEF	UBUS	0.12	0.09

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	UBUS	0.01	6.8920e-003
tblVehicleEF	UBUS	1.8400e-004	1.8600e-004
tblVehicleEF	UBUS	5.2000e-004	0.02
tblVehicleEF	UBUS	0.02	8.5770e-003
tblVehicleEF	UBUS	2.9600e-004	0.00
tblVehicleEF	UBUS	1.16	1.04
tblVehicleEF	UBUS	5.9740e-003	1.0770e-003
tblVehicleEF	UBUS	0.13	0.10
tblWoodstoves	NumberCatalytic	2.85	0.00
tblWoodstoves	NumberNoncatalytic	2.85	0.00
tblWoodstoves	WoodstoveWoodMass	3,120.00	0.00

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

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	tons/yr										MT/yr					
2023	0.1667	1.6519	1.4922	3.0600e-003	0.4187	0.0729	0.4916	0.1866	0.0674	0.2539	0.0000	268.9876	268.9876	0.0797	9.6000e-004	271.2674
2024	0.2079	1.8374	2.2456	4.1800e-003	0.0380	0.0810	0.1190	0.0106	0.0762	0.0867	0.0000	364.3141	364.3141	0.0729	5.0700e-003	367.6474
2025	0.9283	1.1028	1.4454	2.7000e-003	0.0249	0.0451	0.0700	6.9200e-003	0.0425	0.0494	0.0000	235.1470	235.1470	0.0461	3.1500e-003	237.2380
Maximum	**0.9283**	**1.8374**	**2.2456**	**4.1800e-003**	**0.4187**	**0.0810**	**0.4916**	**0.1866**	**0.0762**	**0.2539**	**0.0000**	**364.3141**	**364.3141**	**0.0797**	**5.0700e-003**	**367.6474**

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	tons/yr										MT/yr					
2023	0.1667	1.6519	1.4922	3.0600e-003	0.1686	0.0729	0.2416	0.0742	0.0674	0.1416	0.0000	268.9873	268.9873	0.0797	9.6000e-004	271.2671
2024	0.2079	1.8374	2.2456	4.1800e-003	0.0380	0.0810	0.1190	0.0106	0.0762	0.0867	0.0000	364.3137	364.3137	0.0729	5.0700e-003	367.6471
2025	0.9283	1.1028	1.4454	2.7000e-003	0.0249	0.0451	0.0700	6.9200e-003	0.0425	0.0494	0.0000	235.1468	235.1468	0.0461	3.1500e-003	237.2377
Maximum	**0.9283**	**1.8374**	**2.2456**	**4.1800e-003**	**0.1686**	**0.0810**	**0.2416**	**0.0742**	**0.0762**	**0.1416**	**0.0000**	**364.3137**	**364.3137**	**0.0797**	**5.0700e-003**	**367.6471**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	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**	**51.92**	**0.00**	**36.74**	**55.05**	**0.00**	**28.80**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**2-1-2023**	**4-30-2023**	0.9224	0.9224
2	**5-1-2023**	**7-31-2023**	0.7923	0.7923
3	**8-1-2023**	**10-31-2023**	0.0040	0.0040
4	**11-1-2023**	**1-31-2024**	0.2805	0.2805
5	**2-1-2024**	**4-30-2024**	0.5022	0.5022
6	**5-1-2024**	**7-31-2024**	0.5124	0.5124
7	**8-1-2024**	**10-31-2024**	0.5129	0.5129
8	**11-1-2024**	**1-31-2025**	0.5018	0.5018
9	**2-1-2025**	**4-30-2025**	0.4618	0.4618
10	**5-1-2025**	**7-31-2025**	1.1845	1.1845
11	**8-1-2025**	**9-30-2025**	0.2216	0.2216
		Highest	1.1845	1.1845

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	tons/yr										MT/yr					
Area	0.8308	0.0625	0.8681	3.8000e-004		8.9600e-003	8.9600e-003		8.9600e-003	8.9600e-003	0.0000	62.4413	62.4413	2.4900e-003	1.1200e-003	62.8372
Energy	0.0164	0.1399	0.0595	8.9000e-004		0.0113	0.0113		0.0113	0.0113	0.0000	257.5924	257.5924	0.0165	4.5900e-003	259.3721
Mobile	0.4371	0.8947	3.8073	0.0125	0.7108	0.0122	0.7230	0.1788	0.0115	0.1904	0.0000	1,164.2059	1,164.2059	0.0477	0.0773	1,188.4193
Waste						0.0000	0.0000		0.0000	0.0000	27.7935	0.0000	27.7935	1.6426	0.0000	68.8573
Water						0.0000	0.0000		0.0000	0.0000	2.3564	6.0567	8.4131	0.2429	5.8200e-003	16.2186
Total	**1.2843**	**1.0970**	**4.7349**	**0.0138**	**0.7108**	**0.0325**	**0.7433**	**0.1788**	**0.0318**	**0.2106**	**30.1499**	**1,490.2963**	**1,520.4462**	**1.9521**	**0.0888**	**1,595.7045**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	tons/yr										MT/yr					
Area	0.8308	0.0625	0.8681	3.8000e-004		8.9600e-003	8.9600e-003		8.9600e-003	8.9600e-003	0.0000	62.4413	62.4413	2.4900e-003	1.1200e-003	62.8372
Energy	0.0164	0.1399	0.0595	8.9000e-004		0.0113	0.0113		0.0113	0.0113	0.0000	257.5924	257.5924	0.0165	4.5900e-003	259.3721
Mobile	0.4365	0.8887	3.7842	0.0124	0.7037	0.0121	0.7158	0.1770	0.0114	0.1885	0.0000	1,153.0293	1,153.0293	0.0475	0.0766	1,177.0550
Waste						0.0000	0.0000		0.0000	0.0000	13.8968	0.0000	13.8968	0.8213	0.0000	34.4286
Water						0.0000	0.0000		0.0000	0.0000	2.3564	5.7058	8.0623	0.2428	5.8100e-003	15.8647
Total	**1.2837**	**1.0911**	**4.7119**	**0.0136**	**0.7037**	**0.0324**	**0.7361**	**0.1770**	**0.0317**	**0.2087**	**16.2532**	**1,478.7689**	**1,495.0220**	**1.1306**	**0.0882**	**1,549.5577**

	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	**0.05**	**0.54**	**0.49**	**0.87**	**1.00**	**0.34**	**0.97**	**1.00**	**0.35**	**0.90**	**46.09**	**0.77**	**1.67**	**42.08**	**0.70**	**2.89**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	70.8000
Total	**70.8000**

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	2/1/2023	3/14/2023	5	30	
2	Site Preparation	Site Preparation	3/15/2023	4/11/2023	5	20	
3	Grading	Grading	4/12/2023	6/13/2023	5	45	
4	Paving	Paving	6/14/2023	8/1/2023	5	35	
5	Building Construction	Building Construction	12/14/2023	8/20/2025	5	440	
6	Architectural Coating	Architectural Coating	6/20/2025	8/7/2025	5	35	

Acres of Grading (Site Preparation Phase): 30

Acres of Grading (Grading Phase): 135

Acres of Paving: 0

Residential Indoor: 415,530; Residential Outdoor: 138,510; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

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	6	15.00	0.00	57.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	62.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Paving	6	15.00	0.00	0.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	41.00	12.00	0.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	8.00	0.00	0.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2023

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	tons/yr										MT/yr					
Fugitive Dust					6.1800e-003	0.0000	6.1800e-003	9.4000e-004	0.0000	9.4000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0340	0.3223	0.2947	5.8000e-004		0.0150	0.0150		0.0139	0.0139	0.0000	50.9881	50.9881	0.0143	0.0000	51.3451
Total	**0.0340**	**0.3223**	**0.2947**	**5.8000e-004**	**6.1800e-003**	**0.0150**	**0.0211**	**9.4000e-004**	**0.0139**	**0.0149**	**0.0000**	**50.9881**	**50.9881**	**0.0143**	**0.0000**	**51.3451**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

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	tons/yr										MT/yr					
Hauling	6.0000e-005	3.6500e-003	8.2000e-004	2.0000e-005	3.8000e-004	3.0000e-005	4.2000e-004	1.1000e-004	3.0000e-005	1.4000e-004	0.0000	1.6273	1.6273	1.0000e-005	2.6000e-004	1.7038
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	0.0000	0.0000
Worker	6.0000e-004	4.0000e-004	4.6900e-003	1.0000e-005	1.2600e-003	1.0000e-005	1.2700e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.3386	1.3386	4.0000e-005	4.0000e-005	1.3511
Total	**6.6000e-004**	**4.0500e-003**	**5.5100e-003**	**3.0000e-005**	**1.6400e-003**	**4.0000e-005**	**1.6900e-003**	**4.5000e-004**	**4.0000e-005**	**4.9000e-004**	**0.0000**	**2.9659**	**2.9659**	**5.0000e-005**	**3.0000e-004**	**3.0549**

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	tons/yr										MT/yr					
Fugitive Dust					2.4100e-003	0.0000	2.4100e-003	3.7000e-004	0.0000	3.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0340	0.3223	0.2947	5.8000e-004		0.0150	0.0150		0.0139	0.0139	0.0000	50.9880	50.9880	0.0143	0.0000	51.3450
Total	**0.0340**	**0.3223**	**0.2947**	**5.8000e-004**	**2.4100e-003**	**0.0150**	**0.0174**	**3.7000e-004**	**0.0139**	**0.0143**	**0.0000**	**50.9880**	**50.9880**	**0.0143**	**0.0000**	**51.3450**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

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	tons/yr										MT/yr					
Hauling	6.0000e-005	3.6500e-003	8.2000e-004	2.0000e-005	3.8000e-004	3.0000e-005	4.2000e-004	1.1000e-004	3.0000e-005	1.4000e-004	0.0000	1.6273	1.6273	1.0000e-005	2.6000e-004	1.7038
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	0.0000	0.0000
Worker	6.0000e-004	4.0000e-004	4.6900e-003	1.0000e-005	1.2600e-003	1.0000e-005	1.2700e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.3386	1.3386	4.0000e-005	4.0000e-005	1.3511
Total	**6.6000e-004**	**4.0500e-003**	**5.5100e-003**	**3.0000e-005**	**1.6400e-003**	**4.0000e-005**	**1.6900e-003**	**4.5000e-004**	**4.0000e-005**	**4.9000e-004**	**0.0000**	**2.9659**	**2.9659**	**5.0000e-005**	**3.0000e-004**	**3.0549**

3.3 Site Preparation - 2023

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	tons/yr										MT/yr					
Fugitive Dust					0.1966	0.0000	0.1966	0.1010	0.0000	0.1010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0266	0.2752	0.1824	3.8000e-004		0.0127	0.0127		0.0117	0.0117	0.0000	33.4507	33.4507	0.0108	0.0000	33.7212
Total	**0.0266**	**0.2752**	**0.1824**	**3.8000e-004**	**0.1966**	**0.0127**	**0.2092**	**0.1010**	**0.0117**	**0.1127**	**0.0000**	**33.4507**	**33.4507**	**0.0108**	**0.0000**	**33.7212**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	4.8000e-004	3.2000e-004	3.7500e-003	1.0000e-005	1.0100e-003	1.0000e-005	1.0100e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	1.0709	1.0709	3.0000e-005	3.0000e-005	1.0809
Total	**4.8000e-004**	**3.2000e-004**	**3.7500e-003**	**1.0000e-005**	**1.0100e-003**	**1.0000e-005**	**1.0100e-003**	**2.7000e-004**	**1.0000e-005**	**2.8000e-004**	**0.0000**	**1.0709**	**1.0709**	**3.0000e-005**	**3.0000e-005**	**1.0809**

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	tons/yr										MT/yr					
Fugitive Dust					0.0767	0.0000	0.0767	0.0394	0.0000	0.0394	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0266	0.2752	0.1824	3.8000e-004		0.0127	0.0127		0.0117	0.0117	0.0000	33.4507	33.4507	0.0108	0.0000	33.7211
Total	**0.0266**	**0.2752**	**0.1824**	**3.8000e-004**	**0.0767**	**0.0127**	**0.0893**	**0.0394**	**0.0117**	**0.0511**	**0.0000**	**33.4507**	**33.4507**	**0.0108**	**0.0000**	**33.7211**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	4.8000e-004	3.2000e-004	3.7500e-003	1.0000e-005	1.0100e-003	1.0000e-005	1.0100e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	1.0709	1.0709	3.0000e-005	3.0000e-005	1.0809
Total	**4.8000e-004**	**3.2000e-004**	**3.7500e-003**	**1.0000e-005**	**1.0100e-003**	**1.0000e-005**	**1.0100e-003**	**2.7000e-004**	**1.0000e-005**	**2.8000e-004**	**0.0000**	**1.0709**	**1.0709**	**3.0000e-005**	**3.0000e-005**	**1.0809**

3.4 Grading - 2023

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	tons/yr										MT/yr					
Fugitive Dust					0.2071	0.0000	0.2071	0.0822	0.0000	0.0822	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0747	0.7766	0.6312	1.4000e-003		0.0321	0.0321		0.0295	0.0295	0.0000	122.7042	122.7042	0.0397	0.0000	123.6964
Total	**0.0747**	**0.7766**	**0.6312**	**1.4000e-003**	**0.2071**	**0.0321**	**0.2392**	**0.0822**	**0.0295**	**0.1117**	**0.0000**	**122.7042**	**122.7042**	**0.0397**	**0.0000**	**123.6964**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

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	tons/yr										MT/yr					
Hauling	7.0000e-005	3.9700e-003	8.9000e-004	2.0000e-005	4.2000e-004	4.0000e-005	4.5000e-004	1.2000e-004	3.0000e-005	1.5000e-004	0.0000	1.7700	1.7700	1.0000e-005	2.8000e-004	1.8533
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	0.0000	0.0000
Worker	1.1900e-003	8.0000e-004	9.3900e-003	3.0000e-005	2.5200e-003	2.0000e-005	2.5300e-003	6.9000e-004	2.0000e-005	7.0000e-004	0.0000	2.6772	2.6772	8.0000e-005	8.0000e-005	2.7022
Total	**1.2600e-003**	**4.7700e-003**	**0.0103**	**5.0000e-005**	**2.9400e-003**	**6.0000e-005**	**2.9800e-003**	**8.1000e-004**	**5.0000e-005**	**8.5000e-004**	**0.0000**	**4.4473**	**4.4473**	**9.0000e-005**	**3.6000e-004**	**4.5555**

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	tons/yr										MT/yr					
Fugitive Dust					0.0808	0.0000	0.0808	0.0321	0.0000	0.0321	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0747	0.7766	0.6312	1.4000e-003		0.0321	0.0321		0.0295	0.0295	0.0000	122.7041	122.7041	0.0397	0.0000	123.6962
Total	**0.0747**	**0.7766**	**0.6312**	**1.4000e-003**	**0.0808**	**0.0321**	**0.1128**	**0.0321**	**0.0295**	**0.0616**	**0.0000**	**122.7041**	**122.7041**	**0.0397**	**0.0000**	**123.6962**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

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	tons/yr										MT/yr					
Hauling	7.0000e-005	3.9700e-003	8.9000e-004	2.0000e-005	4.2000e-004	4.0000e-005	4.5000e-004	1.2000e-004	3.0000e-005	1.5000e-004	0.0000	1.7700	1.7700	1.0000e-005	2.8000e-004	1.8533
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	0.0000	0.0000
Worker	1.1900e-003	8.0000e-004	9.3900e-003	3.0000e-005	2.5200e-003	2.0000e-005	2.5300e-003	6.9000e-004	2.0000e-005	7.0000e-004	0.0000	2.6772	2.6772	8.0000e-005	8.0000e-005	2.7022
Total	**1.2600e-003**	**4.7700e-003**	**0.0103**	**5.0000e-005**	**2.9400e-003**	**6.0000e-005**	**2.9800e-003**	**8.1000e-004**	**5.0000e-005**	**8.5000e-004**	**0.0000**	**4.4473**	**4.4473**	**9.0000e-005**	**3.6000e-004**	**4.5555**

3.5 Paving - 2023

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	tons/yr										MT/yr					
Off-Road	0.0181	0.1784	0.2552	4.0000e-004		8.9300e-003	8.9300e-003		8.2100e-003	8.2100e-003	0.0000	35.0470	35.0470	0.0113	0.0000	35.3304
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0181**	**0.1784**	**0.2552**	**4.0000e-004**		**8.9300e-003**	**8.9300e-003**		**8.2100e-003**	**8.2100e-003**	**0.0000**	**35.0470**	**35.0470**	**0.0113**	**0.0000**	**35.3304**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Paving - 2023

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	7.0000e-004	4.7000e-004	5.4800e-003	2.0000e-005	1.4700e-003	1.0000e-005	1.4800e-003	4.0000e-004	1.0000e-005	4.1000e-004	0.0000	1.5617	1.5617	5.0000e-005	4.0000e-005	1.5763
Total	**7.0000e-004**	**4.7000e-004**	**5.4800e-003**	**2.0000e-005**	**1.4700e-003**	**1.0000e-005**	**1.4800e-003**	**4.0000e-004**	**1.0000e-005**	**4.1000e-004**	**0.0000**	**1.5617**	**1.5617**	**5.0000e-005**	**4.0000e-005**	**1.5763**

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	tons/yr										MT/yr					
Off-Road	0.0181	0.1784	0.2552	4.0000e-004		8.9300e-003	8.9300e-003		8.2100e-003	8.2100e-003	0.0000	35.0470	35.0470	0.0113	0.0000	35.3304
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0181**	**0.1784**	**0.2552**	**4.0000e-004**		**8.9300e-003**	**8.9300e-003**		**8.2100e-003**	**8.2100e-003**	**0.0000**	**35.0470**	**35.0470**	**0.0113**	**0.0000**	**35.3304**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Paving - 2023

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	7.0000e-004	4.7000e-004	5.4800e-003	2.0000e-005	1.4700e-003	1.0000e-005	1.4800e-003	4.0000e-004	1.0000e-005	4.1000e-004	0.0000	1.5617	1.5617	5.0000e-005	4.0000e-005	1.5763
Total	**7.0000e-004**	**4.7000e-004**	**5.4800e-003**	**2.0000e-005**	**1.4700e-003**	**1.0000e-005**	**1.4800e-003**	**4.0000e-004**	**1.0000e-005**	**4.1000e-004**	**0.0000**	**1.5617**	**1.5617**	**5.0000e-005**	**4.0000e-005**	**1.5763**

3.6 Building Construction - 2023

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	tons/yr										MT/yr					
Off-Road	9.4400e-003	0.0863	0.0975	1.6000e-004		4.2000e-003	4.2000e-003		3.9500e-003	3.9500e-003	0.0000	13.9083	13.9083	3.3100e-003	0.0000	13.9910
Total	**9.4400e-003**	**0.0863**	**0.0975**	**1.6000e-004**		**4.2000e-003**	**4.2000e-003**		**3.9500e-003**	**3.9500e-003**	**0.0000**	**13.9083**	**13.9083**	**3.3100e-003**	**0.0000**	**13.9910**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2023

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	tons/yr										MT/yr					
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	0.0000	0.0000
Vendor	9.0000e-005	3.1100e-003	1.1200e-003	1.0000e-005	3.7000e-004	2.0000e-005	3.9000e-004	1.1000e-004	2.0000e-005	1.3000e-004	0.0000	1.3799	1.3799	1.0000e-005	2.0000e-004	1.4387
Worker	6.5000e-004	4.4000e-004	5.1300e-003	2.0000e-005	1.3800e-003	1.0000e-005	1.3900e-003	3.7000e-004	1.0000e-005	3.8000e-004	0.0000	1.4636	1.4636	5.0000e-005	4.0000e-005	1.4772
Total	**7.4000e-004**	**3.5500e-003**	**6.2500e-003**	**3.0000e-005**	**1.7500e-003**	**3.0000e-005**	**1.7800e-003**	**4.8000e-004**	**3.0000e-005**	**5.1000e-004**	**0.0000**	**2.8435**	**2.8435**	**6.0000e-005**	**2.4000e-004**	**2.9159**

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	tons/yr										MT/yr					
Off-Road	9.4400e-003	0.0863	0.0975	1.6000e-004		4.2000e-003	4.2000e-003		3.9500e-003	3.9500e-003	0.0000	13.9083	13.9083	3.3100e-003	0.0000	13.9910
Total	**9.4400e-003**	**0.0863**	**0.0975**	**1.6000e-004**		**4.2000e-003**	**4.2000e-003**		**3.9500e-003**	**3.9500e-003**	**0.0000**	**13.9083**	**13.9083**	**3.3100e-003**	**0.0000**	**13.9910**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2023

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	tons/yr										MT/yr					
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	0.0000	0.0000
Vendor	9.0000e-005	3.1100e-003	1.1200e-003	1.0000e-005	3.7000e-004	2.0000e-005	3.9000e-004	1.1000e-004	2.0000e-005	1.3000e-004	0.0000	1.3799	1.3799	1.0000e-005	2.0000e-004	1.4387
Worker	6.5000e-004	4.4000e-004	5.1300e-003	2.0000e-005	1.3800e-003	1.0000e-005	1.3900e-003	3.7000e-004	1.0000e-005	3.8000e-004	0.0000	1.4636	1.4636	5.0000e-005	4.0000e-005	1.4772
Total	**7.4000e-004**	**3.5500e-003**	**6.2500e-003**	**3.0000e-005**	**1.7500e-003**	**3.0000e-005**	**1.7800e-003**	**4.8000e-004**	**3.0000e-005**	**5.1000e-004**	**0.0000**	**2.8435**	**2.8435**	**6.0000e-005**	**2.4000e-004**	**2.9159**

3.6 Building Construction - 2024

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	tons/yr										MT/yr					
Off-Road	0.1928	1.7611	2.1179	3.5300e-003		0.0803	0.0803		0.0756	0.0756	0.0000	303.7223	303.7223	0.0718	0.0000	305.5179
Total	**0.1928**	**1.7611**	**2.1179**	**3.5300e-003**		**0.0803**	**0.0803**		**0.0756**	**0.0756**	**0.0000**	**303.7223**	**303.7223**	**0.0718**	**0.0000**	**305.5179**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2024

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	tons/yr										MT/yr					
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	0.0000	0.0000
Vendor	1.9200e-003	0.0678	0.0237	3.1000e-004	8.0000e-003	4.2000e-004	8.4300e-003	2.4000e-003	4.1000e-004	2.8000e-003	0.0000	29.6898	29.6898	1.7000e-004	4.2200e-003	30.9509
Worker	0.0132	8.5000e-003	0.1041	3.4000e-004	0.0300	2.0000e-004	0.0302	8.1800e-003	1.8000e-004	8.3600e-003	0.0000	30.9020	30.9020	9.1000e-004	8.5000e-004	31.1787
Total	**0.0151**	**0.0763**	**0.1278**	**6.5000e-004**	**0.0380**	**6.2000e-004**	**0.0387**	**0.0106**	**5.9000e-004**	**0.0112**	**0.0000**	**60.5917**	**60.5917**	**1.0800e-003**	**5.0700e-003**	**62.1296**

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	tons/yr										MT/yr					
Off-Road	0.1928	1.7611	2.1179	3.5300e-003		0.0803	0.0803		0.0756	0.0756	0.0000	303.7220	303.7220	0.0718	0.0000	305.5175
Total	**0.1928**	**1.7611**	**2.1179**	**3.5300e-003**		**0.0803**	**0.0803**		**0.0756**	**0.0756**	**0.0000**	**303.7220**	**303.7220**	**0.0718**	**0.0000**	**305.5175**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2024

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	tons/yr										MT/yr					
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	0.0000	0.0000
Vendor	1.9200e-003	0.0678	0.0237	3.1000e-004	8.0000e-003	4.2000e-004	8.4300e-003	2.4000e-003	4.1000e-004	2.8000e-003	0.0000	29.6898	29.6898	1.7000e-004	4.2200e-003	30.9509
Worker	0.0132	8.5000e-003	0.1041	3.4000e-004	0.0300	2.0000e-004	0.0302	8.1800e-003	1.8000e-004	8.3600e-003	0.0000	30.9020	30.9020	9.1000e-004	8.5000e-004	31.1787
Total	**0.0151**	**0.0763**	**0.1278**	**6.5000e-004**	**0.0380**	**6.2000e-004**	**0.0387**	**0.0106**	**5.9000e-004**	**0.0112**	**0.0000**	**60.5917**	**60.5917**	**1.0800e-003**	**5.0700e-003**	**62.1296**

3.6 Building Construction - 2025

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	tons/yr										MT/yr					
Off-Road	0.1135	1.0350	1.3350	2.2400e-003		0.0438	0.0438		0.0412	0.0412	0.0000	192.4932	192.4932	0.0453	0.0000	193.6244
Total	**0.1135**	**1.0350**	**1.3350**	**2.2400e-003**		**0.0438**	**0.0438**		**0.0412**	**0.0412**	**0.0000**	**192.4932**	**192.4932**	**0.0453**	**0.0000**	**193.6244**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2025

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	tons/yr										MT/yr					
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	0.0000	0.0000
Vendor	1.1800e-003	0.0428	0.0146	1.9000e-004	5.0700e-003	2.7000e-004	5.3400e-003	1.5200e-003	2.6000e-004	1.7800e-003	0.0000	18.4967	18.4967	1.0000e-004	2.6200e-003	19.2800
Worker	7.8100e-003	4.8300e-003	0.0616	2.1000e-004	0.0190	1.2000e-004	0.0192	5.1800e-003	1.1000e-004	5.2900e-003	0.0000	18.9110	18.9110	5.2000e-004	5.1000e-004	19.0746
Total	**8.9900e-003**	**0.0476**	**0.0762**	**4.0000e-004**	**0.0241**	**3.9000e-004**	**0.0245**	**6.7000e-003**	**3.7000e-004**	**7.0700e-003**	**0.0000**	**37.4077**	**37.4077**	**6.2000e-004**	**3.1300e-003**	**38.3546**

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	tons/yr										MT/yr					
Off-Road	0.1135	1.0350	1.3350	2.2400e-003		0.0438	0.0438		0.0412	0.0412	0.0000	192.4929	192.4929	0.0453	0.0000	193.6242
Total	**0.1135**	**1.0350**	**1.3350**	**2.2400e-003**		**0.0438**	**0.0438**		**0.0412**	**0.0412**	**0.0000**	**192.4929**	**192.4929**	**0.0453**	**0.0000**	**193.6242**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2025

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	tons/yr										MT/yr					
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	0.0000	0.0000
Vendor	1.1800e-003	0.0428	0.0146	1.9000e-004	5.0700e-003	2.7000e-004	5.3400e-003	1.5200e-003	2.6000e-004	1.7800e-003	0.0000	18.4967	18.4967	1.0000e-004	2.6200e-003	19.2800
Worker	7.8100e-003	4.8300e-003	0.0616	2.1000e-004	0.0190	1.2000e-004	0.0192	5.1800e-003	1.1000e-004	5.2900e-003	0.0000	18.9110	18.9110	5.2000e-004	5.1000e-004	19.0746
Total	**8.9900e-003**	**0.0476**	**0.0762**	**4.0000e-004**	**0.0241**	**3.9000e-004**	**0.0245**	**6.7000e-003**	**3.7000e-004**	**7.0700e-003**	**0.0000**	**37.4077**	**37.4077**	**6.2000e-004**	**3.1300e-003**	**38.3546**

3.7 Architectural Coating - 2025

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	tons/yr										MT/yr					
Archit. Coating	0.8025					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9900e-003	0.0201	0.0317	5.0000e-005		9.0000e-004	9.0000e-004		9.0000e-004	9.0000e-004	0.0000	4.4682	4.4682	2.4000e-004	0.0000	4.4743
Total	**0.8055**	**0.0201**	**0.0317**	**5.0000e-005**		**9.0000e-004**	**9.0000e-004**		**9.0000e-004**	**9.0000e-004**	**0.0000**	**4.4682**	**4.4682**	**2.4000e-004**	**0.0000**	**4.4743**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2025

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	3.2000e-004	2.0000e-004	2.5300e-003	1.0000e-005	7.8000e-004	0.0000	7.9000e-004	2.1000e-004	0.0000	2.2000e-004	0.0000	0.7780	0.7780	2.0000e-005	2.0000e-005	0.7847
Total	**3.2000e-004**	**2.0000e-004**	**2.5300e-003**	**1.0000e-005**	**7.8000e-004**	**0.0000**	**7.9000e-004**	**2.1000e-004**	**0.0000**	**2.2000e-004**	**0.0000**	**0.7780**	**0.7780**	**2.0000e-005**	**2.0000e-005**	**0.7847**

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	tons/yr										MT/yr					
Archit. Coating	0.8025					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9900e-003	0.0201	0.0317	5.0000e-005		9.0000e-004	9.0000e-004		9.0000e-004	9.0000e-004	0.0000	4.4682	4.4682	2.4000e-004	0.0000	4.4743
Total	**0.8055**	**0.0201**	**0.0317**	**5.0000e-005**		**9.0000e-004**	**9.0000e-004**		**9.0000e-004**	**9.0000e-004**	**0.0000**	**4.4682**	**4.4682**	**2.4000e-004**	**0.0000**	**4.4743**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2025

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	3.2000e-004	2.0000e-004	2.5300e-003	1.0000e-005	7.8000e-004	0.0000	7.9000e-004	2.1000e-004	0.0000	2.2000e-004	0.0000	0.7780	0.7780	2.0000e-005	2.0000e-005	0.7847
Total	**3.2000e-004**	**2.0000e-004**	**2.5300e-003**	**1.0000e-005**	**7.8000e-004**	**0.0000**	**7.9000e-004**	**2.1000e-004**	**0.0000**	**2.2000e-004**	**0.0000**	**0.7780**	**0.7780**	**2.0000e-005**	**2.0000e-005**	**0.7847**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	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	tons/yr										MT/yr					
Mitigated	0.4365	0.8887	3.7842	0.0124	0.7037	0.0121	0.7158	0.1770	0.0114	0.1885	0.0000	1,153.0293	1,153.0293	0.0475	0.0766	1,177.0550
Unmitigated	0.4371	0.8947	3.8073	0.0125	0.7108	0.0122	0.7230	0.1788	0.0115	0.1904	0.0000	1,164.2059	1,164.2059	0.0477	0.0773	1,188.4193

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	1,076.16	1,087.56	974.70	2,790,359	2,762,455
Total	1,076.16	1,087.56	974.70	2,790,359	2,762,455

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
Single Family Housing	10.00	5.00	7.00	46.00	13.00	41.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.524132	0.036190	0.197078	0.133526	0.030925	0.007792	0.010137	0.051911	0.001635	0.001042	0.003862	0.000668	0.001102

5.0 Energy Detail

Historical Energy Use: N

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	95.5923	95.5923	0.0134	1.6200e-003	96.4093
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	95.5923	95.5923	0.0134	1.6200e-003	96.4093
NaturalGas Mitigated	0.0164	0.1399	0.0595	8.9000e-004		0.0113	0.0113		0.0113	0.0113	0.0000	162.0001	162.0001	3.1100e-003	2.9700e-003	162.9628
NaturalGas Unmitigated	0.0164	0.1399	0.0595	8.9000e-004		0.0113	0.0113		0.0113	0.0113	0.0000	162.0001	162.0001	3.1100e-003	2.9700e-003	162.9628

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	tons/yr										MT/yr					
Single Family Housing	3.03577e+006	0.0164	0.1399	0.0595	8.9000e-004		0.0113	0.0113		0.0113	0.0113	0.0000	162.0001	162.0001	3.1100e-003	2.9700e-003	162.9628
Total		**0.0164**	**0.1399**	**0.0595**	**8.9000e-004**		**0.0113**	**0.0113**		**0.0113**	**0.0113**	**0.0000**	**162.0001**	**162.0001**	**3.1100e-003**	**2.9700e-003**	**162.9628**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	tons/yr										MT/yr					
Single Family Housing	3.03577e+006	0.0164	0.1399	0.0595	8.9000e-004		0.0113	0.0113		0.0113	0.0113	0.0000	162.0001	162.0001	3.1100e-003	2.9700e-003	162.9628
Total		**0.0164**	**0.1399**	**0.0595**	**8.9000e-004**		**0.0113**	**0.0113**		**0.0113**	**0.0113**	**0.0000**	**162.0001**	**162.0001**	**3.1100e-003**	**2.9700e-003**	**162.9628**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	892987	95.5923	0.0134	1.6200e-003	96.4093
Total		**95.5923**	**0.0134**	**1.6200e-003**	**96.4093**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	892987	95.5923	0.0134	1.6200e-003	96.4093
Total		**95.5923**	**0.0134**	**1.6200e-003**	**96.4093**

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	tons/yr										MT/yr					
Mitigated	0.8308	0.0625	0.8681	3.8000e-004		8.9600e-003	8.9600e-003		8.9600e-003	8.9600e-003	0.0000	62.4413	62.4413	2.4900e-003	1.1200e-003	62.8372
Unmitigated	0.8308	0.0625	0.8681	3.8000e-004		8.9600e-003	8.9600e-003		8.9600e-003	8.9600e-003	0.0000	62.4413	62.4413	2.4900e-003	1.1200e-003	62.8372

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	tons/yr										MT/yr					
Architectural Coating	0.0803					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7190					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	6.1700e-003	0.0527	0.0224	3.4000e-004		4.2600e-003	4.2600e-003		4.2600e-003	4.2600e-003	0.0000	61.0586	61.0586	1.1700e-003	1.1200e-003	61.4215
Landscaping	0.0254	9.7400e-003	0.8457	4.0000e-005		4.6900e-003	4.6900e-003		4.6900e-003	4.6900e-003	0.0000	1.3827	1.3827	1.3200e-003	0.0000	1.4158
Total	**0.8308**	**0.0625**	**0.8681**	**3.8000e-004**		**8.9500e-003**	**8.9500e-003**		**8.9500e-003**	**8.9500e-003**	**0.0000**	**62.4413**	**62.4413**	**2.4900e-003**	**1.1200e-003**	**62.8372**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	tons/yr										MT/yr					
Architectural Coating	0.0803					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7190					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	6.1700e-003	0.0527	0.0224	3.4000e-004		4.2600e-003	4.2600e-003		4.2600e-003	4.2600e-003	0.0000	61.0586	61.0586	1.1700e-003	1.1200e-003	61.4215
Landscaping	0.0254	9.7400e-003	0.8457	4.0000e-005		4.6900e-003	4.6900e-003		4.6900e-003	4.6900e-003	0.0000	1.3827	1.3827	1.3200e-003	0.0000	1.4158
Total	**0.8308**	**0.0625**	**0.8681**	**3.8000e-004**		**8.9500e-003**	**8.9500e-003**		**8.9500e-003**	**8.9500e-003**	**0.0000**	**62.4413**	**62.4413**	**2.4900e-003**	**1.1200e-003**	**62.8372**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	8.0623	0.2428	5.8100e-003	15.8647
Unmitigated	8.4131	0.2429	5.8200e-003	16.2186

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	7.42756 / 4.68259	8.4131	0.2429	5.8200e-003	16.2186
Total		**8.4131**	**0.2429**	**5.8200e-003**	**16.2186**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	7.42756 / 3.74607	8.0623	0.2428	5.8100e-003	15.8647
Total		**8.0623**	**0.2428**	**5.8100e-003**	**15.8647**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	13.8968	0.8213	0.0000	34.4286
Unmitigated	27.7935	1.6426	0.0000	68.8573

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	136.92	27.7935	1.6426	0.0000	68.8573
Total		**27.7935**	**1.6426**	**0.0000**	**68.8573**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	68.46	13.8968	0.8213	0.0000	34.4286
Total		**13.8968**	**0.8213**	**0.0000**	**34.4286**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	70.8000	0.0000	0.0000	70.8000

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

11.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	100	70.8000	0.0000	0.0000	70.8000
Total		**70.8000**	**0.0000**	**0.0000**	**70.8000**

Discovery Builders- Vanden Estates - Solano-Sacramento County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Discovery Builders- Vanden Estates

Solano-Sacramento County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	114.00	Dwelling Unit	26.70	205,200.00	326

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	56
Climate Zone	4			**Operational Year**	2025
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	236	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 Intensity factor is based on 2015-2017 PG&E Historical Data.

Land Use - Client's information

Construction Phase - Client's input
Note: Architectural coating is flagged: This phase is supposed to take place concurrently with the building construction. For now we selected the last 2 monthos of building construction time for the schedule of this task.

Trips and VMT - For Grading: CalEEMod estimate based on material imported

On-road Fugitive Dust - Updated silt loading factor for Solano County from the CARB 2021 Miscellaneous Process Methodology 7.9 for Entrained Road Travel, Paved Road Dust

Demolition - Based on estimation of building size (sq.ft)

Grading - Conservative assumption for 500CY of material import during grading phase
Total graded acres provided by the client

Architectural Coating - Update valus for Solano-Sacramento county (start date after 2021)

Vehicle Emission Factors - EMFAC 2021

Vehicle Emission Factors - EMFAC 2021

Vehicle Emission Factors - EMFAC 2021

Road Dust - Updated silt loading factorfor Solano County from the CARB 2021 Miscellaneous Process methodology 7.9 for entrained road travel, paved road dust.

Woodstoves - no wood-burning devices assumed
Gas and # No Fireplace was copied from the Data Request

Consumer Products - An updated 2020 VOC emission inventory from CARB and population estimates based on CA DOF demographic projections were used to estimate a Solano County VOC EF for 2020.

Area Coating - Updated for Solano-Sacramento county

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation - Cleint is committed to use Tier 4 construction equipment for this project based on the data request.

Mobile Land Use Mitigation -

Area Mitigation - VOC EF for Sacramento-Solano county is used here. No mitigated EF has been considered for now

Water Mitigation -

Waste Mitigation -

Fleet Mix - EMFAC 2021

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

Discovery Builders- Vanden Estates - Solano-Sacramento County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConsumerProducts	ROG_EF	2.14E-05	1.92E-05
tblFireplaces	NumberGas	0.00	77.52
tblFireplaces	NumberNoFireplace	78.66	36.48
tblFireplaces	NumberWood	35.34	0.00
tblFleetMix	HHD	0.02	0.05
tblFleetMix	LDA	0.56	0.52
tblFleetMix	LDT1	0.05	0.04
tblFleetMix	LDT2	0.17	0.20
tblFleetMix	LHD1	0.03	0.03
tblFleetMix	LHD2	6.6300e-003	7.7920e-003
tblFleetMix	MCY	0.03	3.8620e-003
tblFleetMix	MDV	0.13	0.13
tblFleetMix	MH	4.3970e-003	1.1020e-003
tblFleetMix	MHD	7.8490e-003	0.01
tblFleetMix	OBUS	1.0250e-003	1.6350e-003
tblFleetMix	SBUS	7.9400e-004	6.6800e-004
tblFleetMix	UBUS	3.9200e-004	1.0420e-003
tblGrading	MaterialImported	0.00	500.00
tblLandUse	LotAcreage	37.01	26.70
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblProjectCharacteristics	CO2IntensityFactor	203.98	236
tblRoadDust	RoadSiltLoading	0.1	0.07

Discovery Builders- Vanden Estates - Solano-Sacramento County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblSequestration	NumberOfNewTrees	0.00	100.00
tblTripsAndVMT	HaulingTripNumber	63.00	62.00
tblVehicleEF	HHD	0.03	0.12
tblVehicleEF	HHD	6.9130e-003	0.03
tblVehicleEF	HHD	7.86	5.92
tblVehicleEF	HHD	0.26	0.27
tblVehicleEF	HHD	3.0140e-003	3.9100e-004
tblVehicleEF	HHD	1,251.03	920.39
tblVehicleEF	HHD	1,304.74	1,533.36
tblVehicleEF	HHD	0.03	6.6350e-003
tblVehicleEF	HHD	0.20	0.15
tblVehicleEF	HHD	0.21	0.24
tblVehicleEF	HHD	0.00	1.0000e-006
tblVehicleEF	HHD	6.38	4.71
tblVehicleEF	HHD	2.44	1.62
tblVehicleEF	HHD	2.33	2.69
tblVehicleEF	HHD	2.5110e-003	2.0430e-003
tblVehicleEF	HHD	0.06	0.08
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	2.4030e-003	1.9510e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.9480e-003	8.9280e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	1.0000e-006	5.7000e-005
tblVehicleEF	HHD	5.0000e-005	1.6000e-005
tblVehicleEF	HHD	0.53	0.39
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.02	0.01

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	HHD	2.1000e-005	1.7000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.01	8.4300e-003
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.0000e-006	5.7000e-005
tblVehicleEF	HHD	5.0000e-005	1.6000e-005
tblVehicleEF	HHD	0.61	0.55
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.03	0.05
tblVehicleEF	HHD	2.1000e-005	1.7000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.03	0.12
tblVehicleEF	HHD	6.9140e-003	0.03
tblVehicleEF	HHD	7.76	5.85
tblVehicleEF	HHD	0.26	0.27
tblVehicleEF	HHD	2.7580e-003	3.5800e-004
tblVehicleEF	HHD	1,235.16	909.44
tblVehicleEF	HHD	1,304.74	1,533.36
tblVehicleEF	HHD	0.03	6.5830e-003
tblVehicleEF	HHD	0.19	0.14
tblVehicleEF	HHD	0.21	0.24
tblVehicleEF	HHD	0.00	1.0000e-006
tblVehicleEF	HHD	6.07	4.38
tblVehicleEF	HHD	2.32	1.54
tblVehicleEF	HHD	2.33	2.69
tblVehicleEF	HHD	2.2200e-003	1.8120e-003
tblVehicleEF	HHD	0.06	0.08
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.03	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	HHD	2.1240e-003	1.7300e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.9480e-003	8.9280e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	3.0000e-006	9.8000e-005
tblVehicleEF	HHD	5.6000e-005	1.8000e-005
tblVehicleEF	HHD	0.56	0.41
tblVehicleEF	HHD	2.0000e-006	0.00
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	2.1000e-005	1.8000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.01	8.3260e-003
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	3.0000e-006	9.8000e-005
tblVehicleEF	HHD	5.6000e-005	1.8000e-005
tblVehicleEF	HHD	0.64	0.57
tblVehicleEF	HHD	2.0000e-006	0.00
tblVehicleEF	HHD	0.03	0.05
tblVehicleEF	HHD	2.1000e-005	1.8000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.02	0.12
tblVehicleEF	HHD	6.9120e-003	0.03
tblVehicleEF	HHD	8.00	6.03
tblVehicleEF	HHD	0.26	0.27
tblVehicleEF	HHD	3.3350e-003	4.3500e-004
tblVehicleEF	HHD	1,272.94	935.51
tblVehicleEF	HHD	1,304.74	1,533.36
tblVehicleEF	HHD	0.03	6.7050e-003
tblVehicleEF	HHD	0.20	0.15

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	HHD	0.21	0.24
tblVehicleEF	HHD	0.00	1.0000e-006
tblVehicleEF	HHD	6.80	4.90
tblVehicleEF	HHD	2.49	1.65
tblVehicleEF	HHD	2.33	2.69
tblVehicleEF	HHD	2.9130e-003	2.3610e-003
tblVehicleEF	HHD	0.06	0.08
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	2.7870e-003	2.2550e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.9480e-003	8.9280e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	0.00	4.6000e-005
tblVehicleEF	HHD	5.2000e-005	1.4000e-005
tblVehicleEF	HHD	0.49	0.36
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	2.3000e-005	1.8000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.01	8.5730e-003
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	0.00	4.6000e-005
tblVehicleEF	HHD	5.2000e-005	1.4000e-005
tblVehicleEF	HHD	0.56	0.51
tblVehicleEF	HHD	0.03	0.05
tblVehicleEF	HHD	2.3000e-005	1.8000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	LDA	1.7540e-003	2.0580e-003
tblVehicleEF	LDA	0.04	0.07

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDA	0.48	0.62
tblVehicleEF	LDA	2.08	3.06
tblVehicleEF	LDA	242.09	260.36
tblVehicleEF	LDA	49.60	66.51
tblVehicleEF	LDA	4.0820e-003	4.4340e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.03	0.04
tblVehicleEF	LDA	0.17	0.25
tblVehicleEF	LDA	0.04	5.3420e-003
tblVehicleEF	LDA	1.3250e-003	1.1650e-003
tblVehicleEF	LDA	1.6690e-003	1.9740e-003
tblVehicleEF	LDA	0.02	1.8700e-003
tblVehicleEF	LDA	1.2200e-003	1.0720e-003
tblVehicleEF	LDA	1.5350e-003	1.8150e-003
tblVehicleEF	LDA	0.04	0.33
tblVehicleEF	LDA	0.09	0.09
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	6.4600e-003	7.7710e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.19	0.31
tblVehicleEF	LDA	2.3950e-003	2.5740e-003
tblVehicleEF	LDA	4.9100e-004	6.5800e-004
tblVehicleEF	LDA	0.04	0.33
tblVehicleEF	LDA	0.09	0.09
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	9.3900e-003	0.01
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.21	0.34
tblVehicleEF	LDA	2.0050e-003	2.2110e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.58	0.84
tblVehicleEF	LDA	1.64	2.41
tblVehicleEF	LDA	262.25	279.90
tblVehicleEF	LDA	48.79	64.82
tblVehicleEF	LDA	3.8030e-003	3.9240e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	0.15	0.22
tblVehicleEF	LDA	0.04	5.3420e-003
tblVehicleEF	LDA	1.3250e-003	1.1650e-003
tblVehicleEF	LDA	1.6690e-003	1.9740e-003
tblVehicleEF	LDA	0.02	1.8700e-003
tblVehicleEF	LDA	1.2200e-003	1.0720e-003
tblVehicleEF	LDA	1.5350e-003	1.8150e-003
tblVehicleEF	LDA	0.09	0.44
tblVehicleEF	LDA	0.10	0.10
tblVehicleEF	LDA	0.08	0.00
tblVehicleEF	LDA	7.2670e-003	8.2010e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.16	0.26
tblVehicleEF	LDA	2.5940e-003	2.7670e-003
tblVehicleEF	LDA	4.8300e-004	6.4100e-004
tblVehicleEF	LDA	0.09	0.44
tblVehicleEF	LDA	0.10	0.10
tblVehicleEF	LDA	0.08	0.00
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.17	0.28

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDA	1.6580e-003	1.9700e-003
tblVehicleEF	LDA	0.05	0.08
tblVehicleEF	LDA	0.47	0.59
tblVehicleEF	LDA	2.57	3.79
tblVehicleEF	LDA	237.99	253.47
tblVehicleEF	LDA	50.50	67.40
tblVehicleEF	LDA	4.3990e-003	4.8460e-003
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	0.03	0.04
tblVehicleEF	LDA	0.19	0.27
tblVehicleEF	LDA	0.04	5.3420e-003
tblVehicleEF	LDA	1.3250e-003	1.1650e-003
tblVehicleEF	LDA	1.6690e-003	1.9740e-003
tblVehicleEF	LDA	0.02	1.8700e-003
tblVehicleEF	LDA	1.2200e-003	1.0720e-003
tblVehicleEF	LDA	1.5350e-003	1.8150e-003
tblVehicleEF	LDA	0.01	0.29
tblVehicleEF	LDA	0.09	0.08
tblVehicleEF	LDA	9.4810e-003	0.00
tblVehicleEF	LDA	6.2090e-003	7.5700e-003
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	0.23	0.37
tblVehicleEF	LDA	2.3540e-003	2.5060e-003
tblVehicleEF	LDA	5.0000e-004	6.6600e-004
tblVehicleEF	LDA	0.01	0.29
tblVehicleEF	LDA	0.09	0.08
tblVehicleEF	LDA	9.4810e-003	0.00
tblVehicleEF	LDA	9.0230e-003	0.01
tblVehicleEF	LDA	0.03	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDA	0.25	0.40
tblVehicleEF	LDT1	3.3770e-003	5.4510e-003
tblVehicleEF	LDT1	0.06	0.12
tblVehicleEF	LDT1	0.75	1.24
tblVehicleEF	LDT1	2.26	5.81
tblVehicleEF	LDT1	288.86	332.04
tblVehicleEF	LDT1	60.23	87.96
tblVehicleEF	LDT1	5.6760e-003	9.1250e-003
tblVehicleEF	LDT1	0.03	0.04
tblVehicleEF	LDT1	0.06	0.12
tblVehicleEF	LDT1	0.23	0.42
tblVehicleEF	LDT1	0.04	6.7270e-003
tblVehicleEF	LDT1	1.5920e-003	1.7280e-003
tblVehicleEF	LDT1	2.1490e-003	3.0870e-003
tblVehicleEF	LDT1	0.02	2.3540e-003
tblVehicleEF	LDT1	1.4650e-003	1.5890e-003
tblVehicleEF	LDT1	1.9760e-003	2.8390e-003
tblVehicleEF	LDT1	0.09	0.72
tblVehicleEF	LDT1	0.18	0.19
tblVehicleEF	LDT1	0.07	0.00
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	0.08	0.07
tblVehicleEF	LDT1	0.30	0.60
tblVehicleEF	LDT1	2.8580e-003	3.2830e-003
tblVehicleEF	LDT1	5.9600e-004	8.7000e-004
tblVehicleEF	LDT1	0.09	0.72
tblVehicleEF	LDT1	0.18	0.19
tblVehicleEF	LDT1	0.07	0.00
tblVehicleEF	LDT1	0.02	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT1	0.08	0.07
tblVehicleEF	LDT1	0.33	0.66
tblVehicleEF	LDT1	3.8360e-003	5.8520e-003
tblVehicleEF	LDT1	0.05	0.10
tblVehicleEF	LDT1	0.89	1.67
tblVehicleEF	LDT1	1.79	4.53
tblVehicleEF	LDT1	309.72	355.25
tblVehicleEF	LDT1	59.29	85.19
tblVehicleEF	LDT1	5.2320e-003	8.0630e-003
tblVehicleEF	LDT1	0.02	0.04
tblVehicleEF	LDT1	0.06	0.10
tblVehicleEF	LDT1	0.20	0.38
tblVehicleEF	LDT1	0.04	6.7270e-003
tblVehicleEF	LDT1	1.5920e-003	1.7280e-003
tblVehicleEF	LDT1	2.1490e-003	3.0870e-003
tblVehicleEF	LDT1	0.02	2.3540e-003
tblVehicleEF	LDT1	1.4650e-003	1.5890e-003
tblVehicleEF	LDT1	1.9760e-003	2.8390e-003
tblVehicleEF	LDT1	0.22	0.99
tblVehicleEF	LDT1	0.21	0.21
tblVehicleEF	LDT1	0.17	0.00
tblVehicleEF	LDT1	0.02	0.03
tblVehicleEF	LDT1	0.08	0.07
tblVehicleEF	LDT1	0.25	0.49
tblVehicleEF	LDT1	3.0650e-003	3.5120e-003
tblVehicleEF	LDT1	5.8700e-004	8.4200e-004
tblVehicleEF	LDT1	0.22	0.99
tblVehicleEF	LDT1	0.21	0.21
tblVehicleEF	LDT1	0.17	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT1	0.02	0.04
tblVehicleEF	LDT1	0.08	0.07
tblVehicleEF	LDT1	0.27	0.54
tblVehicleEF	LDT1	3.2020e-003	5.2300e-003
tblVehicleEF	LDT1	0.07	0.13
tblVehicleEF	LDT1	0.73	1.17
tblVehicleEF	LDT1	2.81	7.25
tblVehicleEF	LDT1	284.59	324.78
tblVehicleEF	LDT1	61.29	90.26
tblVehicleEF	LDT1	6.1600e-003	9.9890e-003
tblVehicleEF	LDT1	0.03	0.04
tblVehicleEF	LDT1	0.07	0.14
tblVehicleEF	LDT1	0.26	0.47
tblVehicleEF	LDT1	0.04	6.7270e-003
tblVehicleEF	LDT1	1.5920e-003	1.7280e-003
tblVehicleEF	LDT1	2.1490e-003	3.0870e-003
tblVehicleEF	LDT1	0.02	2.3540e-003
tblVehicleEF	LDT1	1.4650e-003	1.5890e-003
tblVehicleEF	LDT1	1.9760e-003	2.8390e-003
tblVehicleEF	LDT1	0.03	0.63
tblVehicleEF	LDT1	0.18	0.17
tblVehicleEF	LDT1	0.02	0.00
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	0.10	0.07
tblVehicleEF	LDT1	0.36	0.72
tblVehicleEF	LDT1	2.8160e-003	3.2110e-003
tblVehicleEF	LDT1	6.0700e-004	8.9200e-004
tblVehicleEF	LDT1	0.03	0.63
tblVehicleEF	LDT1	0.18	0.17

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT1	0.02	0.00
tblVehicleEF	LDT1	0.02	0.03
tblVehicleEF	LDT1	0.10	0.07
tblVehicleEF	LDT1	0.39	0.78
tblVehicleEF	LDT2	2.6710e-003	2.5210e-003
tblVehicleEF	LDT2	0.06	0.08
tblVehicleEF	LDT2	0.63	0.73
tblVehicleEF	LDT2	2.66	3.66
tblVehicleEF	LDT2	305.28	342.36
tblVehicleEF	LDT2	63.97	86.77
tblVehicleEF	LDT2	5.3240e-003	5.8360e-003
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.05	0.06
tblVehicleEF	LDT2	0.24	0.33
tblVehicleEF	LDT2	0.04	6.4360e-003
tblVehicleEF	LDT2	1.3420e-003	1.2270e-003
tblVehicleEF	LDT2	1.6860e-003	2.0640e-003
tblVehicleEF	LDT2	0.02	2.2530e-003
tblVehicleEF	LDT2	1.2350e-003	1.1290e-003
tblVehicleEF	LDT2	1.5500e-003	1.8980e-003
tblVehicleEF	LDT2	0.06	0.33
tblVehicleEF	LDT2	0.12	0.09
tblVehicleEF	LDT2	0.06	0.00
tblVehicleEF	LDT2	0.01	9.6590e-003
tblVehicleEF	LDT2	0.06	0.03
tblVehicleEF	LDT2	0.28	0.38
tblVehicleEF	LDT2	3.0200e-003	3.3840e-003
tblVehicleEF	LDT2	6.3300e-004	8.5800e-004
tblVehicleEF	LDT2	0.06	0.33

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT2	0.12	0.09
tblVehicleEF	LDT2	0.06	0.00
tblVehicleEF	LDT2	0.02	0.01
tblVehicleEF	LDT2	0.06	0.03
tblVehicleEF	LDT2	0.30	0.42
tblVehicleEF	LDT2	3.0470e-003	2.7100e-003
tblVehicleEF	LDT2	0.05	0.07
tblVehicleEF	LDT2	0.76	0.99
tblVehicleEF	LDT2	2.10	2.87
tblVehicleEF	LDT2	325.26	360.07
tblVehicleEF	LDT2	62.91	84.18
tblVehicleEF	LDT2	4.9390e-003	5.1690e-003
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.05	0.05
tblVehicleEF	LDT2	0.22	0.30
tblVehicleEF	LDT2	0.04	6.4360e-003
tblVehicleEF	LDT2	1.3420e-003	1.2270e-003
tblVehicleEF	LDT2	1.6860e-003	2.0640e-003
tblVehicleEF	LDT2	0.02	2.2530e-003
tblVehicleEF	LDT2	1.2350e-003	1.1290e-003
tblVehicleEF	LDT2	1.5500e-003	1.8980e-003
tblVehicleEF	LDT2	0.15	0.43
tblVehicleEF	LDT2	0.14	0.10
tblVehicleEF	LDT2	0.13	0.00
tblVehicleEF	LDT2	0.01	0.01
tblVehicleEF	LDT2	0.05	0.03
tblVehicleEF	LDT2	0.23	0.32
tblVehicleEF	LDT2	3.2180e-003	3.5590e-003
tblVehicleEF	LDT2	6.2300e-004	8.3200e-004

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT2	0.15	0.43
tblVehicleEF	LDT2	0.14	0.10
tblVehicleEF	LDT2	0.13	0.00
tblVehicleEF	LDT2	0.02	0.01
tblVehicleEF	LDT2	0.05	0.03
tblVehicleEF	LDT2	0.25	0.35
tblVehicleEF	LDT2	2.5250e-003	2.4120e-003
tblVehicleEF	LDT2	0.07	0.10
tblVehicleEF	LDT2	0.62	0.69
tblVehicleEF	LDT2	3.30	4.54
tblVehicleEF	LDT2	301.19	331.94
tblVehicleEF	LDT2	65.15	87.29
tblVehicleEF	LDT2	5.7500e-003	6.3700e-003
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.06	0.07
tblVehicleEF	LDT2	0.27	0.37
tblVehicleEF	LDT2	0.04	6.4360e-003
tblVehicleEF	LDT2	1.3420e-003	1.2270e-003
tblVehicleEF	LDT2	1.6860e-003	2.0640e-003
tblVehicleEF	LDT2	0.02	2.2530e-003
tblVehicleEF	LDT2	1.2350e-003	1.1290e-003
tblVehicleEF	LDT2	1.5500e-003	1.8980e-003
tblVehicleEF	LDT2	0.02	0.30
tblVehicleEF	LDT2	0.12	0.08
tblVehicleEF	LDT2	0.02	0.00
tblVehicleEF	LDT2	9.9950e-003	9.4070e-003
tblVehicleEF	LDT2	0.07	0.03
tblVehicleEF	LDT2	0.33	0.45
tblVehicleEF	LDT2	2.9800e-003	3.2810e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT2	6.4500e-004	8.6300e-004
tblVehicleEF	LDT2	0.02	0.30
tblVehicleEF	LDT2	0.12	0.08
tblVehicleEF	LDT2	0.02	0.00
tblVehicleEF	LDT2	0.01	0.01
tblVehicleEF	LDT2	0.07	0.03
tblVehicleEF	LDT2	0.36	0.50
tblVehicleEF	LHD1	4.3180e-003	4.6310e-003
tblVehicleEF	LHD1	8.9910e-003	9.2870e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.17	0.18
tblVehicleEF	LHD1	0.86	0.92
tblVehicleEF	LHD1	0.94	1.80
tblVehicleEF	LHD1	9.24	9.12
tblVehicleEF	LHD1	755.58	763.23
tblVehicleEF	LHD1	9.93	14.97
tblVehicleEF	LHD1	8.9500e-004	8.2400e-004
tblVehicleEF	LHD1	0.05	0.05
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	1.14	1.05
tblVehicleEF	LHD1	0.27	0.38
tblVehicleEF	LHD1	1.0310e-003	9.2500e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.8020e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.2400e-004	2.0100e-004
tblVehicleEF	LHD1	9.8700e-004	8.8500e-004
tblVehicleEF	LHD1	0.03	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD1	2.5140e-003	2.4510e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.0600e-004	1.8400e-004
tblVehicleEF	LHD1	1.9890e-003	0.12
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	9.9700e-004	0.00
tblVehicleEF	LHD1	0.11	0.12
tblVehicleEF	LHD1	0.22	0.06
tblVehicleEF	LHD1	0.06	0.10
tblVehicleEF	LHD1	8.9000e-005	8.8000e-005
tblVehicleEF	LHD1	7.3540e-003	7.4280e-003
tblVehicleEF	LHD1	9.8000e-005	1.4800e-004
tblVehicleEF	LHD1	1.9890e-003	0.12
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	9.9700e-004	0.00
tblVehicleEF	LHD1	0.14	0.14
tblVehicleEF	LHD1	0.22	0.06
tblVehicleEF	LHD1	0.07	0.11
tblVehicleEF	LHD1	4.3310e-003	4.6520e-003
tblVehicleEF	LHD1	9.1680e-003	9.4660e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.17	0.18
tblVehicleEF	LHD1	0.87	0.94
tblVehicleEF	LHD1	0.87	1.66
tblVehicleEF	LHD1	9.24	9.12
tblVehicleEF	LHD1	755.60	763.27
tblVehicleEF	LHD1	9.80	14.74

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD1	8.9700e-004	8.2700e-004
tblVehicleEF	LHD1	0.05	0.05
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	1.08	0.99
tblVehicleEF	LHD1	0.25	0.35
tblVehicleEF	LHD1	1.0310e-003	9.2500e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.8020e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.2400e-004	2.0100e-004
tblVehicleEF	LHD1	9.8700e-004	8.8500e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5140e-003	2.4510e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.0600e-004	1.8400e-004
tblVehicleEF	LHD1	4.6780e-003	0.16
tblVehicleEF	LHD1	0.09	0.03
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.3130e-003	0.00
tblVehicleEF	LHD1	0.11	0.12
tblVehicleEF	LHD1	0.22	0.06
tblVehicleEF	LHD1	0.06	0.09
tblVehicleEF	LHD1	8.9000e-005	8.8000e-005
tblVehicleEF	LHD1	7.3540e-003	7.4280e-003
tblVehicleEF	LHD1	9.7000e-005	1.4600e-004
tblVehicleEF	LHD1	4.6780e-003	0.16
tblVehicleEF	LHD1	0.09	0.03
tblVehicleEF	LHD1	0.03	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD1	2.3130e-003	0.00
tblVehicleEF	LHD1	0.14	0.15
tblVehicleEF	LHD1	0.22	0.06
tblVehicleEF	LHD1	0.07	0.10
tblVehicleEF	LHD1	4.3030e-003	4.6080e-003
tblVehicleEF	LHD1	8.8020e-003	9.0980e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.17	0.18
tblVehicleEF	LHD1	0.84	0.90
tblVehicleEF	LHD1	1.03	1.97
tblVehicleEF	LHD1	9.24	9.12
tblVehicleEF	LHD1	755.55	763.19
tblVehicleEF	LHD1	10.09	15.27
tblVehicleEF	LHD1	8.9200e-004	8.2100e-004
tblVehicleEF	LHD1	0.05	0.05
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	1.17	1.08
tblVehicleEF	LHD1	0.29	0.41
tblVehicleEF	LHD1	1.0310e-003	9.2500e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.8020e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.2400e-004	2.0100e-004
tblVehicleEF	LHD1	9.8700e-004	8.8500e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5140e-003	2.4510e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.0600e-004	1.8400e-004

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD1	5.9200e-004	0.11
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.8600e-004	0.00
tblVehicleEF	LHD1	0.11	0.12
tblVehicleEF	LHD1	0.25	0.06
tblVehicleEF	LHD1	0.07	0.10
tblVehicleEF	LHD1	8.9000e-005	8.8000e-005
tblVehicleEF	LHD1	7.3530e-003	7.4270e-003
tblVehicleEF	LHD1	1.0000e-004	1.5100e-004
tblVehicleEF	LHD1	5.9200e-004	0.11
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.8600e-004	0.00
tblVehicleEF	LHD1	0.13	0.14
tblVehicleEF	LHD1	0.25	0.06
tblVehicleEF	LHD1	0.08	0.11
tblVehicleEF	LHD2	2.6620e-003	2.5970e-003
tblVehicleEF	LHD2	6.8360e-003	7.5600e-003
tblVehicleEF	LHD2	6.5040e-003	9.7140e-003
tblVehicleEF	LHD2	0.13	0.13
tblVehicleEF	LHD2	0.66	0.58
tblVehicleEF	LHD2	0.48	0.94
tblVehicleEF	LHD2	14.63	14.60
tblVehicleEF	LHD2	743.33	820.97
tblVehicleEF	LHD2	6.35	7.70
tblVehicleEF	LHD2	1.9270e-003	1.9220e-003
tblVehicleEF	LHD2	0.07	0.09
tblVehicleEF	LHD2	0.01	0.02

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD2	0.11	0.12
tblVehicleEF	LHD2	1.08	1.07
tblVehicleEF	LHD2	0.15	0.19
tblVehicleEF	LHD2	1.5350e-003	1.5290e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.7000e-005	7.3000e-005
tblVehicleEF	LHD2	1.4680e-003	1.4630e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.7330e-003	2.7300e-003
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	8.9000e-005	6.7000e-005
tblVehicleEF	LHD2	7.8200e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.2500e-004	0.00
tblVehicleEF	LHD2	0.12	0.14
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	7.1590e-003	7.8850e-003
tblVehicleEF	LHD2	6.3000e-005	7.6000e-005
tblVehicleEF	LHD2	7.8200e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	4.2500e-004	0.00
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.03	0.05

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD2	2.6700e-003	2.6080e-003
tblVehicleEF	LHD2	6.8870e-003	7.6120e-003
tblVehicleEF	LHD2	6.1330e-003	9.1710e-003
tblVehicleEF	LHD2	0.13	0.13
tblVehicleEF	LHD2	0.66	0.59
tblVehicleEF	LHD2	0.45	0.87
tblVehicleEF	LHD2	14.63	14.60
tblVehicleEF	LHD2	743.34	820.98
tblVehicleEF	LHD2	6.29	7.58
tblVehicleEF	LHD2	1.9290e-003	1.9230e-003
tblVehicleEF	LHD2	0.07	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.11	0.12
tblVehicleEF	LHD2	1.03	1.02
tblVehicleEF	LHD2	0.14	0.18
tblVehicleEF	LHD2	1.5350e-003	1.5290e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.7000e-005	7.3000e-005
tblVehicleEF	LHD2	1.4680e-003	1.4630e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.7330e-003	2.7300e-003
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	8.9000e-005	6.7000e-005
tblVehicleEF	LHD2	1.8070e-003	0.07
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	9.6400e-004	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD2	0.12	0.14
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.03	0.04
tblVehicleEF	LHD2	7.1590e-003	7.8850e-003
tblVehicleEF	LHD2	6.2000e-005	7.5000e-005
tblVehicleEF	LHD2	1.8070e-003	0.07
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	9.6400e-004	0.00
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	2.6540e-003	2.5850e-003
tblVehicleEF	LHD2	6.7800e-003	7.5040e-003
tblVehicleEF	LHD2	6.9320e-003	0.01
tblVehicleEF	LHD2	0.13	0.13
tblVehicleEF	LHD2	0.65	0.57
tblVehicleEF	LHD2	0.53	1.03
tblVehicleEF	LHD2	14.63	14.60
tblVehicleEF	LHD2	743.32	820.95
tblVehicleEF	LHD2	6.43	7.86
tblVehicleEF	LHD2	1.9250e-003	1.9200e-003
tblVehicleEF	LHD2	0.07	0.09
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	0.11	0.12
tblVehicleEF	LHD2	1.10	1.10
tblVehicleEF	LHD2	0.16	0.20
tblVehicleEF	LHD2	1.5350e-003	1.5290e-003
tblVehicleEF	LHD2	0.09	0.09

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.7000e-005	7.3000e-005
tblVehicleEF	LHD2	1.4680e-003	1.4630e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.7330e-003	2.7300e-003
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	8.9000e-005	6.7000e-005
tblVehicleEF	LHD2	2.5600e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	1.3200e-004	0.00
tblVehicleEF	LHD2	0.12	0.14
tblVehicleEF	LHD2	0.08	0.02
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	7.1590e-003	7.8850e-003
tblVehicleEF	LHD2	6.4000e-005	7.8000e-005
tblVehicleEF	LHD2	2.5600e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	1.3200e-004	0.00
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.08	0.02
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	MCY	0.36	0.18
tblVehicleEF	MCY	0.26	0.20
tblVehicleEF	MCY	21.80	14.81
tblVehicleEF	MCY	9.11	8.47
tblVehicleEF	MCY	222.79	192.97

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MCY	61.99	53.02
tblVehicleEF	MCY	0.07	0.04
tblVehicleEF	MCY	0.02	9.0630e-003
tblVehicleEF	MCY	1.20	0.65
tblVehicleEF	MCY	0.27	0.16
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	2.0990e-003	1.8220e-003
tblVehicleEF	MCY	2.9200e-003	3.3960e-003
tblVehicleEF	MCY	5.0400e-003	4.2000e-003
tblVehicleEF	MCY	1.9630e-003	1.7070e-003
tblVehicleEF	MCY	2.7480e-003	3.1970e-003
tblVehicleEF	MCY	1.04	2.43
tblVehicleEF	MCY	0.82	3.58
tblVehicleEF	MCY	0.56	0.00
tblVehicleEF	MCY	2.43	1.23
tblVehicleEF	MCY	0.47	1.36
tblVehicleEF	MCY	1.98	1.52
tblVehicleEF	MCY	2.2050e-003	1.9080e-003
tblVehicleEF	MCY	6.1300e-004	5.2400e-004
tblVehicleEF	MCY	1.04	2.43
tblVehicleEF	MCY	0.82	3.58
tblVehicleEF	MCY	0.56	0.00
tblVehicleEF	MCY	3.00	1.46
tblVehicleEF	MCY	0.47	1.36
tblVehicleEF	MCY	2.16	1.66
tblVehicleEF	MCY	0.35	0.18
tblVehicleEF	MCY	0.22	0.17
tblVehicleEF	MCY	21.23	14.66
tblVehicleEF	MCY	7.93	7.31

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MCY	221.57	192.61
tblVehicleEF	MCY	58.97	50.28
tblVehicleEF	MCY	0.06	0.04
tblVehicleEF	MCY	0.01	8.6480e-003
tblVehicleEF	MCY	1.03	0.56
tblVehicleEF	MCY	0.25	0.14
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	2.0990e-003	1.8220e-003
tblVehicleEF	MCY	2.9200e-003	3.3960e-003
tblVehicleEF	MCY	5.0400e-003	4.2000e-003
tblVehicleEF	MCY	1.9630e-003	1.7070e-003
tblVehicleEF	MCY	2.7480e-003	3.1970e-003
tblVehicleEF	MCY	2.73	3.89
tblVehicleEF	MCY	1.18	3.79
tblVehicleEF	MCY	1.67	0.00
tblVehicleEF	MCY	2.35	1.19
tblVehicleEF	MCY	0.45	1.40
tblVehicleEF	MCY	1.64	1.26
tblVehicleEF	MCY	2.1930e-003	1.9040e-003
tblVehicleEF	MCY	5.8400e-004	4.9700e-004
tblVehicleEF	MCY	2.73	3.89
tblVehicleEF	MCY	1.18	3.79
tblVehicleEF	MCY	1.67	0.00
tblVehicleEF	MCY	2.90	1.42
tblVehicleEF	MCY	0.45	1.40
tblVehicleEF	MCY	1.78	1.36
tblVehicleEF	MCY	0.37	0.19
tblVehicleEF	MCY	0.32	0.25
tblVehicleEF	MCY	24.34	15.83

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MCY	11.05	10.30
tblVehicleEF	MCY	227.35	194.79
tblVehicleEF	MCY	66.65	57.15
tblVehicleEF	MCY	0.07	0.05
tblVehicleEF	MCY	0.02	9.6640e-003
tblVehicleEF	MCY	1.31	0.71
tblVehicleEF	MCY	0.30	0.17
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	2.0990e-003	1.8220e-003
tblVehicleEF	MCY	2.9200e-003	3.3960e-003
tblVehicleEF	MCY	5.0400e-003	4.2000e-003
tblVehicleEF	MCY	1.9630e-003	1.7070e-003
tblVehicleEF	MCY	2.7480e-003	3.1970e-003
tblVehicleEF	MCY	0.18	1.99
tblVehicleEF	MCY	0.87	3.23
tblVehicleEF	MCY	0.11	0.00
tblVehicleEF	MCY	2.58	1.29
tblVehicleEF	MCY	0.56	1.47
tblVehicleEF	MCY	2.46	1.90
tblVehicleEF	MCY	2.2500e-003	1.9260e-003
tblVehicleEF	MCY	6.6000e-004	5.6500e-004
tblVehicleEF	MCY	0.18	1.99
tblVehicleEF	MCY	0.87	3.23
tblVehicleEF	MCY	0.11	0.00
tblVehicleEF	MCY	3.18	1.53
tblVehicleEF	MCY	0.56	1.47
tblVehicleEF	MCY	2.68	2.06
tblVehicleEF	MDV	3.2150e-003	3.3870e-003
tblVehicleEF	MDV	0.07	0.11

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MDV	0.69	0.85
tblVehicleEF	MDV	3.02	4.16
tblVehicleEF	MDV	376.27	417.27
tblVehicleEF	MDV	79.53	106.39
tblVehicleEF	MDV	7.3500e-003	8.2110e-003
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.31	0.46
tblVehicleEF	MDV	0.04	6.5950e-003
tblVehicleEF	MDV	1.4030e-003	1.3070e-003
tblVehicleEF	MDV	1.7530e-003	2.1690e-003
tblVehicleEF	MDV	0.02	2.3080e-003
tblVehicleEF	MDV	1.2940e-003	1.2050e-003
tblVehicleEF	MDV	1.6120e-003	1.9940e-003
tblVehicleEF	MDV	0.08	0.45
tblVehicleEF	MDV	0.16	0.11
tblVehicleEF	MDV	0.08	0.00
tblVehicleEF	MDV	0.01	0.01
tblVehicleEF	MDV	0.07	0.04
tblVehicleEF	MDV	0.37	0.54
tblVehicleEF	MDV	3.7190e-003	4.1220e-003
tblVehicleEF	MDV	7.8700e-004	1.0520e-003
tblVehicleEF	MDV	0.08	0.45
tblVehicleEF	MDV	0.16	0.11
tblVehicleEF	MDV	0.08	0.00
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	0.07	0.04
tblVehicleEF	MDV	0.40	0.60
tblVehicleEF	MDV	3.6710e-003	3.6450e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MDV	0.06	0.09
tblVehicleEF	MDV	0.83	1.15
tblVehicleEF	MDV	2.37	3.27
tblVehicleEF	MDV	396.81	435.09
tblVehicleEF	MDV	78.29	103.57
tblVehicleEF	MDV	6.9040e-003	7.3580e-003
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	0.06	0.08
tblVehicleEF	MDV	0.28	0.41
tblVehicleEF	MDV	0.04	6.5950e-003
tblVehicleEF	MDV	1.4030e-003	1.3070e-003
tblVehicleEF	MDV	1.7530e-003	2.1690e-003
tblVehicleEF	MDV	0.02	2.3080e-003
tblVehicleEF	MDV	1.2940e-003	1.2050e-003
tblVehicleEF	MDV	1.6120e-003	1.9940e-003
tblVehicleEF	MDV	0.19	0.58
tblVehicleEF	MDV	0.17	0.12
tblVehicleEF	MDV	0.17	0.00
tblVehicleEF	MDV	0.01	0.01
tblVehicleEF	MDV	0.06	0.04
tblVehicleEF	MDV	0.30	0.45
tblVehicleEF	MDV	3.9220e-003	4.2990e-003
tblVehicleEF	MDV	7.7500e-004	1.0240e-003
tblVehicleEF	MDV	0.19	0.58
tblVehicleEF	MDV	0.17	0.12
tblVehicleEF	MDV	0.17	0.00
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	0.06	0.04
tblVehicleEF	MDV	0.33	0.49

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MDV	3.0420e-003	3.2440e-003
tblVehicleEF	MDV	0.09	0.13
tblVehicleEF	MDV	0.67	0.80
tblVehicleEF	MDV	3.75	5.18
tblVehicleEF	MDV	372.07	406.21
tblVehicleEF	MDV	80.92	107.27
tblVehicleEF	MDV	7.8440e-003	8.8830e-003
tblVehicleEF	MDV	0.03	0.05
tblVehicleEF	MDV	0.07	0.11
tblVehicleEF	MDV	0.35	0.51
tblVehicleEF	MDV	0.04	6.5950e-003
tblVehicleEF	MDV	1.4030e-003	1.3070e-003
tblVehicleEF	MDV	1.7530e-003	2.1690e-003
tblVehicleEF	MDV	0.02	2.3080e-003
tblVehicleEF	MDV	1.2940e-003	1.2050e-003
tblVehicleEF	MDV	1.6120e-003	1.9940e-003
tblVehicleEF	MDV	0.03	0.42
tblVehicleEF	MDV	0.16	0.10
tblVehicleEF	MDV	0.02	0.00
tblVehicleEF	MDV	0.01	0.01
tblVehicleEF	MDV	0.08	0.04
tblVehicleEF	MDV	0.44	0.65
tblVehicleEF	MDV	3.6780e-003	4.0130e-003
tblVehicleEF	MDV	8.0100e-004	1.0600e-003
tblVehicleEF	MDV	0.03	0.42
tblVehicleEF	MDV	0.16	0.10
tblVehicleEF	MDV	0.02	0.00
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	0.08	0.04

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MDV	0.48	0.71
tblVehicleEF	MH	9.7180e-003	0.01
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.89	0.92
tblVehicleEF	MH	1.95	2.30
tblVehicleEF	MH	1,528.93	1,691.97
tblVehicleEF	MH	17.93	22.23
tblVehicleEF	MH	0.06	0.07
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.62	1.60
tblVehicleEF	MH	0.25	0.32
tblVehicleEF	MH	0.13	0.04
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.2100e-004	2.6200e-004
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	3.2920e-003	3.2950e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.0300e-004	2.4100e-004
tblVehicleEF	MH	0.66	31.79
tblVehicleEF	MH	0.06	7.96
tblVehicleEF	MH	0.25	0.00
tblVehicleEF	MH	0.07	0.07
tblVehicleEF	MH	0.01	1.9600e-003
tblVehicleEF	MH	0.09	0.11
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	1.7700e-004	2.2000e-004
tblVehicleEF	MH	0.66	31.79
tblVehicleEF	MH	0.06	7.96

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MH	0.25	0.00
tblVehicleEF	MH	0.09	0.10
tblVehicleEF	MH	0.01	1.9600e-003
tblVehicleEF	MH	0.10	0.12
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	0.92	0.95
tblVehicleEF	MH	1.76	2.08
tblVehicleEF	MH	1,528.98	1,692.02
tblVehicleEF	MH	17.61	21.85
tblVehicleEF	MH	0.06	0.07
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.53	1.50
tblVehicleEF	MH	0.24	0.30
tblVehicleEF	MH	0.13	0.04
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.2100e-004	2.6200e-004
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	3.2920e-003	3.2950e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.0300e-004	2.4100e-004
tblVehicleEF	MH	1.55	42.60
tblVehicleEF	MH	0.06	8.74
tblVehicleEF	MH	0.58	0.00
tblVehicleEF	MH	0.07	0.08
tblVehicleEF	MH	0.01	2.0200e-003
tblVehicleEF	MH	0.08	0.10
tblVehicleEF	MH	0.02	0.02

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MH	1.7400e-004	2.1600e-004
tblVehicleEF	MH	1.55	42.60
tblVehicleEF	MH	0.06	8.74
tblVehicleEF	MH	0.58	0.00
tblVehicleEF	MH	0.09	0.10
tblVehicleEF	MH	0.01	2.0200e-003
tblVehicleEF	MH	0.09	0.11
tblVehicleEF	MH	9.4290e-003	0.01
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.86	0.89
tblVehicleEF	MH	2.17	2.57
tblVehicleEF	MH	1,528.87	1,691.91
tblVehicleEF	MH	18.31	22.68
tblVehicleEF	MH	0.06	0.07
tblVehicleEF	MH	0.03	0.04
tblVehicleEF	MH	1.67	1.65
tblVehicleEF	MH	0.28	0.35
tblVehicleEF	MH	0.13	0.04
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.2100e-004	2.6200e-004
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	3.2920e-003	3.2950e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.0300e-004	2.4100e-004
tblVehicleEF	MH	0.21	28.39
tblVehicleEF	MH	0.06	7.08
tblVehicleEF	MH	0.08	0.00
tblVehicleEF	MH	0.07	0.07

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MH	0.01	2.0060e-003
tblVehicleEF	MH	0.10	0.11
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	1.8100e-004	2.2400e-004
tblVehicleEF	MH	0.21	28.39
tblVehicleEF	MH	0.06	7.08
tblVehicleEF	MH	0.08	0.00
tblVehicleEF	MH	0.09	0.09
tblVehicleEF	MH	0.01	2.0060e-003
tblVehicleEF	MH	0.11	0.13
tblVehicleEF	MHD	4.0240e-003	0.01
tblVehicleEF	MHD	2.2450e-003	8.7630e-003
tblVehicleEF	MHD	0.01	8.8210e-003
tblVehicleEF	MHD	0.41	0.68
tblVehicleEF	MHD	0.29	0.37
tblVehicleEF	MHD	1.17	1.04
tblVehicleEF	MHD	75.13	165.19
tblVehicleEF	MHD	1,122.68	1,235.68
tblVehicleEF	MHD	10.09	8.51
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.13	0.15
tblVehicleEF	MHD	8.2430e-003	6.1930e-003
tblVehicleEF	MHD	0.45	0.93
tblVehicleEF	MHD	1.52	1.05
tblVehicleEF	MHD	1.66	1.41
tblVehicleEF	MHD	3.9300e-004	1.7480e-003
tblVehicleEF	MHD	0.13	0.05
tblVehicleEF	MHD	7.4700e-003	0.01
tblVehicleEF	MHD	1.2000e-004	9.9000e-005

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MHD	3.7600e-004	1.6720e-003
tblVehicleEF	MHD	0.06	0.02
tblVehicleEF	MHD	7.1380e-003	0.01
tblVehicleEF	MHD	1.1100e-004	9.1000e-005
tblVehicleEF	MHD	4.3800e-004	0.03
tblVehicleEF	MHD	0.02	6.2740e-003
tblVehicleEF	MHD	0.02	0.03
tblVehicleEF	MHD	2.3400e-004	0.00
tblVehicleEF	MHD	0.02	0.04
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.05	0.05
tblVehicleEF	MHD	7.1300e-004	1.5410e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	1.0000e-004	8.4000e-005
tblVehicleEF	MHD	4.3800e-004	0.03
tblVehicleEF	MHD	0.02	6.2740e-003
tblVehicleEF	MHD	0.03	0.04
tblVehicleEF	MHD	2.3400e-004	0.00
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.06	0.05
tblVehicleEF	MHD	3.7880e-003	0.01
tblVehicleEF	MHD	2.3090e-003	8.8550e-003
tblVehicleEF	MHD	9.7330e-003	8.2890e-003
tblVehicleEF	MHD	0.34	0.62
tblVehicleEF	MHD	0.30	0.37
tblVehicleEF	MHD	1.07	0.95
tblVehicleEF	MHD	75.32	164.37
tblVehicleEF	MHD	1,122.69	1,235.69

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MHD	9.92	8.36
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.13	0.15
tblVehicleEF	MHD	7.9270e-003	5.9550e-003
tblVehicleEF	MHD	0.45	0.89
tblVehicleEF	MHD	1.45	0.99
tblVehicleEF	MHD	1.66	1.40
tblVehicleEF	MHD	3.3400e-004	1.4830e-003
tblVehicleEF	MHD	0.13	0.05
tblVehicleEF	MHD	7.4700e-003	0.01
tblVehicleEF	MHD	1.2000e-004	9.9000e-005
tblVehicleEF	MHD	3.2000e-004	1.4180e-003
tblVehicleEF	MHD	0.06	0.02
tblVehicleEF	MHD	7.1380e-003	0.01
tblVehicleEF	MHD	1.1100e-004	9.1000e-005
tblVehicleEF	MHD	1.0370e-003	0.04
tblVehicleEF	MHD	0.02	6.9000e-003
tblVehicleEF	MHD	0.02	0.03
tblVehicleEF	MHD	5.5500e-004	0.00
tblVehicleEF	MHD	0.02	0.04
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.05	0.04
tblVehicleEF	MHD	7.1500e-004	1.5330e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	9.8000e-005	8.3000e-005
tblVehicleEF	MHD	1.0370e-003	0.04
tblVehicleEF	MHD	0.02	6.9000e-003
tblVehicleEF	MHD	0.03	0.04
tblVehicleEF	MHD	5.5500e-004	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.05	0.05
tblVehicleEF	MHD	4.2520e-003	0.01
tblVehicleEF	MHD	2.1780e-003	8.6690e-003
tblVehicleEF	MHD	0.01	9.4290e-003
tblVehicleEF	MHD	0.48	0.75
tblVehicleEF	MHD	0.28	0.36
tblVehicleEF	MHD	1.30	1.16
tblVehicleEF	MHD	75.00	166.42
tblVehicleEF	MHD	1,122.66	1,235.66
tblVehicleEF	MHD	10.30	8.70
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.13	0.15
tblVehicleEF	MHD	8.7060e-003	6.5400e-003
tblVehicleEF	MHD	0.46	0.95
tblVehicleEF	MHD	1.55	1.07
tblVehicleEF	MHD	1.67	1.42
tblVehicleEF	MHD	4.7300e-004	2.1130e-003
tblVehicleEF	MHD	0.13	0.05
tblVehicleEF	MHD	7.4700e-003	0.01
tblVehicleEF	MHD	1.2000e-004	9.9000e-005
tblVehicleEF	MHD	4.5300e-004	2.0220e-003
tblVehicleEF	MHD	0.06	0.02
tblVehicleEF	MHD	7.1380e-003	0.01
tblVehicleEF	MHD	1.1100e-004	9.1000e-005
tblVehicleEF	MHD	1.3500e-004	0.02
tblVehicleEF	MHD	0.02	5.5970e-003
tblVehicleEF	MHD	0.02	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MHD	6.8000e-005	0.00
tblVehicleEF	MHD	0.02	0.03
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.06	0.05
tblVehicleEF	MHD	7.1200e-004	1.5520e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	1.0200e-004	8.6000e-005
tblVehicleEF	MHD	1.3500e-004	0.02
tblVehicleEF	MHD	0.02	5.5970e-003
tblVehicleEF	MHD	0.03	0.04
tblVehicleEF	MHD	6.8000e-005	0.00
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	OBUS	8.1900e-003	0.01
tblVehicleEF	OBUS	4.2030e-003	0.01
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.93	0.83
tblVehicleEF	OBUS	0.48	0.68
tblVehicleEF	OBUS	1.81	2.25
tblVehicleEF	OBUS	149.52	130.05
tblVehicleEF	OBUS	1,350.91	1,634.57
tblVehicleEF	OBUS	15.02	18.99
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.13	0.14
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.65	0.54
tblVehicleEF	OBUS	1.35	1.19
tblVehicleEF	OBUS	1.12	0.93

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	OBUS	2.2400e-004	4.7400e-004
tblVehicleEF	OBUS	0.13	0.05
tblVehicleEF	OBUS	9.4470e-003	0.02
tblVehicleEF	OBUS	1.4200e-004	1.6100e-004
tblVehicleEF	OBUS	2.1400e-004	4.5400e-004
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	9.0260e-003	0.02
tblVehicleEF	OBUS	1.3000e-004	1.4800e-004
tblVehicleEF	OBUS	1.3920e-003	0.09
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.07	0.07
tblVehicleEF	OBUS	6.1700e-004	0.00
tblVehicleEF	OBUS	0.03	0.06
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.09	0.11
tblVehicleEF	OBUS	1.4170e-003	1.2300e-003
tblVehicleEF	OBUS	0.01	0.02
tblVehicleEF	OBUS	1.4900e-004	1.8800e-004
tblVehicleEF	OBUS	1.3920e-003	0.09
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.09	0.09
tblVehicleEF	OBUS	6.1700e-004	0.00
tblVehicleEF	OBUS	0.04	0.08
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.10	0.12
tblVehicleEF	OBUS	8.3480e-003	0.01
tblVehicleEF	OBUS	4.3520e-003	0.01
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.92	0.82

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	OBUS	0.50	0.70
tblVehicleEF	OBUS	1.64	2.04
tblVehicleEF	OBUS	147.67	128.67
tblVehicleEF	OBUS	1,350.93	1,634.61
tblVehicleEF	OBUS	14.73	18.62
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.13	0.14
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.62	0.52
tblVehicleEF	OBUS	1.29	1.13
tblVehicleEF	OBUS	1.11	0.91
tblVehicleEF	OBUS	1.9900e-004	4.0900e-004
tblVehicleEF	OBUS	0.13	0.05
tblVehicleEF	OBUS	9.4470e-003	0.02
tblVehicleEF	OBUS	1.4200e-004	1.6100e-004
tblVehicleEF	OBUS	1.9000e-004	3.9100e-004
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	9.0260e-003	0.02
tblVehicleEF	OBUS	1.3000e-004	1.4800e-004
tblVehicleEF	OBUS	3.1410e-003	0.13
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.07	0.07
tblVehicleEF	OBUS	1.3670e-003	0.00
tblVehicleEF	OBUS	0.03	0.06
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.08	0.10
tblVehicleEF	OBUS	1.4000e-003	1.2170e-003
tblVehicleEF	OBUS	0.01	0.02
tblVehicleEF	OBUS	1.4600e-004	1.8400e-004

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	OBUS	3.1410e-003	0.13
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.09	0.09
tblVehicleEF	OBUS	1.3670e-003	0.00
tblVehicleEF	OBUS	0.04	0.09
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.09	0.11
tblVehicleEF	OBUS	7.9790e-003	0.01
tblVehicleEF	OBUS	4.0530e-003	0.01
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.95	0.85
tblVehicleEF	OBUS	0.47	0.66
tblVehicleEF	OBUS	2.02	2.51
tblVehicleEF	OBUS	152.08	131.95
tblVehicleEF	OBUS	1,350.88	1,634.54
tblVehicleEF	OBUS	15.37	19.42
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.13	0.14
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.69	0.57
tblVehicleEF	OBUS	1.38	1.22
tblVehicleEF	OBUS	1.13	0.95
tblVehicleEF	OBUS	2.5800e-004	5.6500e-004
tblVehicleEF	OBUS	0.13	0.05
tblVehicleEF	OBUS	9.4470e-003	0.02
tblVehicleEF	OBUS	1.4200e-004	1.6100e-004
tblVehicleEF	OBUS	2.4700e-004	5.4000e-004
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	9.0260e-003	0.02

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	OBUS	1.3000e-004	1.4800e-004
tblVehicleEF	OBUS	5.1500e-004	0.08
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.07	0.06
tblVehicleEF	OBUS	2.1100e-004	0.00
tblVehicleEF	OBUS	0.03	0.06
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.09	0.12
tblVehicleEF	OBUS	1.4420e-003	1.2480e-003
tblVehicleEF	OBUS	0.01	0.02
tblVehicleEF	OBUS	1.5200e-004	1.9200e-004
tblVehicleEF	OBUS	5.1500e-004	0.08
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.08	0.08
tblVehicleEF	OBUS	2.1100e-004	0.00
tblVehicleEF	OBUS	0.04	0.08
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.10	0.13
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.4590e-003	0.07
tblVehicleEF	SBUS	3.1480e-003	2.6400e-003
tblVehicleEF	SBUS	1.58	0.85
tblVehicleEF	SBUS	0.50	1.06
tblVehicleEF	SBUS	0.50	0.41
tblVehicleEF	SBUS	328.90	170.78
tblVehicleEF	SBUS	1,038.46	1,070.29
tblVehicleEF	SBUS	2.48	1.78
tblVehicleEF	SBUS	0.05	0.02
tblVehicleEF	SBUS	0.14	0.15

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	SBUS	2.5140e-003	1.4920e-003
tblVehicleEF	SBUS	3.44	1.60
tblVehicleEF	SBUS	4.93	3.73
tblVehicleEF	SBUS	0.95	0.42
tblVehicleEF	SBUS	3.5330e-003	1.6290e-003
tblVehicleEF	SBUS	0.74	0.04
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.7000e-005	2.2000e-005
tblVehicleEF	SBUS	3.3800e-003	1.5580e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.7770e-003	2.7840e-003
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.4000e-005	2.0000e-005
tblVehicleEF	SBUS	5.1900e-004	0.03
tblVehicleEF	SBUS	4.8580e-003	6.3000e-003
tblVehicleEF	SBUS	0.16	0.08
tblVehicleEF	SBUS	1.8100e-004	0.00
tblVehicleEF	SBUS	0.09	0.08
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.02
tblVehicleEF	SBUS	3.1210e-003	1.5650e-003
tblVehicleEF	SBUS	9.8910e-003	9.9740e-003
tblVehicleEF	SBUS	2.5000e-005	1.8000e-005
tblVehicleEF	SBUS	5.1900e-004	0.03
tblVehicleEF	SBUS	4.8580e-003	6.3000e-003
tblVehicleEF	SBUS	0.22	0.14
tblVehicleEF	SBUS	1.8100e-004	0.00
tblVehicleEF	SBUS	0.10	0.17

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.02
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.5630e-003	0.07
tblVehicleEF	SBUS	2.6100e-003	2.1960e-003
tblVehicleEF	SBUS	1.55	0.83
tblVehicleEF	SBUS	0.51	1.08
tblVehicleEF	SBUS	0.36	0.29
tblVehicleEF	SBUS	337.22	174.74
tblVehicleEF	SBUS	1,038.48	1,070.32
tblVehicleEF	SBUS	2.25	1.59
tblVehicleEF	SBUS	0.05	0.03
tblVehicleEF	SBUS	0.14	0.15
tblVehicleEF	SBUS	2.3960e-003	1.4210e-003
tblVehicleEF	SBUS	3.52	1.62
tblVehicleEF	SBUS	4.70	3.56
tblVehicleEF	SBUS	0.95	0.42
tblVehicleEF	SBUS	2.9860e-003	1.3810e-003
tblVehicleEF	SBUS	0.74	0.04
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.7000e-005	2.2000e-005
tblVehicleEF	SBUS	2.8570e-003	1.3210e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.7770e-003	2.7840e-003
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.4000e-005	2.0000e-005
tblVehicleEF	SBUS	1.2390e-003	0.04
tblVehicleEF	SBUS	5.3210e-003	6.9580e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	SBUS	0.16	0.08
tblVehicleEF	SBUS	4.5100e-004	0.00
tblVehicleEF	SBUS	0.09	0.08
tblVehicleEF	SBUS	9.0710e-003	0.01
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	3.2000e-003	1.6020e-003
tblVehicleEF	SBUS	9.8920e-003	9.9750e-003
tblVehicleEF	SBUS	2.2000e-005	1.6000e-005
tblVehicleEF	SBUS	1.2390e-003	0.04
tblVehicleEF	SBUS	5.3210e-003	6.9580e-003
tblVehicleEF	SBUS	0.22	0.14
tblVehicleEF	SBUS	4.5100e-004	0.00
tblVehicleEF	SBUS	0.10	0.17
tblVehicleEF	SBUS	9.0710e-003	0.01
tblVehicleEF	SBUS	0.02	0.01
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.3520e-003	0.07
tblVehicleEF	SBUS	3.7300e-003	3.1180e-003
tblVehicleEF	SBUS	1.63	0.88
tblVehicleEF	SBUS	0.49	1.04
tblVehicleEF	SBUS	0.68	0.55
tblVehicleEF	SBUS	317.41	165.32
tblVehicleEF	SBUS	1,038.44	1,070.25
tblVehicleEF	SBUS	2.77	2.01
tblVehicleEF	SBUS	0.05	0.02
tblVehicleEF	SBUS	0.14	0.15
tblVehicleEF	SBUS	2.6650e-003	1.5820e-003
tblVehicleEF	SBUS	3.35	1.55
tblVehicleEF	SBUS	5.02	3.81

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	SBUS	0.95	0.43
tblVehicleEF	SBUS	4.2870e-003	1.9710e-003
tblVehicleEF	SBUS	0.74	0.04
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.7000e-005	2.2000e-005
tblVehicleEF	SBUS	4.1020e-003	1.8850e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.7770e-003	2.7840e-003
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.4000e-005	2.0000e-005
tblVehicleEF	SBUS	1.4800e-004	0.02
tblVehicleEF	SBUS	4.9080e-003	5.6280e-003
tblVehicleEF	SBUS	0.16	0.08
tblVehicleEF	SBUS	5.9000e-005	0.00
tblVehicleEF	SBUS	0.09	0.08
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.02
tblVehicleEF	SBUS	3.0130e-003	1.5130e-003
tblVehicleEF	SBUS	9.8910e-003	9.9740e-003
tblVehicleEF	SBUS	2.7000e-005	2.0000e-005
tblVehicleEF	SBUS	1.4800e-004	0.02
tblVehicleEF	SBUS	4.9080e-003	5.6280e-003
tblVehicleEF	SBUS	0.22	0.14
tblVehicleEF	SBUS	5.9000e-005	0.00
tblVehicleEF	SBUS	0.10	0.17
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.02
tblVehicleEF	UBUS	1.13	0.98

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	UBUS	0.03	0.02
tblVehicleEF	UBUS	8.40	11.85
tblVehicleEF	UBUS	1.64	1.98
tblVehicleEF	UBUS	1,550.86	1,179.65
tblVehicleEF	UBUS	17.95	18.09
tblVehicleEF	UBUS	0.21	0.18
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.60	0.26
tblVehicleEF	UBUS	0.19	0.17
tblVehicleEF	UBUS	0.09	0.11
tblVehicleEF	UBUS	0.03	0.03
tblVehicleEF	UBUS	4.5070e-003	3.6910e-003
tblVehicleEF	UBUS	1.2800e-004	1.3400e-004
tblVehicleEF	UBUS	0.04	0.04
tblVehicleEF	UBUS	6.5920e-003	6.8280e-003
tblVehicleEF	UBUS	4.3010e-003	3.5250e-003
tblVehicleEF	UBUS	1.1700e-004	1.2300e-004
tblVehicleEF	UBUS	1.3120e-003	0.03
tblVehicleEF	UBUS	0.02	9.5940e-003
tblVehicleEF	UBUS	8.0200e-004	0.00
tblVehicleEF	UBUS	0.02	0.05
tblVehicleEF	UBUS	4.6980e-003	1.0410e-003
tblVehicleEF	UBUS	0.11	0.08
tblVehicleEF	UBUS	0.01	6.8920e-003
tblVehicleEF	UBUS	1.7800e-004	1.7900e-004
tblVehicleEF	UBUS	1.3120e-003	0.03
tblVehicleEF	UBUS	0.02	9.5940e-003
tblVehicleEF	UBUS	8.0200e-004	0.00
tblVehicleEF	UBUS	1.16	1.04

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	UBUS	4.6980e-003	1.0410e-003
tblVehicleEF	UBUS	0.12	0.09
tblVehicleEF	UBUS	1.13	0.98
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	8.40	11.85
tblVehicleEF	UBUS	1.32	1.62
tblVehicleEF	UBUS	1,550.87	1,179.65
tblVehicleEF	UBUS	17.40	17.49
tblVehicleEF	UBUS	0.21	0.18
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.60	0.26
tblVehicleEF	UBUS	0.17	0.16
tblVehicleEF	UBUS	0.09	0.11
tblVehicleEF	UBUS	0.03	0.03
tblVehicleEF	UBUS	4.5070e-003	3.6910e-003
tblVehicleEF	UBUS	1.2800e-004	1.3400e-004
tblVehicleEF	UBUS	0.04	0.04
tblVehicleEF	UBUS	6.5920e-003	6.8280e-003
tblVehicleEF	UBUS	4.3010e-003	3.5250e-003
tblVehicleEF	UBUS	1.1700e-004	1.2300e-004
tblVehicleEF	UBUS	3.0120e-003	0.05
tblVehicleEF	UBUS	0.02	0.01
tblVehicleEF	UBUS	1.7820e-003	0.00
tblVehicleEF	UBUS	0.02	0.05
tblVehicleEF	UBUS	4.2890e-003	1.0790e-003
tblVehicleEF	UBUS	0.10	0.07
tblVehicleEF	UBUS	0.01	6.8920e-003
tblVehicleEF	UBUS	1.7200e-004	1.7300e-004
tblVehicleEF	UBUS	3.0120e-003	0.05

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	UBUS	0.02	0.01
tblVehicleEF	UBUS	1.7820e-003	0.00
tblVehicleEF	UBUS	1.16	1.04
tblVehicleEF	UBUS	4.2890e-003	1.0790e-003
tblVehicleEF	UBUS	0.10	0.08
tblVehicleEF	UBUS	1.13	0.98
tblVehicleEF	UBUS	0.03	0.02
tblVehicleEF	UBUS	8.40	11.85
tblVehicleEF	UBUS	2.04	2.43
tblVehicleEF	UBUS	1,550.86	1,179.65
tblVehicleEF	UBUS	18.64	18.83
tblVehicleEF	UBUS	0.21	0.18
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.61	0.26
tblVehicleEF	UBUS	0.20	0.18
tblVehicleEF	UBUS	0.09	0.11
tblVehicleEF	UBUS	0.03	0.03
tblVehicleEF	UBUS	4.5070e-003	3.6910e-003
tblVehicleEF	UBUS	1.2800e-004	1.3400e-004
tblVehicleEF	UBUS	0.04	0.04
tblVehicleEF	UBUS	6.5920e-003	6.8280e-003
tblVehicleEF	UBUS	4.3010e-003	3.5250e-003
tblVehicleEF	UBUS	1.1700e-004	1.2300e-004
tblVehicleEF	UBUS	5.2000e-004	0.02
tblVehicleEF	UBUS	0.02	8.5770e-003
tblVehicleEF	UBUS	2.9600e-004	0.00
tblVehicleEF	UBUS	0.02	0.05
tblVehicleEF	UBUS	5.9740e-003	1.0770e-003
tblVehicleEF	UBUS	0.12	0.09

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	UBUS	0.01	6.8920e-003
tblVehicleEF	UBUS	1.8400e-004	1.8600e-004
tblVehicleEF	UBUS	5.2000e-004	0.02
tblVehicleEF	UBUS	0.02	8.5770e-003
tblVehicleEF	UBUS	2.9600e-004	0.00
tblVehicleEF	UBUS	1.16	1.04
tblVehicleEF	UBUS	5.9740e-003	1.0770e-003
tblVehicleEF	UBUS	0.13	0.10
tblWoodstoves	NumberCatalytic	2.85	0.00
tblWoodstoves	NumberNoncatalytic	2.85	0.00
tblWoodstoves	WoodstoveWoodMass	3,120.00	0.00

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
2023	3.3831	34.7157	28.5456	0.0643	19.7610	1.4269	21.0277	10.1307	1.3128	11.2961	0.0000	6,238.9850	6,238.9850	1.9486	0.0432	6,292.7999
2024	1.5973	13.9967	17.2088	0.0321	0.2994	0.6180	0.9174	0.0830	0.5814	0.6644	0.0000	3,084.4821	3,084.4821	0.6129	0.0421	3,112.3409
2025	47.5331	14.1700	19.0289	0.0355	0.3456	0.5840	0.9296	0.0955	0.5524	0.6480	0.0000	3,405.5692	3,405.5692	0.6254	0.0422	3,433.7676
Maximum	**47.5331**	**34.7157**	**28.5456**	**0.0643**	**19.7610**	**1.4269**	**21.0277**	**10.1307**	**1.3128**	**11.2961**	**0.0000**	**6,238.9850**	**6,238.9850**	**1.9486**	**0.0432**	**6,292.7999**

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					
2023	3.3831	34.7157	28.5456	0.0643	7.7702	1.4269	9.0369	3.9682	1.3128	5.1336	0.0000	6,238.9850	6,238.9850	1.9486	0.0432	6,292.7999
2024	1.5973	13.9967	17.2088	0.0321	0.2994	0.6180	0.9174	0.0830	0.5814	0.6644	0.0000	3,084.4821	3,084.4821	0.6129	0.0421	3,112.3409
2025	47.5331	14.1700	19.0289	0.0355	0.3456	0.5840	0.9296	0.0955	0.5524	0.6480	0.0000	3,405.5692	3,405.5692	0.6254	0.0422	3,433.7676
Maximum	**47.5331**	**34.7157**	**28.5456**	**0.0643**	**7.7702**	**1.4269**	**9.0369**	**3.9682**	**1.3128**	**5.1336**	**0.0000**	**6,238.9850**	**6,238.9850**	**1.9486**	**0.0432**	**6,292.7999**

Discovery Builders- Vanden Estates - Solano-Sacramento County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	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	58.76	0.00	52.42	59.78	0.00	48.88	0.00	0.00	0.00	0.00	0.00	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	4.8122	1.3942	9.9434	8.7000e-003		0.1561	0.1561		0.1561	0.1561	0.0000	1,658.5350	1,658.5350	0.0477	0.0301	1,668.6956
Energy	0.0897	0.7665	0.3262	4.8900e-003		0.0620	0.0620		0.0620	0.0620		978.4908	978.4908	0.0188	0.0179	984.3054
Mobile	2.6456	4.6603	23.6228	0.0731	4.1384	0.0687	4.2071	1.0402	0.0649	1.1051		7,507.8051	7,507.8051	0.2706	0.4636	7,652.7105
Total	**7.5475**	**6.8209**	**33.8923**	**0.0866**	**4.1384**	**0.2868**	**4.4252**	**1.0402**	**0.2830**	**1.3232**	**0.0000**	**10,144.8308**	**10,144.8308**	**0.3370**	**0.5116**	**10,305.7115**

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	4.8122	1.3942	9.9434	8.7000e-003		0.1561	0.1561		0.1561	0.1561	0.0000	1,658.5350	1,658.5350	0.0477	0.0301	1,668.6956
Energy	0.0897	0.7665	0.3262	4.8900e-003		0.0620	0.0620		0.0620	0.0620		978.4908	978.4908	0.0188	0.0179	984.3054
Mobile	2.6422	4.6293	23.4549	0.0724	4.0970	0.0681	4.1651	1.0298	0.0643	1.0941		7,435.5550	7,435.5550	0.2695	0.4598	7,579.3257
Total	**7.5440**	**6.7899**	**33.7245**	**0.0859**	**4.0970**	**0.2862**	**4.3832**	**1.0298**	**0.2824**	**1.3121**	**0.0000**	**10,072.5807**	**10,072.5807**	**0.3359**	**0.5079**	**10,232.3267**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	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	**0.05**	**0.45**	**0.50**	**0.81**	**1.00**	**0.22**	**0.95**	**1.00**	**0.21**	**0.83**	**0.00**	**0.71**	**0.71**	**0.32**	**0.73**	**0.71**

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	2/1/2023	3/14/2023	5	30	
2	Site Preparation	Site Preparation	3/15/2023	4/11/2023	5	20	
3	Grading	Grading	4/12/2023	6/13/2023	5	45	
4	Paving	Paving	6/14/2023	8/1/2023	5	35	
5	Building Construction	Building Construction	12/14/2023	8/20/2025	5	440	
6	Architectural Coating	Architectural Coating	6/20/2025	8/7/2025	5	35	

Acres of Grading (Site Preparation Phase): 30

Acres of Grading (Grading Phase): 135

Acres of Paving: 0

Residential Indoor: 415,530; Residential Outdoor: 138,510; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (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	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

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	6	15.00	0.00	57.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	62.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	41.00	12.00	0.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	8.00	0.00	0.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

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					0.4123	0.0000	0.4123	0.0624	0.0000	0.0624			0.0000			0.0000
Off-Road	2.2691	21.4844	19.6434	0.0388		0.9975	0.9975		0.9280	0.9280		3,746.9840	3,746.9840	1.0494		3,773.2183
Total	**2.2691**	**21.4844**	**19.6434**	**0.0388**	**0.4123**	**0.9975**	**1.4098**	**0.0624**	**0.9280**	**0.9904**		**3,746.9840**	**3,746.9840**	**1.0494**		**3,773.2183**

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	4.3300e-003	0.2321	0.0544	1.1300e-003	0.0263	2.2300e-003	0.0286	7.4300e-003	2.1300e-003	9.5600e-003		119.5171	119.5171	6.6000e-004	0.0188	125.1354
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	0.0000
Worker	0.0436	0.0238	0.3412	1.0500e-003	0.0866	5.8000e-004	0.0872	0.0235	5.3000e-004	0.0241		105.6299	105.6299	2.8900e-003	2.6100e-003	106.4811
Total	**0.0480**	**0.2559**	**0.3956**	**2.1800e-003**	**0.1130**	**2.8100e-003**	**0.1158**	**0.0310**	**2.6600e-003**	**0.0336**		**225.1470**	**225.1470**	**3.5500e-003**	**0.0214**	**231.6166**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

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					0.1608	0.0000	0.1608	0.0243	0.0000	0.0243			0.0000			0.0000
Off-Road	2.2691	21.4844	19.6434	0.0388		0.9975	0.9975		0.9280	0.9280	0.0000	3,746.9840	3,746.9840	1.0494		3,773.2183
Total	**2.2691**	**21.4844**	**19.6434**	**0.0388**	**0.1608**	**0.9975**	**1.1583**	**0.0243**	**0.9280**	**0.9523**	**0.0000**	**3,746.9840**	**3,746.9840**	**1.0494**		**3,773.2183**

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	4.3300e-003	0.2321	0.0544	1.1300e-003	0.0263	2.2300e-003	0.0286	7.4300e-003	2.1300e-003	9.5600e-003		119.5171	119.5171	6.6000e-004	0.0188	125.1354
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	0.0000
Worker	0.0436	0.0238	0.3412	1.0500e-003	0.0866	5.8000e-004	0.0872	0.0235	5.3000e-004	0.0241		105.6299	105.6299	2.8900e-003	2.6100e-003	106.4811
Total	**0.0480**	**0.2559**	**0.3956**	**2.1800e-003**	**0.1130**	**2.8100e-003**	**0.1158**	**0.0310**	**2.6600e-003**	**0.0336**		**225.1470**	**225.1470**	**3.5500e-003**	**0.0214**	**231.6166**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

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					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**19.6570**	**1.2660**	**20.9230**	**10.1025**	**1.1647**	**11.2672**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

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	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	0.0000
Worker	0.0524	0.0286	0.4095	1.2500e-003	0.1040	7.0000e-004	0.1046	0.0282	6.4000e-004	0.0289		126.7559	126.7559	3.4700e-003	3.1400e-003	127.7774
Total	**0.0524**	**0.0286**	**0.4095**	**1.2500e-003**	**0.1040**	**7.0000e-004**	**0.1046**	**0.0282**	**6.4000e-004**	**0.0289**		**126.7559**	**126.7559**	**3.4700e-003**	**3.1400e-003**	**127.7774**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

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					7.6662	0.0000	7.6662	3.9400	0.0000	3.9400			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**7.6662**	**1.2660**	**8.9323**	**3.9400**	**1.1647**	**5.1047**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

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	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	0.0000
Worker	0.0524	0.0286	0.4095	1.2500e-003	0.1040	7.0000e-004	0.1046	0.0282	6.4000e-004	0.0289		126.7559	126.7559	3.4700e-003	3.1400e-003	127.7774
Total	**0.0524**	**0.0286**	**0.4095**	**1.2500e-003**	**0.1040**	**7.0000e-004**	**0.1046**	**0.0282**	**6.4000e-004**	**0.0289**		**126.7559**	**126.7559**	**3.4700e-003**	**3.1400e-003**	**127.7774**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

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					9.2048	0.0000	9.2048	3.6540	0.0000	3.6540			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.2048**	**1.4245**	**10.6293**	**3.6540**	**1.3105**	**4.9645**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

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	3.1400e-003	0.1683	0.0394	8.2000e-004	0.0191	1.6200e-003	0.0207	5.3800e-003	1.5500e-003	6.9300e-003		86.6674	86.6674	4.8000e-004	0.0136	90.7415
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	0.0000
Worker	0.0582	0.0318	0.4550	1.3900e-003	0.1155	7.7000e-004	0.1163	0.0314	7.1000e-004	0.0321		140.8399	140.8399	3.8500e-003	3.4900e-003	141.9748
Total	**0.0613**	**0.2001**	**0.4944**	**2.2100e-003**	**0.1346**	**2.3900e-003**	**0.1370**	**0.0367**	**2.2600e-003**	**0.0390**		**227.5073**	**227.5073**	**4.3300e-003**	**0.0171**	**232.7163**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

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					3.5899	0.0000	3.5899	1.4250	0.0000	1.4250			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**3.5899**	**1.4245**	**5.0144**	**1.4250**	**1.3105**	**2.7356**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

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	3.1400e-003	0.1683	0.0394	8.2000e-004	0.0191	1.6200e-003	0.0207	5.3800e-003	1.5500e-003	6.9300e-003		86.6674	86.6674	4.8000e-004	0.0136	90.7415
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	0.0000
Worker	0.0582	0.0318	0.4550	1.3900e-003	0.1155	7.7000e-004	0.1163	0.0314	7.1000e-004	0.0321		140.8399	140.8399	3.8500e-003	3.4900e-003	141.9748
Total	**0.0613**	**0.2001**	**0.4944**	**2.2100e-003**	**0.1346**	**2.3900e-003**	**0.1370**	**0.0367**	**2.2600e-003**	**0.0390**		**227.5073**	**227.5073**	**4.3300e-003**	**0.0171**	**232.7163**

Discovery Builders- Vanden Estates - Solano-Sacramento County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Paving - 2023

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	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

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	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	0.0000
Worker	0.0436	0.0238	0.3412	1.0500e-003	0.0866	5.8000e-004	0.0872	0.0235	5.3000e-004	0.0241		105.6299	105.6299	2.8900e-003	2.6100e-003	106.4811
Total	**0.0436**	**0.0238**	**0.3412**	**1.0500e-003**	**0.0866**	**5.8000e-004**	**0.0872**	**0.0235**	**5.3000e-004**	**0.0241**		**105.6299**	**105.6299**	**2.8900e-003**	**2.6100e-003**	**106.4811**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Paving - 2023

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	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

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	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	0.0000
Worker	0.0436	0.0238	0.3412	1.0500e-003	0.0866	5.8000e-004	0.0872	0.0235	5.3000e-004	0.0241		105.6299	105.6299	2.8900e-003	2.6100e-003	106.4811
Total	**0.0436**	**0.0238**	**0.3412**	**1.0500e-003**	**0.0866**	**5.8000e-004**	**0.0872**	**0.0235**	**5.3000e-004**	**0.0241**		**105.6299**	**105.6299**	**2.8900e-003**	**2.6100e-003**	**106.4811**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2023

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	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

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	0.0000
Vendor	0.0155	0.4952	0.1839	2.4000e-003	0.0626	3.2100e-003	0.0658	0.0187	3.0700e-003	0.0218		253.3092	253.3092	1.4400e-003	0.0360	264.0839
Worker	0.1193	0.0652	0.9327	2.8600e-003	0.2368	1.5800e-003	0.2384	0.0643	1.4600e-003	0.0658		288.7218	288.7218	7.9000e-003	7.1500e-003	291.0484
Total	**0.1348**	**0.5603**	**1.1166**	**5.2600e-003**	**0.2994**	**4.7900e-003**	**0.3042**	**0.0830**	**4.5300e-003**	**0.0875**		**542.0310**	**542.0310**	**9.3400e-003**	**0.0432**	**555.1324**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2023

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	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

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	0.0000
Vendor	0.0155	0.4952	0.1839	2.4000e-003	0.0626	3.2100e-003	0.0658	0.0187	3.0700e-003	0.0218		253.3092	253.3092	1.4400e-003	0.0360	264.0839
Worker	0.1193	0.0652	0.9327	2.8600e-003	0.2368	1.5800e-003	0.2384	0.0643	1.4600e-003	0.0658		288.7218	288.7218	7.9000e-003	7.1500e-003	291.0484
Total	**0.1348**	**0.5603**	**1.1166**	**5.2600e-003**	**0.2994**	**4.7900e-003**	**0.3042**	**0.0830**	**4.5300e-003**	**0.0875**		**542.0310**	**542.0310**	**9.3400e-003**	**0.0432**	**555.1324**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2024

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	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

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	0.0000
Vendor	0.0150	0.4950	0.1781	2.3700e-003	0.0626	3.2300e-003	0.0659	0.0187	3.0900e-003	0.0218		249.6165	249.6165	1.4100e-003	0.0354	260.2077
Worker	0.1107	0.0579	0.8638	2.7600e-003	0.2368	1.5000e-003	0.2383	0.0643	1.3900e-003	0.0657		279.1667	279.1667	7.1300e-003	6.6500e-003	281.3256
Total	**0.1258**	**0.5529**	**1.0419**	**5.1300e-003**	**0.2994**	**4.7300e-003**	**0.3041**	**0.0830**	**4.4800e-003**	**0.0875**		**528.7832**	**528.7832**	**8.5400e-003**	**0.0421**	**541.5333**

Discovery Builders- Vanden Estates - Solano-Sacramento County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2024

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	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

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	0.0000
Vendor	0.0150	0.4950	0.1781	2.3700e-003	0.0626	3.2300e-003	0.0659	0.0187	3.0900e-003	0.0218		249.6165	249.6165	1.4100e-003	0.0354	260.2077
Worker	0.1107	0.0579	0.8638	2.7600e-003	0.2368	1.5000e-003	0.2383	0.0643	1.3900e-003	0.0657		279.1667	279.1667	7.1300e-003	6.6500e-003	281.3256
Total	**0.1258**	**0.5529**	**1.0419**	**5.1300e-003**	**0.2994**	**4.7300e-003**	**0.3041**	**0.0830**	**4.4800e-003**	**0.0875**		**528.7832**	**528.7832**	**8.5400e-003**	**0.0421**	**541.5333**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2025

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	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

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	0.0000
Vendor	0.0147	0.4929	0.1734	2.3300e-003	0.0626	3.2200e-003	0.0659	0.0187	3.0800e-003	0.0218		245.4430	245.4430	1.4000e-003	0.0347	255.8264
Worker	0.1033	0.0519	0.8047	2.6700e-003	0.2368	1.4400e-003	0.2382	0.0643	1.3200e-003	0.0656		269.5991	269.5991	6.4600e-003	6.2200e-003	271.6135
Total	**0.1180**	**0.5447**	**0.9781**	**5.0000e-003**	**0.2994**	**4.6600e-003**	**0.3041**	**0.0830**	**4.4000e-003**	**0.0874**		**515.0421**	**515.0421**	**7.8600e-003**	**0.0410**	**527.4399**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2025

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	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

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	0.0000
Vendor	0.0147	0.4929	0.1734	2.3300e-003	0.0626	3.2200e-003	0.0659	0.0187	3.0800e-003	0.0218		245.4430	245.4430	1.4000e-003	0.0347	255.8264
Worker	0.1033	0.0519	0.8047	2.6700e-003	0.2368	1.4400e-003	0.2382	0.0643	1.3200e-003	0.0656		269.5991	269.5991	6.4600e-003	6.2200e-003	271.6135
Total	**0.1180**	**0.5447**	**0.9781**	**5.0000e-003**	**0.2994**	**4.6600e-003**	**0.3041**	**0.0830**	**4.4000e-003**	**0.0874**		**515.0421**	**515.0421**	**7.8600e-003**	**0.0410**	**527.4399**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2025

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	45.8567					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**46.0276**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

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	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	0.0000
Worker	0.0202	0.0101	0.1570	5.2000e-004	0.0462	2.8000e-004	0.0465	0.0125	2.6000e-004	0.0128		52.6047	52.6047	1.2600e-003	1.2100e-003	52.9978
Total	**0.0202**	**0.0101**	**0.1570**	**5.2000e-004**	**0.0462**	**2.8000e-004**	**0.0465**	**0.0125**	**2.6000e-004**	**0.0128**		**52.6047**	**52.6047**	**1.2600e-003**	**1.2100e-003**	**52.9978**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2025

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	45.8567					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**46.0276**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

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	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	0.0000
Worker	0.0202	0.0101	0.1570	5.2000e-004	0.0462	2.8000e-004	0.0465	0.0125	2.6000e-004	0.0128		52.6047	52.6047	1.2600e-003	1.2100e-003	52.9978
Total	**0.0202**	**0.0101**	**0.1570**	**5.2000e-004**	**0.0462**	**2.8000e-004**	**0.0465**	**0.0125**	**2.6000e-004**	**0.0128**		**52.6047**	**52.6047**	**1.2600e-003**	**1.2100e-003**	**52.9978**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	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	2.6422	4.6293	23.4549	0.0724	4.0970	0.0681	4.1651	1.0298	0.0643	1.0941		7,435.5550	7,435.5550	0.2695	0.4598	7,579.3257
Unmitigated	2.6456	4.6603	23.6228	0.0731	4.1384	0.0687	4.2071	1.0402	0.0649	1.1051		7,507.8051	7,507.8051	0.2706	0.4636	7,652.7105

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	1,076.16	1,087.56	974.70	2,790,359	2,762,455
Total	1,076.16	1,087.56	974.70	2,790,359	2,762,455

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
Single Family Housing	10.00	5.00	7.00	46.00	13.00	41.00	86	11	3

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.524132	0.036190	0.197078	0.133526	0.030925	0.007792	0.010137	0.051911	0.001635	0.001042	0.003862	0.000668	0.001102

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	0.0897	0.7665	0.3262	4.8900e-003		0.0620	0.0620		0.0620	0.0620		978.4908	978.4908	0.0188	0.0179	984.3054
NaturalGas Unmitigated	0.0897	0.7665	0.3262	4.8900e-003		0.0620	0.0620		0.0620	0.0620		978.4908	978.4908	0.0188	0.0179	984.3054

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
Single Family Housing	8317.17	0.0897	0.7665	0.3262	4.8900e-003		0.0620	0.0620		0.0620	0.0620		978.4908	978.4908	0.0188	0.0179	984.3054
Total		**0.0897**	**0.7665**	**0.3262**	**4.8900e-003**		**0.0620**	**0.0620**		**0.0620**	**0.0620**		**978.4908**	**978.4908**	**0.0188**	**0.0179**	**984.3054**

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					
Single Family Housing	8.31717	0.0897	0.7665	0.3262	4.8900e-003		0.0620	0.0620		0.0620	0.0620		978.4908	978.4908	0.0188	0.0179	984.3054
Total		**0.0897**	**0.7665**	**0.3262**	**4.8900e-003**		**0.0620**	**0.0620**		**0.0620**	**0.0620**		**978.4908**	**978.4908**	**0.0188**	**0.0179**	**984.3054**

6.0 Area Detail

6.1 Mitigation Measures Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	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	4.8122	1.3942	9.9434	8.7000e-003		0.1561	0.1561		0.1561	0.1561	0.0000	1,658.5350	1,658.5350	0.0477	0.0301	1,668.6956
Unmitigated	4.8122	1.3942	9.9434	8.7000e-003		0.1561	0.1561		0.1561	0.1561	0.0000	1,658.5350	1,658.5350	0.0477	0.0301	1,668.6956

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	0.4397					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.9398					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1505	1.2859	0.5472	8.2100e-003		0.1040	0.1040		0.1040	0.1040	0.0000	1,641.6000	1,641.6000	0.0315	0.0301	1,651.3552
Landscaping	0.2821	0.1082	9.3962	5.0000e-004		0.0521	0.0521		0.0521	0.0521		16.9350	16.9350	0.0162		17.3404
Total	**4.8122**	**1.3942**	**9.9434**	**8.7100e-003**		**0.1561**	**0.1561**		**0.1561**	**0.1561**	**0.0000**	**1,658.5350**	**1,658.5350**	**0.0477**	**0.0301**	**1,668.6956**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	0.4397					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.9398					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1505	1.2859	0.5472	8.2100e-003		0.1040	0.1040		0.1040	0.1040	0.0000	1,641.6000	1,641.6000	0.0315	0.0301	1,651.3552
Landscaping	0.2821	0.1082	9.3962	5.0000e-004		0.0521	0.0521		0.0521	0.0521		16.9350	16.9350	0.0162		17.3404
Total	**4.8122**	**1.3942**	**9.9434**	**8.7100e-003**		**0.1561**	**0.1561**		**0.1561**	**0.1561**	**0.0000**	**1,658.5350**	**1,658.5350**	**0.0477**	**0.0301**	**1,668.6956**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Discovery Builders- Vanden Estates

Solano-Sacramento County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	114.00	Dwelling Unit	26.70	205,200.00	326

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	56
Climate Zone	4			**Operational Year**	2025
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	236	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 Intensity factor is based on 2015-2017 PG&E Historical Data.

Land Use - Client's information

Construction Phase - Client's input
Note: Architectural coating is flagged: This phase is supposed to take place concurrently with the building construction. For now we selected the last 2 monthos of building construction time for the schedule of this task.

Trips and VMT - For Grading: CalEEMod estimate based on material imported

On-road Fugitive Dust - Updated silt loading factor for Solano County from the CARB 2021 Miscellaneous Process Methodology 7.9 for Entrained Road Travel, Paved Road Dust

Demolition - Based on estimation of building size (sq.ft)

Grading - Conservative assumption for 500CY of material import during grading phase
Total graded acres provided by the client

Architectural Coating - Update valus for Solano-Sacramento county (start date after 2021)

Vehicle Emission Factors - EMFAC 2021

Vehicle Emission Factors - EMFAC 2021

Vehicle Emission Factors - EMFAC 2021

Road Dust - Updated silt loading factorfor Solano County from the CARB 2021 Miscellaneous Process methodology 7.9 for entrained road travel, paved road dust.

Woodstoves - no wood-burning devices assumed
Gas and # No Fireplace was copied from the Data Request

Consumer Products - An updated 2020 VOC emission inventory from CARB and population estimates based on CA DOF demographic projections were used to estimate a Solano County VOC EF for 2020.

Area Coating - Updated for Solano-Sacramento county

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation - Cleint is committed to use Tier 4 construction equipment for this project based on the data request.

Mobile Land Use Mitigation -

Area Mitigation - VOC EF for Sacramento-Solano county is used here. No mitigated EF has been considered for now

Water Mitigation -

Waste Mitigation -

Fleet Mix - EMFAC 2021

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

Discovery Builders- Vanden Estates - Solano-Sacramento County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConsumerProducts	ROG_EF	2.14E-05	1.92E-05
tblFireplaces	NumberGas	0.00	77.52
tblFireplaces	NumberNoFireplace	78.66	36.48
tblFireplaces	NumberWood	35.34	0.00
tblFleetMix	HHD	0.02	0.05
tblFleetMix	LDA	0.56	0.52
tblFleetMix	LDT1	0.05	0.04
tblFleetMix	LDT2	0.17	0.20
tblFleetMix	LHD1	0.03	0.03
tblFleetMix	LHD2	6.6300e-003	7.7920e-003
tblFleetMix	MCY	0.03	3.8620e-003
tblFleetMix	MDV	0.13	0.13
tblFleetMix	MH	4.3970e-003	1.1020e-003
tblFleetMix	MHD	7.8490e-003	0.01
tblFleetMix	OBUS	1.0250e-003	1.6350e-003
tblFleetMix	SBUS	7.9400e-004	6.6800e-004
tblFleetMix	UBUS	3.9200e-004	1.0420e-003
tblGrading	MaterialImported	0.00	500.00
tblLandUse	LotAcreage	37.01	26.70
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblOnRoadDust	RoadSiltLoading	0.10	0.07
tblProjectCharacteristics	CO2IntensityFactor	203.98	236
tblRoadDust	RoadSiltLoading	0.1	0.07

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblSequestration	NumberOfNewTrees	0.00	100.00
tblTripsAndVMT	HaulingTripNumber	63.00	62.00
tblVehicleEF	HHD	0.03	0.12
tblVehicleEF	HHD	6.9130e-003	0.03
tblVehicleEF	HHD	7.86	5.92
tblVehicleEF	HHD	0.26	0.27
tblVehicleEF	HHD	3.0140e-003	3.9100e-004
tblVehicleEF	HHD	1,251.03	920.39
tblVehicleEF	HHD	1,304.74	1,533.36
tblVehicleEF	HHD	0.03	6.6350e-003
tblVehicleEF	HHD	0.20	0.15
tblVehicleEF	HHD	0.21	0.24
tblVehicleEF	HHD	0.00	1.0000e-006
tblVehicleEF	HHD	6.38	4.71
tblVehicleEF	HHD	2.44	1.62
tblVehicleEF	HHD	2.33	2.69
tblVehicleEF	HHD	2.5110e-003	2.0430e-003
tblVehicleEF	HHD	0.06	0.08
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	2.4030e-003	1.9510e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.9480e-003	8.9280e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	1.0000e-006	5.7000e-005
tblVehicleEF	HHD	5.0000e-005	1.6000e-005
tblVehicleEF	HHD	0.53	0.39
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.02	0.01

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	HHD	2.1000e-005	1.7000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.01	8.4300e-003
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	1.0000e-006	5.7000e-005
tblVehicleEF	HHD	5.0000e-005	1.6000e-005
tblVehicleEF	HHD	0.61	0.55
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.03	0.05
tblVehicleEF	HHD	2.1000e-005	1.7000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.03	0.12
tblVehicleEF	HHD	6.9140e-003	0.03
tblVehicleEF	HHD	7.76	5.85
tblVehicleEF	HHD	0.26	0.27
tblVehicleEF	HHD	2.7580e-003	3.5800e-004
tblVehicleEF	HHD	1,235.16	909.44
tblVehicleEF	HHD	1,304.74	1,533.36
tblVehicleEF	HHD	0.03	6.5830e-003
tblVehicleEF	HHD	0.19	0.14
tblVehicleEF	HHD	0.21	0.24
tblVehicleEF	HHD	0.00	1.0000e-006
tblVehicleEF	HHD	6.07	4.38
tblVehicleEF	HHD	2.32	1.54
tblVehicleEF	HHD	2.33	2.69
tblVehicleEF	HHD	2.2200e-003	1.8120e-003
tblVehicleEF	HHD	0.06	0.08
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.03	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	HHD	2.1240e-003	1.7300e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.9480e-003	8.9280e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	3.0000e-006	9.8000e-005
tblVehicleEF	HHD	5.6000e-005	1.8000e-005
tblVehicleEF	HHD	0.56	0.41
tblVehicleEF	HHD	2.0000e-006	0.00
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	2.1000e-005	1.8000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.01	8.3260e-003
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	3.0000e-006	9.8000e-005
tblVehicleEF	HHD	5.6000e-005	1.8000e-005
tblVehicleEF	HHD	0.64	0.57
tblVehicleEF	HHD	2.0000e-006	0.00
tblVehicleEF	HHD	0.03	0.05
tblVehicleEF	HHD	2.1000e-005	1.8000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.02	0.12
tblVehicleEF	HHD	6.9120e-003	0.03
tblVehicleEF	HHD	8.00	6.03
tblVehicleEF	HHD	0.26	0.27
tblVehicleEF	HHD	3.3350e-003	4.3500e-004
tblVehicleEF	HHD	1,272.94	935.51
tblVehicleEF	HHD	1,304.74	1,533.36
tblVehicleEF	HHD	0.03	6.7050e-003
tblVehicleEF	HHD	0.20	0.15

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	HHD	0.21	0.24
tblVehicleEF	HHD	0.00	1.0000e-006
tblVehicleEF	HHD	6.80	4.90
tblVehicleEF	HHD	2.49	1.65
tblVehicleEF	HHD	2.33	2.69
tblVehicleEF	HHD	2.9130e-003	2.3610e-003
tblVehicleEF	HHD	0.06	0.08
tblVehicleEF	HHD	0.04	0.04
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	2.7870e-003	2.2550e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.9480e-003	8.9280e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	0.00	4.6000e-005
tblVehicleEF	HHD	5.2000e-005	1.4000e-005
tblVehicleEF	HHD	0.49	0.36
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	2.3000e-005	1.8000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	HHD	0.01	8.5730e-003
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	0.00	4.6000e-005
tblVehicleEF	HHD	5.2000e-005	1.4000e-005
tblVehicleEF	HHD	0.56	0.51
tblVehicleEF	HHD	0.03	0.05
tblVehicleEF	HHD	2.3000e-005	1.8000e-005
tblVehicleEF	HHD	1.0000e-006	0.00
tblVehicleEF	LDA	1.7540e-003	2.0580e-003
tblVehicleEF	LDA	0.04	0.07

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDA	0.48	0.62
tblVehicleEF	LDA	2.08	3.06
tblVehicleEF	LDA	242.09	260.36
tblVehicleEF	LDA	49.60	66.51
tblVehicleEF	LDA	4.0820e-003	4.4340e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.03	0.04
tblVehicleEF	LDA	0.17	0.25
tblVehicleEF	LDA	0.04	5.3420e-003
tblVehicleEF	LDA	1.3250e-003	1.1650e-003
tblVehicleEF	LDA	1.6690e-003	1.9740e-003
tblVehicleEF	LDA	0.02	1.8700e-003
tblVehicleEF	LDA	1.2200e-003	1.0720e-003
tblVehicleEF	LDA	1.5350e-003	1.8150e-003
tblVehicleEF	LDA	0.04	0.33
tblVehicleEF	LDA	0.09	0.09
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	6.4600e-003	7.7710e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.19	0.31
tblVehicleEF	LDA	2.3950e-003	2.5740e-003
tblVehicleEF	LDA	4.9100e-004	6.5800e-004
tblVehicleEF	LDA	0.04	0.33
tblVehicleEF	LDA	0.09	0.09
tblVehicleEF	LDA	0.03	0.00
tblVehicleEF	LDA	9.3900e-003	0.01
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.21	0.34
tblVehicleEF	LDA	2.0050e-003	2.2110e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDA	0.04	0.06
tblVehicleEF	LDA	0.58	0.84
tblVehicleEF	LDA	1.64	2.41
tblVehicleEF	LDA	262.25	279.90
tblVehicleEF	LDA	48.79	64.82
tblVehicleEF	LDA	3.8030e-003	3.9240e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	0.15	0.22
tblVehicleEF	LDA	0.04	5.3420e-003
tblVehicleEF	LDA	1.3250e-003	1.1650e-003
tblVehicleEF	LDA	1.6690e-003	1.9740e-003
tblVehicleEF	LDA	0.02	1.8700e-003
tblVehicleEF	LDA	1.2200e-003	1.0720e-003
tblVehicleEF	LDA	1.5350e-003	1.8150e-003
tblVehicleEF	LDA	0.09	0.44
tblVehicleEF	LDA	0.10	0.10
tblVehicleEF	LDA	0.08	0.00
tblVehicleEF	LDA	7.2670e-003	8.2010e-003
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.16	0.26
tblVehicleEF	LDA	2.5940e-003	2.7670e-003
tblVehicleEF	LDA	4.8300e-004	6.4100e-004
tblVehicleEF	LDA	0.09	0.44
tblVehicleEF	LDA	0.10	0.10
tblVehicleEF	LDA	0.08	0.00
tblVehicleEF	LDA	0.01	0.01
tblVehicleEF	LDA	0.02	0.03
tblVehicleEF	LDA	0.17	0.28

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDA	1.6580e-003	1.9700e-003
tblVehicleEF	LDA	0.05	0.08
tblVehicleEF	LDA	0.47	0.59
tblVehicleEF	LDA	2.57	3.79
tblVehicleEF	LDA	237.99	253.47
tblVehicleEF	LDA	50.50	67.40
tblVehicleEF	LDA	4.3990e-003	4.8460e-003
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	0.03	0.04
tblVehicleEF	LDA	0.19	0.27
tblVehicleEF	LDA	0.04	5.3420e-003
tblVehicleEF	LDA	1.3250e-003	1.1650e-003
tblVehicleEF	LDA	1.6690e-003	1.9740e-003
tblVehicleEF	LDA	0.02	1.8700e-003
tblVehicleEF	LDA	1.2200e-003	1.0720e-003
tblVehicleEF	LDA	1.5350e-003	1.8150e-003
tblVehicleEF	LDA	0.01	0.29
tblVehicleEF	LDA	0.09	0.08
tblVehicleEF	LDA	9.4810e-003	0.00
tblVehicleEF	LDA	6.2090e-003	7.5700e-003
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	0.23	0.37
tblVehicleEF	LDA	2.3540e-003	2.5060e-003
tblVehicleEF	LDA	5.0000e-004	6.6600e-004
tblVehicleEF	LDA	0.01	0.29
tblVehicleEF	LDA	0.09	0.08
tblVehicleEF	LDA	9.4810e-003	0.00
tblVehicleEF	LDA	9.0230e-003	0.01
tblVehicleEF	LDA	0.03	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDA	0.25	0.40
tblVehicleEF	LDT1	3.3770e-003	5.4510e-003
tblVehicleEF	LDT1	0.06	0.12
tblVehicleEF	LDT1	0.75	1.24
tblVehicleEF	LDT1	2.26	5.81
tblVehicleEF	LDT1	288.86	332.04
tblVehicleEF	LDT1	60.23	87.96
tblVehicleEF	LDT1	5.6760e-003	9.1250e-003
tblVehicleEF	LDT1	0.03	0.04
tblVehicleEF	LDT1	0.06	0.12
tblVehicleEF	LDT1	0.23	0.42
tblVehicleEF	LDT1	0.04	6.7270e-003
tblVehicleEF	LDT1	1.5920e-003	1.7280e-003
tblVehicleEF	LDT1	2.1490e-003	3.0870e-003
tblVehicleEF	LDT1	0.02	2.3540e-003
tblVehicleEF	LDT1	1.4650e-003	1.5890e-003
tblVehicleEF	LDT1	1.9760e-003	2.8390e-003
tblVehicleEF	LDT1	0.09	0.72
tblVehicleEF	LDT1	0.18	0.19
tblVehicleEF	LDT1	0.07	0.00
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	0.08	0.07
tblVehicleEF	LDT1	0.30	0.60
tblVehicleEF	LDT1	2.8580e-003	3.2830e-003
tblVehicleEF	LDT1	5.9600e-004	8.7000e-004
tblVehicleEF	LDT1	0.09	0.72
tblVehicleEF	LDT1	0.18	0.19
tblVehicleEF	LDT1	0.07	0.00
tblVehicleEF	LDT1	0.02	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT1	0.08	0.07
tblVehicleEF	LDT1	0.33	0.66
tblVehicleEF	LDT1	3.8360e-003	5.8520e-003
tblVehicleEF	LDT1	0.05	0.10
tblVehicleEF	LDT1	0.89	1.67
tblVehicleEF	LDT1	1.79	4.53
tblVehicleEF	LDT1	309.72	355.25
tblVehicleEF	LDT1	59.29	85.19
tblVehicleEF	LDT1	5.2320e-003	8.0630e-003
tblVehicleEF	LDT1	0.02	0.04
tblVehicleEF	LDT1	0.06	0.10
tblVehicleEF	LDT1	0.20	0.38
tblVehicleEF	LDT1	0.04	6.7270e-003
tblVehicleEF	LDT1	1.5920e-003	1.7280e-003
tblVehicleEF	LDT1	2.1490e-003	3.0870e-003
tblVehicleEF	LDT1	0.02	2.3540e-003
tblVehicleEF	LDT1	1.4650e-003	1.5890e-003
tblVehicleEF	LDT1	1.9760e-003	2.8390e-003
tblVehicleEF	LDT1	0.22	0.99
tblVehicleEF	LDT1	0.21	0.21
tblVehicleEF	LDT1	0.17	0.00
tblVehicleEF	LDT1	0.02	0.03
tblVehicleEF	LDT1	0.08	0.07
tblVehicleEF	LDT1	0.25	0.49
tblVehicleEF	LDT1	3.0650e-003	3.5120e-003
tblVehicleEF	LDT1	5.8700e-004	8.4200e-004
tblVehicleEF	LDT1	0.22	0.99
tblVehicleEF	LDT1	0.21	0.21
tblVehicleEF	LDT1	0.17	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT1	0.02	0.04
tblVehicleEF	LDT1	0.08	0.07
tblVehicleEF	LDT1	0.27	0.54
tblVehicleEF	LDT1	3.2020e-003	5.2300e-003
tblVehicleEF	LDT1	0.07	0.13
tblVehicleEF	LDT1	0.73	1.17
tblVehicleEF	LDT1	2.81	7.25
tblVehicleEF	LDT1	284.59	324.78
tblVehicleEF	LDT1	61.29	90.26
tblVehicleEF	LDT1	6.1600e-003	9.9890e-003
tblVehicleEF	LDT1	0.03	0.04
tblVehicleEF	LDT1	0.07	0.14
tblVehicleEF	LDT1	0.26	0.47
tblVehicleEF	LDT1	0.04	6.7270e-003
tblVehicleEF	LDT1	1.5920e-003	1.7280e-003
tblVehicleEF	LDT1	2.1490e-003	3.0870e-003
tblVehicleEF	LDT1	0.02	2.3540e-003
tblVehicleEF	LDT1	1.4650e-003	1.5890e-003
tblVehicleEF	LDT1	1.9760e-003	2.8390e-003
tblVehicleEF	LDT1	0.03	0.63
tblVehicleEF	LDT1	0.18	0.17
tblVehicleEF	LDT1	0.02	0.00
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	0.10	0.07
tblVehicleEF	LDT1	0.36	0.72
tblVehicleEF	LDT1	2.8160e-003	3.2110e-003
tblVehicleEF	LDT1	6.0700e-004	8.9200e-004
tblVehicleEF	LDT1	0.03	0.63
tblVehicleEF	LDT1	0.18	0.17

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT1	0.02	0.00
tblVehicleEF	LDT1	0.02	0.03
tblVehicleEF	LDT1	0.10	0.07
tblVehicleEF	LDT1	0.39	0.78
tblVehicleEF	LDT2	2.6710e-003	2.5210e-003
tblVehicleEF	LDT2	0.06	0.08
tblVehicleEF	LDT2	0.63	0.73
tblVehicleEF	LDT2	2.66	3.66
tblVehicleEF	LDT2	305.28	342.36
tblVehicleEF	LDT2	63.97	86.77
tblVehicleEF	LDT2	5.3240e-003	5.8360e-003
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.05	0.06
tblVehicleEF	LDT2	0.24	0.33
tblVehicleEF	LDT2	0.04	6.4360e-003
tblVehicleEF	LDT2	1.3420e-003	1.2270e-003
tblVehicleEF	LDT2	1.6860e-003	2.0640e-003
tblVehicleEF	LDT2	0.02	2.2530e-003
tblVehicleEF	LDT2	1.2350e-003	1.1290e-003
tblVehicleEF	LDT2	1.5500e-003	1.8980e-003
tblVehicleEF	LDT2	0.06	0.33
tblVehicleEF	LDT2	0.12	0.09
tblVehicleEF	LDT2	0.06	0.00
tblVehicleEF	LDT2	0.01	9.6590e-003
tblVehicleEF	LDT2	0.06	0.03
tblVehicleEF	LDT2	0.28	0.38
tblVehicleEF	LDT2	3.0200e-003	3.3840e-003
tblVehicleEF	LDT2	6.3300e-004	8.5800e-004
tblVehicleEF	LDT2	0.06	0.33

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT2	0.12	0.09
tblVehicleEF	LDT2	0.06	0.00
tblVehicleEF	LDT2	0.02	0.01
tblVehicleEF	LDT2	0.06	0.03
tblVehicleEF	LDT2	0.30	0.42
tblVehicleEF	LDT2	3.0470e-003	2.7100e-003
tblVehicleEF	LDT2	0.05	0.07
tblVehicleEF	LDT2	0.76	0.99
tblVehicleEF	LDT2	2.10	2.87
tblVehicleEF	LDT2	325.26	360.07
tblVehicleEF	LDT2	62.91	84.18
tblVehicleEF	LDT2	4.9390e-003	5.1690e-003
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.05	0.05
tblVehicleEF	LDT2	0.22	0.30
tblVehicleEF	LDT2	0.04	6.4360e-003
tblVehicleEF	LDT2	1.3420e-003	1.2270e-003
tblVehicleEF	LDT2	1.6860e-003	2.0640e-003
tblVehicleEF	LDT2	0.02	2.2530e-003
tblVehicleEF	LDT2	1.2350e-003	1.1290e-003
tblVehicleEF	LDT2	1.5500e-003	1.8980e-003
tblVehicleEF	LDT2	0.15	0.43
tblVehicleEF	LDT2	0.14	0.10
tblVehicleEF	LDT2	0.13	0.00
tblVehicleEF	LDT2	0.01	0.01
tblVehicleEF	LDT2	0.05	0.03
tblVehicleEF	LDT2	0.23	0.32
tblVehicleEF	LDT2	3.2180e-003	3.5590e-003
tblVehicleEF	LDT2	6.2300e-004	8.3200e-004

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT2	0.15	0.43
tblVehicleEF	LDT2	0.14	0.10
tblVehicleEF	LDT2	0.13	0.00
tblVehicleEF	LDT2	0.02	0.01
tblVehicleEF	LDT2	0.05	0.03
tblVehicleEF	LDT2	0.25	0.35
tblVehicleEF	LDT2	2.5250e-003	2.4120e-003
tblVehicleEF	LDT2	0.07	0.10
tblVehicleEF	LDT2	0.62	0.69
tblVehicleEF	LDT2	3.30	4.54
tblVehicleEF	LDT2	301.19	331.94
tblVehicleEF	LDT2	65.15	87.29
tblVehicleEF	LDT2	5.7500e-003	6.3700e-003
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.06	0.07
tblVehicleEF	LDT2	0.27	0.37
tblVehicleEF	LDT2	0.04	6.4360e-003
tblVehicleEF	LDT2	1.3420e-003	1.2270e-003
tblVehicleEF	LDT2	1.6860e-003	2.0640e-003
tblVehicleEF	LDT2	0.02	2.2530e-003
tblVehicleEF	LDT2	1.2350e-003	1.1290e-003
tblVehicleEF	LDT2	1.5500e-003	1.8980e-003
tblVehicleEF	LDT2	0.02	0.30
tblVehicleEF	LDT2	0.12	0.08
tblVehicleEF	LDT2	0.02	0.00
tblVehicleEF	LDT2	9.9950e-003	9.4070e-003
tblVehicleEF	LDT2	0.07	0.03
tblVehicleEF	LDT2	0.33	0.45
tblVehicleEF	LDT2	2.9800e-003	3.2810e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LDT2	6.4500e-004	8.6300e-004
tblVehicleEF	LDT2	0.02	0.30
tblVehicleEF	LDT2	0.12	0.08
tblVehicleEF	LDT2	0.02	0.00
tblVehicleEF	LDT2	0.01	0.01
tblVehicleEF	LDT2	0.07	0.03
tblVehicleEF	LDT2	0.36	0.50
tblVehicleEF	LHD1	4.3180e-003	4.6310e-003
tblVehicleEF	LHD1	8.9910e-003	9.2870e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.17	0.18
tblVehicleEF	LHD1	0.86	0.92
tblVehicleEF	LHD1	0.94	1.80
tblVehicleEF	LHD1	9.24	9.12
tblVehicleEF	LHD1	755.58	763.23
tblVehicleEF	LHD1	9.93	14.97
tblVehicleEF	LHD1	8.9500e-004	8.2400e-004
tblVehicleEF	LHD1	0.05	0.05
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	1.14	1.05
tblVehicleEF	LHD1	0.27	0.38
tblVehicleEF	LHD1	1.0310e-003	9.2500e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.8020e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.2400e-004	2.0100e-004
tblVehicleEF	LHD1	9.8700e-004	8.8500e-004
tblVehicleEF	LHD1	0.03	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD1	2.5140e-003	2.4510e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.0600e-004	1.8400e-004
tblVehicleEF	LHD1	1.9890e-003	0.12
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	9.9700e-004	0.00
tblVehicleEF	LHD1	0.11	0.12
tblVehicleEF	LHD1	0.22	0.06
tblVehicleEF	LHD1	0.06	0.10
tblVehicleEF	LHD1	8.9000e-005	8.8000e-005
tblVehicleEF	LHD1	7.3540e-003	7.4280e-003
tblVehicleEF	LHD1	9.8000e-005	1.4800e-004
tblVehicleEF	LHD1	1.9890e-003	0.12
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	9.9700e-004	0.00
tblVehicleEF	LHD1	0.14	0.14
tblVehicleEF	LHD1	0.22	0.06
tblVehicleEF	LHD1	0.07	0.11
tblVehicleEF	LHD1	4.3310e-003	4.6520e-003
tblVehicleEF	LHD1	9.1680e-003	9.4660e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.17	0.18
tblVehicleEF	LHD1	0.87	0.94
tblVehicleEF	LHD1	0.87	1.66
tblVehicleEF	LHD1	9.24	9.12
tblVehicleEF	LHD1	755.60	763.27
tblVehicleEF	LHD1	9.80	14.74

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD1	8.9700e-004	8.2700e-004
tblVehicleEF	LHD1	0.05	0.05
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	1.08	0.99
tblVehicleEF	LHD1	0.25	0.35
tblVehicleEF	LHD1	1.0310e-003	9.2500e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.8020e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.2400e-004	2.0100e-004
tblVehicleEF	LHD1	9.8700e-004	8.8500e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5140e-003	2.4510e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.0600e-004	1.8400e-004
tblVehicleEF	LHD1	4.6780e-003	0.16
tblVehicleEF	LHD1	0.09	0.03
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.3130e-003	0.00
tblVehicleEF	LHD1	0.11	0.12
tblVehicleEF	LHD1	0.22	0.06
tblVehicleEF	LHD1	0.06	0.09
tblVehicleEF	LHD1	8.9000e-005	8.8000e-005
tblVehicleEF	LHD1	7.3540e-003	7.4280e-003
tblVehicleEF	LHD1	9.7000e-005	1.4600e-004
tblVehicleEF	LHD1	4.6780e-003	0.16
tblVehicleEF	LHD1	0.09	0.03
tblVehicleEF	LHD1	0.03	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD1	2.3130e-003	0.00
tblVehicleEF	LHD1	0.14	0.15
tblVehicleEF	LHD1	0.22	0.06
tblVehicleEF	LHD1	0.07	0.10
tblVehicleEF	LHD1	4.3030e-003	4.6080e-003
tblVehicleEF	LHD1	8.8020e-003	9.0980e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	0.17	0.18
tblVehicleEF	LHD1	0.84	0.90
tblVehicleEF	LHD1	1.03	1.97
tblVehicleEF	LHD1	9.24	9.12
tblVehicleEF	LHD1	755.55	763.19
tblVehicleEF	LHD1	10.09	15.27
tblVehicleEF	LHD1	8.9200e-004	8.2100e-004
tblVehicleEF	LHD1	0.05	0.05
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.08	0.07
tblVehicleEF	LHD1	1.17	1.08
tblVehicleEF	LHD1	0.29	0.41
tblVehicleEF	LHD1	1.0310e-003	9.2500e-004
tblVehicleEF	LHD1	0.08	0.08
tblVehicleEF	LHD1	0.01	9.8020e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.2400e-004	2.0100e-004
tblVehicleEF	LHD1	9.8700e-004	8.8500e-004
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.5140e-003	2.4510e-003
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	2.0600e-004	1.8400e-004

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD1	5.9200e-004	0.11
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	2.8600e-004	0.00
tblVehicleEF	LHD1	0.11	0.12
tblVehicleEF	LHD1	0.25	0.06
tblVehicleEF	LHD1	0.07	0.10
tblVehicleEF	LHD1	8.9000e-005	8.8000e-005
tblVehicleEF	LHD1	7.3530e-003	7.4270e-003
tblVehicleEF	LHD1	1.0000e-004	1.5100e-004
tblVehicleEF	LHD1	5.9200e-004	0.11
tblVehicleEF	LHD1	0.08	0.03
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	2.8600e-004	0.00
tblVehicleEF	LHD1	0.13	0.14
tblVehicleEF	LHD1	0.25	0.06
tblVehicleEF	LHD1	0.08	0.11
tblVehicleEF	LHD2	2.6620e-003	2.5970e-003
tblVehicleEF	LHD2	6.8360e-003	7.5600e-003
tblVehicleEF	LHD2	6.5040e-003	9.7140e-003
tblVehicleEF	LHD2	0.13	0.13
tblVehicleEF	LHD2	0.66	0.58
tblVehicleEF	LHD2	0.48	0.94
tblVehicleEF	LHD2	14.63	14.60
tblVehicleEF	LHD2	743.33	820.97
tblVehicleEF	LHD2	6.35	7.70
tblVehicleEF	LHD2	1.9270e-003	1.9220e-003
tblVehicleEF	LHD2	0.07	0.09
tblVehicleEF	LHD2	0.01	0.02

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD2	0.11	0.12
tblVehicleEF	LHD2	1.08	1.07
tblVehicleEF	LHD2	0.15	0.19
tblVehicleEF	LHD2	1.5350e-003	1.5290e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.7000e-005	7.3000e-005
tblVehicleEF	LHD2	1.4680e-003	1.4630e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.7330e-003	2.7300e-003
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	8.9000e-005	6.7000e-005
tblVehicleEF	LHD2	7.8200e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	4.2500e-004	0.00
tblVehicleEF	LHD2	0.12	0.14
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	7.1590e-003	7.8850e-003
tblVehicleEF	LHD2	6.3000e-005	7.6000e-005
tblVehicleEF	LHD2	7.8200e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	4.2500e-004	0.00
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.03	0.05

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD2	2.6700e-003	2.6080e-003
tblVehicleEF	LHD2	6.8870e-003	7.6120e-003
tblVehicleEF	LHD2	6.1330e-003	9.1710e-003
tblVehicleEF	LHD2	0.13	0.13
tblVehicleEF	LHD2	0.66	0.59
tblVehicleEF	LHD2	0.45	0.87
tblVehicleEF	LHD2	14.63	14.60
tblVehicleEF	LHD2	743.34	820.98
tblVehicleEF	LHD2	6.29	7.58
tblVehicleEF	LHD2	1.9290e-003	1.9230e-003
tblVehicleEF	LHD2	0.07	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.11	0.12
tblVehicleEF	LHD2	1.03	1.02
tblVehicleEF	LHD2	0.14	0.18
tblVehicleEF	LHD2	1.5350e-003	1.5290e-003
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.7000e-005	7.3000e-005
tblVehicleEF	LHD2	1.4680e-003	1.4630e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.7330e-003	2.7300e-003
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	8.9000e-005	6.7000e-005
tblVehicleEF	LHD2	1.8070e-003	0.07
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	9.6400e-004	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD2	0.12	0.14
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.03	0.04
tblVehicleEF	LHD2	7.1590e-003	7.8850e-003
tblVehicleEF	LHD2	6.2000e-005	7.5000e-005
tblVehicleEF	LHD2	1.8070e-003	0.07
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	9.6400e-004	0.00
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.07	0.02
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	2.6540e-003	2.5850e-003
tblVehicleEF	LHD2	6.7800e-003	7.5040e-003
tblVehicleEF	LHD2	6.9320e-003	0.01
tblVehicleEF	LHD2	0.13	0.13
tblVehicleEF	LHD2	0.65	0.57
tblVehicleEF	LHD2	0.53	1.03
tblVehicleEF	LHD2	14.63	14.60
tblVehicleEF	LHD2	743.32	820.95
tblVehicleEF	LHD2	6.43	7.86
tblVehicleEF	LHD2	1.9250e-003	1.9200e-003
tblVehicleEF	LHD2	0.07	0.09
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	0.11	0.12
tblVehicleEF	LHD2	1.10	1.10
tblVehicleEF	LHD2	0.16	0.20
tblVehicleEF	LHD2	1.5350e-003	1.5290e-003
tblVehicleEF	LHD2	0.09	0.09

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	9.7000e-005	7.3000e-005
tblVehicleEF	LHD2	1.4680e-003	1.4630e-003
tblVehicleEF	LHD2	0.04	0.03
tblVehicleEF	LHD2	2.7330e-003	2.7300e-003
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	8.9000e-005	6.7000e-005
tblVehicleEF	LHD2	2.5600e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	1.3200e-004	0.00
tblVehicleEF	LHD2	0.12	0.14
tblVehicleEF	LHD2	0.08	0.02
tblVehicleEF	LHD2	0.03	0.05
tblVehicleEF	LHD2	7.1590e-003	7.8850e-003
tblVehicleEF	LHD2	6.4000e-005	7.8000e-005
tblVehicleEF	LHD2	2.5600e-004	0.05
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	1.3200e-004	0.00
tblVehicleEF	LHD2	0.14	0.16
tblVehicleEF	LHD2	0.08	0.02
tblVehicleEF	LHD2	0.04	0.06
tblVehicleEF	MCY	0.36	0.18
tblVehicleEF	MCY	0.26	0.20
tblVehicleEF	MCY	21.80	14.81
tblVehicleEF	MCY	9.11	8.47
tblVehicleEF	MCY	222.79	192.97

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MCY	61.99	53.02
tblVehicleEF	MCY	0.07	0.04
tblVehicleEF	MCY	0.02	9.0630e-003
tblVehicleEF	MCY	1.20	0.65
tblVehicleEF	MCY	0.27	0.16
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	2.0990e-003	1.8220e-003
tblVehicleEF	MCY	2.9200e-003	3.3960e-003
tblVehicleEF	MCY	5.0400e-003	4.2000e-003
tblVehicleEF	MCY	1.9630e-003	1.7070e-003
tblVehicleEF	MCY	2.7480e-003	3.1970e-003
tblVehicleEF	MCY	1.04	2.43
tblVehicleEF	MCY	0.82	3.58
tblVehicleEF	MCY	0.56	0.00
tblVehicleEF	MCY	2.43	1.23
tblVehicleEF	MCY	0.47	1.36
tblVehicleEF	MCY	1.98	1.52
tblVehicleEF	MCY	2.2050e-003	1.9080e-003
tblVehicleEF	MCY	6.1300e-004	5.2400e-004
tblVehicleEF	MCY	1.04	2.43
tblVehicleEF	MCY	0.82	3.58
tblVehicleEF	MCY	0.56	0.00
tblVehicleEF	MCY	3.00	1.46
tblVehicleEF	MCY	0.47	1.36
tblVehicleEF	MCY	2.16	1.66
tblVehicleEF	MCY	0.35	0.18
tblVehicleEF	MCY	0.22	0.17
tblVehicleEF	MCY	21.23	14.66
tblVehicleEF	MCY	7.93	7.31

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MCY	221.57	192.61
tblVehicleEF	MCY	58.97	50.28
tblVehicleEF	MCY	0.06	0.04
tblVehicleEF	MCY	0.01	8.6480e-003
tblVehicleEF	MCY	1.03	0.56
tblVehicleEF	MCY	0.25	0.14
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	2.0990e-003	1.8220e-003
tblVehicleEF	MCY	2.9200e-003	3.3960e-003
tblVehicleEF	MCY	5.0400e-003	4.2000e-003
tblVehicleEF	MCY	1.9630e-003	1.7070e-003
tblVehicleEF	MCY	2.7480e-003	3.1970e-003
tblVehicleEF	MCY	2.73	3.89
tblVehicleEF	MCY	1.18	3.79
tblVehicleEF	MCY	1.67	0.00
tblVehicleEF	MCY	2.35	1.19
tblVehicleEF	MCY	0.45	1.40
tblVehicleEF	MCY	1.64	1.26
tblVehicleEF	MCY	2.1930e-003	1.9040e-003
tblVehicleEF	MCY	5.8400e-004	4.9700e-004
tblVehicleEF	MCY	2.73	3.89
tblVehicleEF	MCY	1.18	3.79
tblVehicleEF	MCY	1.67	0.00
tblVehicleEF	MCY	2.90	1.42
tblVehicleEF	MCY	0.45	1.40
tblVehicleEF	MCY	1.78	1.36
tblVehicleEF	MCY	0.37	0.19
tblVehicleEF	MCY	0.32	0.25
tblVehicleEF	MCY	24.34	15.83

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MCY	11.05	10.30
tblVehicleEF	MCY	227.35	194.79
tblVehicleEF	MCY	66.65	57.15
tblVehicleEF	MCY	0.07	0.05
tblVehicleEF	MCY	0.02	9.6640e-003
tblVehicleEF	MCY	1.31	0.71
tblVehicleEF	MCY	0.30	0.17
tblVehicleEF	MCY	0.01	0.01
tblVehicleEF	MCY	2.0990e-003	1.8220e-003
tblVehicleEF	MCY	2.9200e-003	3.3960e-003
tblVehicleEF	MCY	5.0400e-003	4.2000e-003
tblVehicleEF	MCY	1.9630e-003	1.7070e-003
tblVehicleEF	MCY	2.7480e-003	3.1970e-003
tblVehicleEF	MCY	0.18	1.99
tblVehicleEF	MCY	0.87	3.23
tblVehicleEF	MCY	0.11	0.00
tblVehicleEF	MCY	2.58	1.29
tblVehicleEF	MCY	0.56	1.47
tblVehicleEF	MCY	2.46	1.90
tblVehicleEF	MCY	2.2500e-003	1.9260e-003
tblVehicleEF	MCY	6.6000e-004	5.6500e-004
tblVehicleEF	MCY	0.18	1.99
tblVehicleEF	MCY	0.87	3.23
tblVehicleEF	MCY	0.11	0.00
tblVehicleEF	MCY	3.18	1.53
tblVehicleEF	MCY	0.56	1.47
tblVehicleEF	MCY	2.68	2.06
tblVehicleEF	MDV	3.2150e-003	3.3870e-003
tblVehicleEF	MDV	0.07	0.11

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MDV	0.69	0.85
tblVehicleEF	MDV	3.02	4.16
tblVehicleEF	MDV	376.27	417.27
tblVehicleEF	MDV	79.53	106.39
tblVehicleEF	MDV	7.3500e-003	8.2110e-003
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	0.07	0.09
tblVehicleEF	MDV	0.31	0.46
tblVehicleEF	MDV	0.04	6.5950e-003
tblVehicleEF	MDV	1.4030e-003	1.3070e-003
tblVehicleEF	MDV	1.7530e-003	2.1690e-003
tblVehicleEF	MDV	0.02	2.3080e-003
tblVehicleEF	MDV	1.2940e-003	1.2050e-003
tblVehicleEF	MDV	1.6120e-003	1.9940e-003
tblVehicleEF	MDV	0.08	0.45
tblVehicleEF	MDV	0.16	0.11
tblVehicleEF	MDV	0.08	0.00
tblVehicleEF	MDV	0.01	0.01
tblVehicleEF	MDV	0.07	0.04
tblVehicleEF	MDV	0.37	0.54
tblVehicleEF	MDV	3.7190e-003	4.1220e-003
tblVehicleEF	MDV	7.8700e-004	1.0520e-003
tblVehicleEF	MDV	0.08	0.45
tblVehicleEF	MDV	0.16	0.11
tblVehicleEF	MDV	0.08	0.00
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	0.07	0.04
tblVehicleEF	MDV	0.40	0.60
tblVehicleEF	MDV	3.6710e-003	3.6450e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MDV	0.06	0.09
tblVehicleEF	MDV	0.83	1.15
tblVehicleEF	MDV	2.37	3.27
tblVehicleEF	MDV	396.81	435.09
tblVehicleEF	MDV	78.29	103.57
tblVehicleEF	MDV	6.9040e-003	7.3580e-003
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	0.06	0.08
tblVehicleEF	MDV	0.28	0.41
tblVehicleEF	MDV	0.04	6.5950e-003
tblVehicleEF	MDV	1.4030e-003	1.3070e-003
tblVehicleEF	MDV	1.7530e-003	2.1690e-003
tblVehicleEF	MDV	0.02	2.3080e-003
tblVehicleEF	MDV	1.2940e-003	1.2050e-003
tblVehicleEF	MDV	1.6120e-003	1.9940e-003
tblVehicleEF	MDV	0.19	0.58
tblVehicleEF	MDV	0.17	0.12
tblVehicleEF	MDV	0.17	0.00
tblVehicleEF	MDV	0.01	0.01
tblVehicleEF	MDV	0.06	0.04
tblVehicleEF	MDV	0.30	0.45
tblVehicleEF	MDV	3.9220e-003	4.2990e-003
tblVehicleEF	MDV	7.7500e-004	1.0240e-003
tblVehicleEF	MDV	0.19	0.58
tblVehicleEF	MDV	0.17	0.12
tblVehicleEF	MDV	0.17	0.00
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	0.06	0.04
tblVehicleEF	MDV	0.33	0.49

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MDV	3.0420e-003	3.2440e-003
tblVehicleEF	MDV	0.09	0.13
tblVehicleEF	MDV	0.67	0.80
tblVehicleEF	MDV	3.75	5.18
tblVehicleEF	MDV	372.07	406.21
tblVehicleEF	MDV	80.92	107.27
tblVehicleEF	MDV	7.8440e-003	8.8830e-003
tblVehicleEF	MDV	0.03	0.05
tblVehicleEF	MDV	0.07	0.11
tblVehicleEF	MDV	0.35	0.51
tblVehicleEF	MDV	0.04	6.5950e-003
tblVehicleEF	MDV	1.4030e-003	1.3070e-003
tblVehicleEF	MDV	1.7530e-003	2.1690e-003
tblVehicleEF	MDV	0.02	2.3080e-003
tblVehicleEF	MDV	1.2940e-003	1.2050e-003
tblVehicleEF	MDV	1.6120e-003	1.9940e-003
tblVehicleEF	MDV	0.03	0.42
tblVehicleEF	MDV	0.16	0.10
tblVehicleEF	MDV	0.02	0.00
tblVehicleEF	MDV	0.01	0.01
tblVehicleEF	MDV	0.08	0.04
tblVehicleEF	MDV	0.44	0.65
tblVehicleEF	MDV	3.6780e-003	4.0130e-003
tblVehicleEF	MDV	8.0100e-004	1.0600e-003
tblVehicleEF	MDV	0.03	0.42
tblVehicleEF	MDV	0.16	0.10
tblVehicleEF	MDV	0.02	0.00
tblVehicleEF	MDV	0.02	0.02
tblVehicleEF	MDV	0.08	0.04

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MDV	0.48	0.71
tblVehicleEF	MH	9.7180e-003	0.01
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.89	0.92
tblVehicleEF	MH	1.95	2.30
tblVehicleEF	MH	1,528.93	1,691.97
tblVehicleEF	MH	17.93	22.23
tblVehicleEF	MH	0.06	0.07
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.62	1.60
tblVehicleEF	MH	0.25	0.32
tblVehicleEF	MH	0.13	0.04
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.2100e-004	2.6200e-004
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	3.2920e-003	3.2950e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.0300e-004	2.4100e-004
tblVehicleEF	MH	0.66	31.79
tblVehicleEF	MH	0.06	7.96
tblVehicleEF	MH	0.25	0.00
tblVehicleEF	MH	0.07	0.07
tblVehicleEF	MH	0.01	1.9600e-003
tblVehicleEF	MH	0.09	0.11
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	1.7700e-004	2.2000e-004
tblVehicleEF	MH	0.66	31.79
tblVehicleEF	MH	0.06	7.96

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MH	0.25	0.00
tblVehicleEF	MH	0.09	0.10
tblVehicleEF	MH	0.01	1.9600e-003
tblVehicleEF	MH	0.10	0.12
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.02	0.02
tblVehicleEF	MH	0.92	0.95
tblVehicleEF	MH	1.76	2.08
tblVehicleEF	MH	1,528.98	1,692.02
tblVehicleEF	MH	17.61	21.85
tblVehicleEF	MH	0.06	0.07
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	1.53	1.50
tblVehicleEF	MH	0.24	0.30
tblVehicleEF	MH	0.13	0.04
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.2100e-004	2.6200e-004
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	3.2920e-003	3.2950e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.0300e-004	2.4100e-004
tblVehicleEF	MH	1.55	42.60
tblVehicleEF	MH	0.06	8.74
tblVehicleEF	MH	0.58	0.00
tblVehicleEF	MH	0.07	0.08
tblVehicleEF	MH	0.01	2.0200e-003
tblVehicleEF	MH	0.08	0.10
tblVehicleEF	MH	0.02	0.02

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MH	1.7400e-004	2.1600e-004
tblVehicleEF	MH	1.55	42.60
tblVehicleEF	MH	0.06	8.74
tblVehicleEF	MH	0.58	0.00
tblVehicleEF	MH	0.09	0.10
tblVehicleEF	MH	0.01	2.0200e-003
tblVehicleEF	MH	0.09	0.11
tblVehicleEF	MH	9.4290e-003	0.01
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.86	0.89
tblVehicleEF	MH	2.17	2.57
tblVehicleEF	MH	1,528.87	1,691.91
tblVehicleEF	MH	18.31	22.68
tblVehicleEF	MH	0.06	0.07
tblVehicleEF	MH	0.03	0.04
tblVehicleEF	MH	1.67	1.65
tblVehicleEF	MH	0.28	0.35
tblVehicleEF	MH	0.13	0.04
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.2100e-004	2.6200e-004
tblVehicleEF	MH	0.06	0.02
tblVehicleEF	MH	3.2920e-003	3.2950e-003
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	2.0300e-004	2.4100e-004
tblVehicleEF	MH	0.21	28.39
tblVehicleEF	MH	0.06	7.08
tblVehicleEF	MH	0.08	0.00
tblVehicleEF	MH	0.07	0.07

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MH	0.01	2.0060e-003
tblVehicleEF	MH	0.10	0.11
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	1.8100e-004	2.2400e-004
tblVehicleEF	MH	0.21	28.39
tblVehicleEF	MH	0.06	7.08
tblVehicleEF	MH	0.08	0.00
tblVehicleEF	MH	0.09	0.09
tblVehicleEF	MH	0.01	2.0060e-003
tblVehicleEF	MH	0.11	0.13
tblVehicleEF	MHD	4.0240e-003	0.01
tblVehicleEF	MHD	2.2450e-003	8.7630e-003
tblVehicleEF	MHD	0.01	8.8210e-003
tblVehicleEF	MHD	0.41	0.68
tblVehicleEF	MHD	0.29	0.37
tblVehicleEF	MHD	1.17	1.04
tblVehicleEF	MHD	75.13	165.19
tblVehicleEF	MHD	1,122.68	1,235.68
tblVehicleEF	MHD	10.09	8.51
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.13	0.15
tblVehicleEF	MHD	8.2430e-003	6.1930e-003
tblVehicleEF	MHD	0.45	0.93
tblVehicleEF	MHD	1.52	1.05
tblVehicleEF	MHD	1.66	1.41
tblVehicleEF	MHD	3.9300e-004	1.7480e-003
tblVehicleEF	MHD	0.13	0.05
tblVehicleEF	MHD	7.4700e-003	0.01
tblVehicleEF	MHD	1.2000e-004	9.9000e-005

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MHD	3.7600e-004	1.6720e-003
tblVehicleEF	MHD	0.06	0.02
tblVehicleEF	MHD	7.1380e-003	0.01
tblVehicleEF	MHD	1.1100e-004	9.1000e-005
tblVehicleEF	MHD	4.3800e-004	0.03
tblVehicleEF	MHD	0.02	6.2740e-003
tblVehicleEF	MHD	0.02	0.03
tblVehicleEF	MHD	2.3400e-004	0.00
tblVehicleEF	MHD	0.02	0.04
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.05	0.05
tblVehicleEF	MHD	7.1300e-004	1.5410e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	1.0000e-004	8.4000e-005
tblVehicleEF	MHD	4.3800e-004	0.03
tblVehicleEF	MHD	0.02	6.2740e-003
tblVehicleEF	MHD	0.03	0.04
tblVehicleEF	MHD	2.3400e-004	0.00
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.06	0.05
tblVehicleEF	MHD	3.7880e-003	0.01
tblVehicleEF	MHD	2.3090e-003	8.8550e-003
tblVehicleEF	MHD	9.7330e-003	8.2890e-003
tblVehicleEF	MHD	0.34	0.62
tblVehicleEF	MHD	0.30	0.37
tblVehicleEF	MHD	1.07	0.95
tblVehicleEF	MHD	75.32	164.37
tblVehicleEF	MHD	1,122.69	1,235.69

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MHD	9.92	8.36
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.13	0.15
tblVehicleEF	MHD	7.9270e-003	5.9550e-003
tblVehicleEF	MHD	0.45	0.89
tblVehicleEF	MHD	1.45	0.99
tblVehicleEF	MHD	1.66	1.40
tblVehicleEF	MHD	3.3400e-004	1.4830e-003
tblVehicleEF	MHD	0.13	0.05
tblVehicleEF	MHD	7.4700e-003	0.01
tblVehicleEF	MHD	1.2000e-004	9.9000e-005
tblVehicleEF	MHD	3.2000e-004	1.4180e-003
tblVehicleEF	MHD	0.06	0.02
tblVehicleEF	MHD	7.1380e-003	0.01
tblVehicleEF	MHD	1.1100e-004	9.1000e-005
tblVehicleEF	MHD	1.0370e-003	0.04
tblVehicleEF	MHD	0.02	6.9000e-003
tblVehicleEF	MHD	0.02	0.03
tblVehicleEF	MHD	5.5500e-004	0.00
tblVehicleEF	MHD	0.02	0.04
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.05	0.04
tblVehicleEF	MHD	7.1500e-004	1.5330e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	9.8000e-005	8.3000e-005
tblVehicleEF	MHD	1.0370e-003	0.04
tblVehicleEF	MHD	0.02	6.9000e-003
tblVehicleEF	MHD	0.03	0.04
tblVehicleEF	MHD	5.5500e-004	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.05	0.05
tblVehicleEF	MHD	4.2520e-003	0.01
tblVehicleEF	MHD	2.1780e-003	8.6690e-003
tblVehicleEF	MHD	0.01	9.4290e-003
tblVehicleEF	MHD	0.48	0.75
tblVehicleEF	MHD	0.28	0.36
tblVehicleEF	MHD	1.30	1.16
tblVehicleEF	MHD	75.00	166.42
tblVehicleEF	MHD	1,122.66	1,235.66
tblVehicleEF	MHD	10.30	8.70
tblVehicleEF	MHD	0.01	0.03
tblVehicleEF	MHD	0.13	0.15
tblVehicleEF	MHD	8.7060e-003	6.5400e-003
tblVehicleEF	MHD	0.46	0.95
tblVehicleEF	MHD	1.55	1.07
tblVehicleEF	MHD	1.67	1.42
tblVehicleEF	MHD	4.7300e-004	2.1130e-003
tblVehicleEF	MHD	0.13	0.05
tblVehicleEF	MHD	7.4700e-003	0.01
tblVehicleEF	MHD	1.2000e-004	9.9000e-005
tblVehicleEF	MHD	4.5300e-004	2.0220e-003
tblVehicleEF	MHD	0.06	0.02
tblVehicleEF	MHD	7.1380e-003	0.01
tblVehicleEF	MHD	1.1100e-004	9.1000e-005
tblVehicleEF	MHD	1.3500e-004	0.02
tblVehicleEF	MHD	0.02	5.5970e-003
tblVehicleEF	MHD	0.02	0.03

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	MHD	6.8000e-005	0.00
tblVehicleEF	MHD	0.02	0.03
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.06	0.05
tblVehicleEF	MHD	7.1200e-004	1.5520e-003
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	1.0200e-004	8.6000e-005
tblVehicleEF	MHD	1.3500e-004	0.02
tblVehicleEF	MHD	0.02	5.5970e-003
tblVehicleEF	MHD	0.03	0.04
tblVehicleEF	MHD	6.8000e-005	0.00
tblVehicleEF	MHD	0.02	0.05
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.06	0.06
tblVehicleEF	OBUS	8.1900e-003	0.01
tblVehicleEF	OBUS	4.2030e-003	0.01
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.93	0.83
tblVehicleEF	OBUS	0.48	0.68
tblVehicleEF	OBUS	1.81	2.25
tblVehicleEF	OBUS	149.52	130.05
tblVehicleEF	OBUS	1,350.91	1,634.57
tblVehicleEF	OBUS	15.02	18.99
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.13	0.14
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.65	0.54
tblVehicleEF	OBUS	1.35	1.19
tblVehicleEF	OBUS	1.12	0.93

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	OBUS	2.2400e-004	4.7400e-004
tblVehicleEF	OBUS	0.13	0.05
tblVehicleEF	OBUS	9.4470e-003	0.02
tblVehicleEF	OBUS	1.4200e-004	1.6100e-004
tblVehicleEF	OBUS	2.1400e-004	4.5400e-004
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	9.0260e-003	0.02
tblVehicleEF	OBUS	1.3000e-004	1.4800e-004
tblVehicleEF	OBUS	1.3920e-003	0.09
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.07	0.07
tblVehicleEF	OBUS	6.1700e-004	0.00
tblVehicleEF	OBUS	0.03	0.06
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.09	0.11
tblVehicleEF	OBUS	1.4170e-003	1.2300e-003
tblVehicleEF	OBUS	0.01	0.02
tblVehicleEF	OBUS	1.4900e-004	1.8800e-004
tblVehicleEF	OBUS	1.3920e-003	0.09
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.09	0.09
tblVehicleEF	OBUS	6.1700e-004	0.00
tblVehicleEF	OBUS	0.04	0.08
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.10	0.12
tblVehicleEF	OBUS	8.3480e-003	0.01
tblVehicleEF	OBUS	4.3520e-003	0.01
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.92	0.82

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	OBUS	0.50	0.70
tblVehicleEF	OBUS	1.64	2.04
tblVehicleEF	OBUS	147.67	128.67
tblVehicleEF	OBUS	1,350.93	1,634.61
tblVehicleEF	OBUS	14.73	18.62
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.13	0.14
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.62	0.52
tblVehicleEF	OBUS	1.29	1.13
tblVehicleEF	OBUS	1.11	0.91
tblVehicleEF	OBUS	1.9900e-004	4.0900e-004
tblVehicleEF	OBUS	0.13	0.05
tblVehicleEF	OBUS	9.4470e-003	0.02
tblVehicleEF	OBUS	1.4200e-004	1.6100e-004
tblVehicleEF	OBUS	1.9000e-004	3.9100e-004
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	9.0260e-003	0.02
tblVehicleEF	OBUS	1.3000e-004	1.4800e-004
tblVehicleEF	OBUS	3.1410e-003	0.13
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.07	0.07
tblVehicleEF	OBUS	1.3670e-003	0.00
tblVehicleEF	OBUS	0.03	0.06
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.08	0.10
tblVehicleEF	OBUS	1.4000e-003	1.2170e-003
tblVehicleEF	OBUS	0.01	0.02
tblVehicleEF	OBUS	1.4600e-004	1.8400e-004

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	OBUS	3.1410e-003	0.13
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.09	0.09
tblVehicleEF	OBUS	1.3670e-003	0.00
tblVehicleEF	OBUS	0.04	0.09
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.09	0.11
tblVehicleEF	OBUS	7.9790e-003	0.01
tblVehicleEF	OBUS	4.0530e-003	0.01
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.95	0.85
tblVehicleEF	OBUS	0.47	0.66
tblVehicleEF	OBUS	2.02	2.51
tblVehicleEF	OBUS	152.08	131.95
tblVehicleEF	OBUS	1,350.88	1,634.54
tblVehicleEF	OBUS	15.37	19.42
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.13	0.14
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.69	0.57
tblVehicleEF	OBUS	1.38	1.22
tblVehicleEF	OBUS	1.13	0.95
tblVehicleEF	OBUS	2.5800e-004	5.6500e-004
tblVehicleEF	OBUS	0.13	0.05
tblVehicleEF	OBUS	9.4470e-003	0.02
tblVehicleEF	OBUS	1.4200e-004	1.6100e-004
tblVehicleEF	OBUS	2.4700e-004	5.4000e-004
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	9.0260e-003	0.02

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	OBUS	1.3000e-004	1.4800e-004
tblVehicleEF	OBUS	5.1500e-004	0.08
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.07	0.06
tblVehicleEF	OBUS	2.1100e-004	0.00
tblVehicleEF	OBUS	0.03	0.06
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.09	0.12
tblVehicleEF	OBUS	1.4420e-003	1.2480e-003
tblVehicleEF	OBUS	0.01	0.02
tblVehicleEF	OBUS	1.5200e-004	1.9200e-004
tblVehicleEF	OBUS	5.1500e-004	0.08
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.08	0.08
tblVehicleEF	OBUS	2.1100e-004	0.00
tblVehicleEF	OBUS	0.04	0.08
tblVehicleEF	OBUS	0.04	0.02
tblVehicleEF	OBUS	0.10	0.13
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.4590e-003	0.07
tblVehicleEF	SBUS	3.1480e-003	2.6400e-003
tblVehicleEF	SBUS	1.58	0.85
tblVehicleEF	SBUS	0.50	1.06
tblVehicleEF	SBUS	0.50	0.41
tblVehicleEF	SBUS	328.90	170.78
tblVehicleEF	SBUS	1,038.46	1,070.29
tblVehicleEF	SBUS	2.48	1.78
tblVehicleEF	SBUS	0.05	0.02
tblVehicleEF	SBUS	0.14	0.15

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	SBUS	2.5140e-003	1.4920e-003
tblVehicleEF	SBUS	3.44	1.60
tblVehicleEF	SBUS	4.93	3.73
tblVehicleEF	SBUS	0.95	0.42
tblVehicleEF	SBUS	3.5330e-003	1.6290e-003
tblVehicleEF	SBUS	0.74	0.04
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.7000e-005	2.2000e-005
tblVehicleEF	SBUS	3.3800e-003	1.5580e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.7770e-003	2.7840e-003
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.4000e-005	2.0000e-005
tblVehicleEF	SBUS	5.1900e-004	0.03
tblVehicleEF	SBUS	4.8580e-003	6.3000e-003
tblVehicleEF	SBUS	0.16	0.08
tblVehicleEF	SBUS	1.8100e-004	0.00
tblVehicleEF	SBUS	0.09	0.08
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.02
tblVehicleEF	SBUS	3.1210e-003	1.5650e-003
tblVehicleEF	SBUS	9.8910e-003	9.9740e-003
tblVehicleEF	SBUS	2.5000e-005	1.8000e-005
tblVehicleEF	SBUS	5.1900e-004	0.03
tblVehicleEF	SBUS	4.8580e-003	6.3000e-003
tblVehicleEF	SBUS	0.22	0.14
tblVehicleEF	SBUS	1.8100e-004	0.00
tblVehicleEF	SBUS	0.10	0.17

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.02
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.5630e-003	0.07
tblVehicleEF	SBUS	2.6100e-003	2.1960e-003
tblVehicleEF	SBUS	1.55	0.83
tblVehicleEF	SBUS	0.51	1.08
tblVehicleEF	SBUS	0.36	0.29
tblVehicleEF	SBUS	337.22	174.74
tblVehicleEF	SBUS	1,038.48	1,070.32
tblVehicleEF	SBUS	2.25	1.59
tblVehicleEF	SBUS	0.05	0.03
tblVehicleEF	SBUS	0.14	0.15
tblVehicleEF	SBUS	2.3960e-003	1.4210e-003
tblVehicleEF	SBUS	3.52	1.62
tblVehicleEF	SBUS	4.70	3.56
tblVehicleEF	SBUS	0.95	0.42
tblVehicleEF	SBUS	2.9860e-003	1.3810e-003
tblVehicleEF	SBUS	0.74	0.04
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.7000e-005	2.2000e-005
tblVehicleEF	SBUS	2.8570e-003	1.3210e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.7770e-003	2.7840e-003
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.4000e-005	2.0000e-005
tblVehicleEF	SBUS	1.2390e-003	0.04
tblVehicleEF	SBUS	5.3210e-003	6.9580e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	SBUS	0.16	0.08
tblVehicleEF	SBUS	4.5100e-004	0.00
tblVehicleEF	SBUS	0.09	0.08
tblVehicleEF	SBUS	9.0710e-003	0.01
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	3.2000e-003	1.6020e-003
tblVehicleEF	SBUS	9.8920e-003	9.9750e-003
tblVehicleEF	SBUS	2.2000e-005	1.6000e-005
tblVehicleEF	SBUS	1.2390e-003	0.04
tblVehicleEF	SBUS	5.3210e-003	6.9580e-003
tblVehicleEF	SBUS	0.22	0.14
tblVehicleEF	SBUS	4.5100e-004	0.00
tblVehicleEF	SBUS	0.10	0.17
tblVehicleEF	SBUS	9.0710e-003	0.01
tblVehicleEF	SBUS	0.02	0.01
tblVehicleEF	SBUS	0.03	0.04
tblVehicleEF	SBUS	6.3520e-003	0.07
tblVehicleEF	SBUS	3.7300e-003	3.1180e-003
tblVehicleEF	SBUS	1.63	0.88
tblVehicleEF	SBUS	0.49	1.04
tblVehicleEF	SBUS	0.68	0.55
tblVehicleEF	SBUS	317.41	165.32
tblVehicleEF	SBUS	1,038.44	1,070.25
tblVehicleEF	SBUS	2.77	2.01
tblVehicleEF	SBUS	0.05	0.02
tblVehicleEF	SBUS	0.14	0.15
tblVehicleEF	SBUS	2.6650e-003	1.5820e-003
tblVehicleEF	SBUS	3.35	1.55
tblVehicleEF	SBUS	5.02	3.81

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	SBUS	0.95	0.43
tblVehicleEF	SBUS	4.2870e-003	1.9710e-003
tblVehicleEF	SBUS	0.74	0.04
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.7000e-005	2.2000e-005
tblVehicleEF	SBUS	4.1020e-003	1.8850e-003
tblVehicleEF	SBUS	0.32	0.02
tblVehicleEF	SBUS	2.7770e-003	2.7840e-003
tblVehicleEF	SBUS	0.03	0.02
tblVehicleEF	SBUS	3.4000e-005	2.0000e-005
tblVehicleEF	SBUS	1.4800e-004	0.02
tblVehicleEF	SBUS	4.9080e-003	5.6280e-003
tblVehicleEF	SBUS	0.16	0.08
tblVehicleEF	SBUS	5.9000e-005	0.00
tblVehicleEF	SBUS	0.09	0.08
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.02
tblVehicleEF	SBUS	3.0130e-003	1.5130e-003
tblVehicleEF	SBUS	9.8910e-003	9.9740e-003
tblVehicleEF	SBUS	2.7000e-005	2.0000e-005
tblVehicleEF	SBUS	1.4800e-004	0.02
tblVehicleEF	SBUS	4.9080e-003	5.6280e-003
tblVehicleEF	SBUS	0.22	0.14
tblVehicleEF	SBUS	5.9000e-005	0.00
tblVehicleEF	SBUS	0.10	0.17
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.02	0.02
tblVehicleEF	UBUS	1.13	0.98

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	UBUS	0.03	0.02
tblVehicleEF	UBUS	8.40	11.85
tblVehicleEF	UBUS	1.64	1.98
tblVehicleEF	UBUS	1,550.86	1,179.65
tblVehicleEF	UBUS	17.95	18.09
tblVehicleEF	UBUS	0.21	0.18
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.60	0.26
tblVehicleEF	UBUS	0.19	0.17
tblVehicleEF	UBUS	0.09	0.11
tblVehicleEF	UBUS	0.03	0.03
tblVehicleEF	UBUS	4.5070e-003	3.6910e-003
tblVehicleEF	UBUS	1.2800e-004	1.3400e-004
tblVehicleEF	UBUS	0.04	0.04
tblVehicleEF	UBUS	6.5920e-003	6.8280e-003
tblVehicleEF	UBUS	4.3010e-003	3.5250e-003
tblVehicleEF	UBUS	1.1700e-004	1.2300e-004
tblVehicleEF	UBUS	1.3120e-003	0.03
tblVehicleEF	UBUS	0.02	9.5940e-003
tblVehicleEF	UBUS	8.0200e-004	0.00
tblVehicleEF	UBUS	0.02	0.05
tblVehicleEF	UBUS	4.6980e-003	1.0410e-003
tblVehicleEF	UBUS	0.11	0.08
tblVehicleEF	UBUS	0.01	6.8920e-003
tblVehicleEF	UBUS	1.7800e-004	1.7900e-004
tblVehicleEF	UBUS	1.3120e-003	0.03
tblVehicleEF	UBUS	0.02	9.5940e-003
tblVehicleEF	UBUS	8.0200e-004	0.00
tblVehicleEF	UBUS	1.16	1.04

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	UBUS	4.6980e-003	1.0410e-003
tblVehicleEF	UBUS	0.12	0.09
tblVehicleEF	UBUS	1.13	0.98
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	8.40	11.85
tblVehicleEF	UBUS	1.32	1.62
tblVehicleEF	UBUS	1,550.87	1,179.65
tblVehicleEF	UBUS	17.40	17.49
tblVehicleEF	UBUS	0.21	0.18
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.60	0.26
tblVehicleEF	UBUS	0.17	0.16
tblVehicleEF	UBUS	0.09	0.11
tblVehicleEF	UBUS	0.03	0.03
tblVehicleEF	UBUS	4.5070e-003	3.6910e-003
tblVehicleEF	UBUS	1.2800e-004	1.3400e-004
tblVehicleEF	UBUS	0.04	0.04
tblVehicleEF	UBUS	6.5920e-003	6.8280e-003
tblVehicleEF	UBUS	4.3010e-003	3.5250e-003
tblVehicleEF	UBUS	1.1700e-004	1.2300e-004
tblVehicleEF	UBUS	3.0120e-003	0.05
tblVehicleEF	UBUS	0.02	0.01
tblVehicleEF	UBUS	1.7820e-003	0.00
tblVehicleEF	UBUS	0.02	0.05
tblVehicleEF	UBUS	4.2890e-003	1.0790e-003
tblVehicleEF	UBUS	0.10	0.07
tblVehicleEF	UBUS	0.01	6.8920e-003
tblVehicleEF	UBUS	1.7200e-004	1.7300e-004
tblVehicleEF	UBUS	3.0120e-003	0.05

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	UBUS	0.02	0.01
tblVehicleEF	UBUS	1.7820e-003	0.00
tblVehicleEF	UBUS	1.16	1.04
tblVehicleEF	UBUS	4.2890e-003	1.0790e-003
tblVehicleEF	UBUS	0.10	0.08
tblVehicleEF	UBUS	1.13	0.98
tblVehicleEF	UBUS	0.03	0.02
tblVehicleEF	UBUS	8.40	11.85
tblVehicleEF	UBUS	2.04	2.43
tblVehicleEF	UBUS	1,550.86	1,179.65
tblVehicleEF	UBUS	18.64	18.83
tblVehicleEF	UBUS	0.21	0.18
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.61	0.26
tblVehicleEF	UBUS	0.20	0.18
tblVehicleEF	UBUS	0.09	0.11
tblVehicleEF	UBUS	0.03	0.03
tblVehicleEF	UBUS	4.5070e-003	3.6910e-003
tblVehicleEF	UBUS	1.2800e-004	1.3400e-004
tblVehicleEF	UBUS	0.04	0.04
tblVehicleEF	UBUS	6.5920e-003	6.8280e-003
tblVehicleEF	UBUS	4.3010e-003	3.5250e-003
tblVehicleEF	UBUS	1.1700e-004	1.2300e-004
tblVehicleEF	UBUS	5.2000e-004	0.02
tblVehicleEF	UBUS	0.02	8.5770e-003
tblVehicleEF	UBUS	2.9600e-004	0.00
tblVehicleEF	UBUS	0.02	0.05
tblVehicleEF	UBUS	5.9740e-003	1.0770e-003
tblVehicleEF	UBUS	0.12	0.09

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblVehicleEF	UBUS	0.01	6.8920e-003
tblVehicleEF	UBUS	1.8400e-004	1.8600e-004
tblVehicleEF	UBUS	5.2000e-004	0.02
tblVehicleEF	UBUS	0.02	8.5770e-003
tblVehicleEF	UBUS	2.9600e-004	0.00
tblVehicleEF	UBUS	1.16	1.04
tblVehicleEF	UBUS	5.9740e-003	1.0770e-003
tblVehicleEF	UBUS	0.13	0.10
tblWoodstoves	NumberCatalytic	2.85	0.00
tblWoodstoves	NumberNoncatalytic	2.85	0.00
tblWoodstoves	WoodstoveWoodMass	3,120.00	0.00

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
2023	3.3808	34.7362	28.5273	0.0642	19.7610	1.4269	21.0277	10.1307	1.3128	11.2961	0.0000	6,227.4931	6,227.4931	1.9492	0.0445	6,281.5039
2024	1.5930	14.0470	17.1835	0.0319	0.2994	0.6181	0.9175	0.0830	0.5814	0.6644	0.0000	3,062.0238	3,062.0238	0.6141	0.0433	3,090.2859
2025	47.5285	14.2211	19.0037	0.0352	0.3456	0.5840	0.9296	0.0955	0.5524	0.6480	0.0000	3,379.6186	3,379.6186	0.6268	0.0435	3,408.2598
Maximum	**47.5285**	**34.7362**	**28.5273**	**0.0642**	**19.7610**	**1.4269**	**21.0277**	**10.1307**	**1.3128**	**11.2961**	**0.0000**	**6,227.4931**	**6,227.4931**	**1.9492**	**0.0445**	**6,281.5039**

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					
2023	3.3808	34.7362	28.5273	0.0642	7.7702	1.4269	9.0369	3.9682	1.3128	5.1336	0.0000	6,227.4931	6,227.4931	1.9492	0.0445	6,281.5039
2024	1.5930	14.0470	17.1835	0.0319	0.2994	0.6181	0.9175	0.0830	0.5814	0.6644	0.0000	3,062.0238	3,062.0238	0.6141	0.0433	3,090.2859
2025	47.5285	14.2211	19.0037	0.0352	0.3456	0.5840	0.9296	0.0955	0.5524	0.6480	0.0000	3,379.6186	3,379.6186	0.6268	0.0435	3,408.2598
Maximum	**47.5285**	**34.7362**	**28.5273**	**0.0642**	**7.7702**	**1.4269**	**9.0369**	**3.9682**	**1.3128**	**5.1336**	**0.0000**	**6,227.4931**	**6,227.4931**	**1.9492**	**0.0445**	**6,281.5039**

Discovery Builders- Vanden Estates - Solano-Sacramento County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	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	58.76	0.00	52.42	59.78	0.00	48.88	0.00	0.00	0.00	0.00	0.00	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	4.8122	1.3942	9.9434	8.7000e-003		0.1561	0.1561		0.1561	0.1561	0.0000	1,658.5350	1,658.5350	0.0477	0.0301	1,668.6956
Energy	0.0897	0.7665	0.3262	4.8900e-003		0.0620	0.0620		0.0620	0.0620		978.4908	978.4908	0.0188	0.0179	984.3054
Mobile	2.4845	5.3080	22.7329	0.0690	4.1384	0.0688	4.2072	1.0402	0.0650	1.1052		7,096.6027	7,096.6027	0.3226	0.4938	7,251.8030
Total	**7.3864**	**7.4687**	**33.0025**	**0.0826**	**4.1384**	**0.2869**	**4.4253**	**1.0402**	**0.2830**	**1.3232**	**0.0000**	**9,733.6284**	**9,733.6284**	**0.3890**	**0.5418**	**9,904.8040**

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	4.8122	1.3942	9.9434	8.7000e-003		0.1561	0.1561		0.1561	0.1561	0.0000	1,658.5350	1,658.5350	0.0477	0.0301	1,668.6956
Energy	0.0897	0.7665	0.3262	4.8900e-003		0.0620	0.0620		0.0620	0.0620		978.4908	978.4908	0.0188	0.0179	984.3054
Mobile	2.4811	5.2728	22.6086	0.0683	4.0970	0.0682	4.1652	1.0298	0.0644	1.0942		7,028.5621	7,028.5621	0.3215	0.4899	7,182.5740
Total	**7.3830**	**7.4334**	**32.8781**	**0.0819**	**4.0970**	**0.2863**	**4.3832**	**1.0298**	**0.2824**	**1.3122**	**0.0000**	**9,665.5878**	**9,665.5878**	**0.3879**	**0.5379**	**9,835.5751**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	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	**0.05**	**0.47**	**0.38**	**0.80**	**1.00**	**0.22**	**0.95**	**1.00**	**0.21**	**0.83**	**0.00**	**0.70**	**0.70**	**0.27**	**0.72**	**0.70**

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	2/1/2023	3/14/2023	5	30	
2	Site Preparation	Site Preparation	3/15/2023	4/11/2023	5	20	
3	Grading	Grading	4/12/2023	6/13/2023	5	45	
4	Paving	Paving	6/14/2023	8/1/2023	5	35	
5	Building Construction	Building Construction	12/14/2023	8/20/2025	5	440	
6	Architectural Coating	Architectural Coating	6/20/2025	8/7/2025	5	35	

Acres of Grading (Site Preparation Phase): 30

Acres of Grading (Grading Phase): 135

Acres of Paving: 0

Residential Indoor: 415,530; Residential Outdoor: 138,510; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (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	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

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	6	15.00	0.00	57.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	62.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	41.00	12.00	0.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	8.00	0.00	0.00	10.00	7.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

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					0.4123	0.0000	0.4123	0.0624	0.0000	0.0624			0.0000			0.0000
Off-Road	2.2691	21.4844	19.6434	0.0388		0.9975	0.9975		0.9280	0.9280		3,746.9840	3,746.9840	1.0494		3,773.2183
Total	**2.2691**	**21.4844**	**19.6434**	**0.0388**	**0.4123**	**0.9975**	**1.4098**	**0.0624**	**0.9280**	**0.9904**		**3,746.9840**	**3,746.9840**	**1.0494**		**3,773.2183**

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	4.0100e-003	0.2490	0.0553	1.1300e-003	0.0263	2.2300e-003	0.0286	7.4300e-003	2.1400e-003	9.5600e-003		119.6804	119.6804	6.4000e-004	0.0188	125.3063
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	0.0000
Worker	0.0422	0.0300	0.3270	9.6000e-004	0.0866	5.8000e-004	0.0872	0.0235	5.3000e-004	0.0241		96.9222	96.9222	3.3800e-003	3.0500e-003	97.9163
Total	**0.0462**	**0.2791**	**0.3823**	**2.0900e-003**	**0.1130**	**2.8100e-003**	**0.1158**	**0.0310**	**2.6700e-003**	**0.0336**		**216.6026**	**216.6026**	**4.0200e-003**	**0.0219**	**223.2225**

Discovery Builders- Vanden Estates - Solano-Sacramento County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

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					0.1608	0.0000	0.1608	0.0243	0.0000	0.0243			0.0000			0.0000
Off-Road	2.2691	21.4844	19.6434	0.0388		0.9975	0.9975		0.9280	0.9280	0.0000	3,746.9840	3,746.9840	1.0494		3,773.2183
Total	**2.2691**	**21.4844**	**19.6434**	**0.0388**	**0.1608**	**0.9975**	**1.1583**	**0.0243**	**0.9280**	**0.9523**	**0.0000**	**3,746.9840**	**3,746.9840**	**1.0494**		**3,773.2183**

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	4.0100e-003	0.2490	0.0553	1.1300e-003	0.0263	2.2300e-003	0.0286	7.4300e-003	2.1400e-003	9.5600e-003		119.6804	119.6804	6.4000e-004	0.0188	125.3063
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	0.0000
Worker	0.0422	0.0300	0.3270	9.6000e-004	0.0866	5.8000e-004	0.0872	0.0235	5.3000e-004	0.0241		96.9222	96.9222	3.3800e-003	3.0500e-003	97.9163
Total	**0.0462**	**0.2791**	**0.3823**	**2.0900e-003**	**0.1130**	**2.8100e-003**	**0.1158**	**0.0310**	**2.6700e-003**	**0.0336**		**216.6026**	**216.6026**	**4.0200e-003**	**0.0219**	**223.2225**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

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					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647		3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**19.6570**	**1.2660**	**20.9230**	**10.1025**	**1.1647**	**11.2672**		**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

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	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	0.0000
Worker	0.0506	0.0360	0.3924	1.1500e-003	0.1040	7.0000e-004	0.1046	0.0282	6.4000e-004	0.0289		116.3066	116.3066	4.0600e-003	3.6600e-003	117.4995
Total	**0.0506**	**0.0360**	**0.3924**	**1.1500e-003**	**0.1040**	**7.0000e-004**	**0.1046**	**0.0282**	**6.4000e-004**	**0.0289**		**116.3066**	**116.3066**	**4.0600e-003**	**3.6600e-003**	**117.4995**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

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					7.6662	0.0000	7.6662	3.9400	0.0000	3.9400			0.0000			0.0000
Off-Road	2.6595	27.5242	18.2443	0.0381		1.2660	1.2660		1.1647	1.1647	0.0000	3,687.3081	3,687.3081	1.1926		3,717.1219
Total	**2.6595**	**27.5242**	**18.2443**	**0.0381**	**7.6662**	**1.2660**	**8.9323**	**3.9400**	**1.1647**	**5.1047**	**0.0000**	**3,687.3081**	**3,687.3081**	**1.1926**		**3,717.1219**

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	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	0.0000
Worker	0.0506	0.0360	0.3924	1.1500e-003	0.1040	7.0000e-004	0.1046	0.0282	6.4000e-004	0.0289		116.3066	116.3066	4.0600e-003	3.6600e-003	117.4995
Total	**0.0506**	**0.0360**	**0.3924**	**1.1500e-003**	**0.1040**	**7.0000e-004**	**0.1046**	**0.0282**	**6.4000e-004**	**0.0289**		**116.3066**	**116.3066**	**4.0600e-003**	**3.6600e-003**	**117.4995**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

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					9.2048	0.0000	9.2048	3.6540	0.0000	3.6540			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.2048**	**1.4245**	**10.6293**	**3.6540**	**1.3105**	**4.9645**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

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	2.9100e-003	0.1806	0.0401	8.2000e-004	0.0191	1.6200e-003	0.0207	5.3800e-003	1.5500e-003	6.9300e-003		86.7858	86.7858	4.7000e-004	0.0137	90.8654
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	0.0000
Worker	0.0562	0.0400	0.4360	1.2800e-003	0.1155	7.7000e-004	0.1163	0.0314	7.1000e-004	0.0321		129.2296	129.2296	4.5100e-003	4.0700e-003	130.5550
Total	**0.0591**	**0.2206**	**0.4761**	**2.1000e-003**	**0.1346**	**2.3900e-003**	**0.1370**	**0.0367**	**2.2600e-003**	**0.0390**		**216.0154**	**216.0154**	**4.9800e-003**	**0.0177**	**221.4204**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

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					3.5899	0.0000	3.5899	1.4250	0.0000	1.4250			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**3.5899**	**1.4245**	**5.0144**	**1.4250**	**1.3105**	**2.7356**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

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	2.9100e-003	0.1806	0.0401	8.2000e-004	0.0191	1.6200e-003	0.0207	5.3800e-003	1.5500e-003	6.9300e-003		86.7858	86.7858	4.7000e-004	0.0137	90.8654
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	0.0000
Worker	0.0562	0.0400	0.4360	1.2800e-003	0.1155	7.7000e-004	0.1163	0.0314	7.1000e-004	0.0321		129.2296	129.2296	4.5100e-003	4.0700e-003	130.5550
Total	**0.0591**	**0.2206**	**0.4761**	**2.1000e-003**	**0.1346**	**2.3900e-003**	**0.1370**	**0.0367**	**2.2600e-003**	**0.0390**		**216.0154**	**216.0154**	**4.9800e-003**	**0.0177**	**221.4204**

Discovery Builders- Vanden Estates - Solano-Sacramento County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Paving - 2023

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	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

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	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	0.0000
Worker	0.0422	0.0300	0.3270	9.6000e-004	0.0866	5.8000e-004	0.0872	0.0235	5.3000e-004	0.0241		96.9222	96.9222	3.3800e-003	3.0500e-003	97.9163
Total	**0.0422**	**0.0300**	**0.3270**	**9.6000e-004**	**0.0866**	**5.8000e-004**	**0.0872**	**0.0235**	**5.3000e-004**	**0.0241**		**96.9222**	**96.9222**	**3.3800e-003**	**3.0500e-003**	**97.9163**

Discovery Builders- Vanden Estates - Solano-Sacramento County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Paving - 2023

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	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

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	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	0.0000
Worker	0.0422	0.0300	0.3270	9.6000e-004	0.0866	5.8000e-004	0.0872	0.0235	5.3000e-004	0.0241		96.9222	96.9222	3.3800e-003	3.0500e-003	97.9163
Total	**0.0422**	**0.0300**	**0.3270**	**9.6000e-004**	**0.0866**	**5.8000e-004**	**0.0872**	**0.0235**	**5.3000e-004**	**0.0241**		**96.9222**	**96.9222**	**3.3800e-003**	**3.0500e-003**	**97.9163**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2023

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	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

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	0.0000
Vendor	0.0148	0.5307	0.1906	2.4100e-003	0.0626	3.2200e-003	0.0659	0.0187	3.0800e-003	0.0218		253.8168	253.8168	1.4000e-003	0.0362	264.6349
Worker	0.1152	0.0821	0.8938	2.6200e-003	0.2368	1.5800e-003	0.2384	0.0643	1.4600e-003	0.0658		264.9207	264.9207	9.2400e-003	8.3400e-003	267.6377
Total	**0.1300**	**0.6128**	**1.0844**	**5.0300e-003**	**0.2994**	**4.8000e-003**	**0.3042**	**0.0830**	**4.5400e-003**	**0.0875**		**518.7375**	**518.7375**	**0.0106**	**0.0445**	**532.2726**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2023

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	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

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	0.0000
Vendor	0.0148	0.5307	0.1906	2.4100e-003	0.0626	3.2200e-003	0.0659	0.0187	3.0800e-003	0.0218		253.8168	253.8168	1.4000e-003	0.0362	264.6349
Worker	0.1152	0.0821	0.8938	2.6200e-003	0.2368	1.5800e-003	0.2384	0.0643	1.4600e-003	0.0658		264.9207	264.9207	9.2400e-003	8.3400e-003	267.6377
Total	**0.1300**	**0.6128**	**1.0844**	**5.0300e-003**	**0.2994**	**4.8000e-003**	**0.3042**	**0.0830**	**4.5400e-003**	**0.0875**		**518.7375**	**518.7375**	**0.0106**	**0.0445**	**532.2726**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2024

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	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

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	0.0000
Vendor	0.0144	0.5304	0.1849	2.3700e-003	0.0626	3.2400e-003	0.0659	0.0187	3.1000e-003	0.0218		250.1202	250.1202	1.3800e-003	0.0356	260.7527
Worker	0.1071	0.0729	0.8318	2.5300e-003	0.2368	1.5000e-003	0.2383	0.0643	1.3900e-003	0.0657		256.2047	256.2047	8.3800e-003	7.7600e-003	258.7255
Total	**0.1215**	**0.6033**	**1.0167**	**4.9000e-003**	**0.2994**	**4.7400e-003**	**0.3041**	**0.0830**	**4.4900e-003**	**0.0875**		**506.3249**	**506.3249**	**9.7600e-003**	**0.0433**	**519.4783**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2024

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	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

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	0.0000
Vendor	0.0144	0.5304	0.1849	2.3700e-003	0.0626	3.2400e-003	0.0659	0.0187	3.1000e-003	0.0218		250.1202	250.1202	1.3800e-003	0.0356	260.7527
Worker	0.1071	0.0729	0.8318	2.5300e-003	0.2368	1.5000e-003	0.2383	0.0643	1.3900e-003	0.0657		256.2047	256.2047	8.3800e-003	7.7600e-003	258.7255
Total	**0.1215**	**0.6033**	**1.0167**	**4.9000e-003**	**0.2994**	**4.7400e-003**	**0.3041**	**0.0830**	**4.4900e-003**	**0.0875**		**506.3249**	**506.3249**	**9.7600e-003**	**0.0433**	**519.4783**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2025

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	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

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	0.0000
Vendor	0.0140	0.5280	0.1802	2.3300e-003	0.0626	3.2300e-003	0.0659	0.0187	3.0900e-003	0.0218		245.9412	245.9412	1.3600e-003	0.0349	256.3643
Worker	0.1000	0.0653	0.7779	2.4500e-003	0.2368	1.4400e-003	0.2382	0.0643	1.3200e-003	0.0656		247.4684	247.4684	7.6200e-003	7.2500e-003	249.8201
Total	**0.1140**	**0.5932**	**0.9582**	**4.7800e-003**	**0.2994**	**4.6700e-003**	**0.3041**	**0.0830**	**4.4100e-003**	**0.0874**		**493.4096**	**493.4096**	**8.9800e-003**	**0.0421**	**506.1845**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2025

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	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

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	0.0000
Vendor	0.0140	0.5280	0.1802	2.3300e-003	0.0626	3.2300e-003	0.0659	0.0187	3.0900e-003	0.0218		245.9412	245.9412	1.3600e-003	0.0349	256.3643
Worker	0.1000	0.0653	0.7779	2.4500e-003	0.2368	1.4400e-003	0.2382	0.0643	1.3200e-003	0.0656		247.4684	247.4684	7.6200e-003	7.2500e-003	249.8201
Total	**0.1140**	**0.5932**	**0.9582**	**4.7800e-003**	**0.2994**	**4.6700e-003**	**0.3041**	**0.0830**	**4.4100e-003**	**0.0874**		**493.4096**	**493.4096**	**8.9800e-003**	**0.0421**	**506.1845**

Discovery Builders- Vanden Estates - Solano-Sacramento County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2025

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	45.8567					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**46.0276**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

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	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	0.0000
Worker	0.0195	0.0127	0.1518	4.8000e-004	0.0462	2.8000e-004	0.0465	0.0125	2.6000e-004	0.0128		48.2865	48.2865	1.4900e-003	1.4200e-003	48.7454
Total	**0.0195**	**0.0127**	**0.1518**	**4.8000e-004**	**0.0462**	**2.8000e-004**	**0.0465**	**0.0125**	**2.6000e-004**	**0.0128**		**48.2865**	**48.2865**	**1.4900e-003**	**1.4200e-003**	**48.7454**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2025

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	45.8567					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**46.0276**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

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	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	0.0000
Worker	0.0195	0.0127	0.1518	4.8000e-004	0.0462	2.8000e-004	0.0465	0.0125	2.6000e-004	0.0128		48.2865	48.2865	1.4900e-003	1.4200e-003	48.7454
Total	**0.0195**	**0.0127**	**0.1518**	**4.8000e-004**	**0.0462**	**2.8000e-004**	**0.0465**	**0.0125**	**2.6000e-004**	**0.0128**		**48.2865**	**48.2865**	**1.4900e-003**	**1.4200e-003**	**48.7454**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	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	2.4811	5.2728	22.6086	0.0683	4.0970	0.0682	4.1652	1.0298	0.0644	1.0942		7,028.5621	7,028.5621	0.3215	0.4899	7,182.5740
Unmitigated	2.4845	5.3080	22.7329	0.0690	4.1384	0.0688	4.2072	1.0402	0.0650	1.1052		7,096.6027	7,096.6027	0.3226	0.4938	7,251.8030

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	1,076.16	1,087.56	974.70	2,790,359	2,762,455
Total	1,076.16	1,087.56	974.70	2,790,359	2,762,455

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
Single Family Housing	10.00	5.00	7.00	46.00	13.00	41.00	86	11	3

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.524132	0.036190	0.197078	0.133526	0.030925	0.007792	0.010137	0.051911	0.001635	0.001042	0.003862	0.000668	0.001102

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	0.0897	0.7665	0.3262	4.8900e-003		0.0620	0.0620		0.0620	0.0620		978.4908	978.4908	0.0188	0.0179	984.3054
NaturalGas Unmitigated	0.0897	0.7665	0.3262	4.8900e-003		0.0620	0.0620		0.0620	0.0620		978.4908	978.4908	0.0188	0.0179	984.3054

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
Single Family Housing	8317.17	0.0897	0.7665	0.3262	4.8900e-003		0.0620	0.0620		0.0620	0.0620		978.4908	978.4908	0.0188	0.0179	984.3054
Total		**0.0897**	**0.7665**	**0.3262**	**4.8900e-003**		**0.0620**	**0.0620**		**0.0620**	**0.0620**		**978.4908**	**978.4908**	**0.0188**	**0.0179**	**984.3054**

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					
Single Family Housing	8.31717	0.0897	0.7665	0.3262	4.8900e-003		0.0620	0.0620		0.0620	0.0620		978.4908	978.4908	0.0188	0.0179	984.3054
Total		**0.0897**	**0.7665**	**0.3262**	**4.8900e-003**		**0.0620**	**0.0620**		**0.0620**	**0.0620**		**978.4908**	**978.4908**	**0.0188**	**0.0179**	**984.3054**

6.0 Area Detail

6.1 Mitigation Measures Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	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	4.8122	1.3942	9.9434	8.7000e-003		0.1561	0.1561		0.1561	0.1561	0.0000	1,658.5350	1,658.5350	0.0477	0.0301	1,668.6956
Unmitigated	4.8122	1.3942	9.9434	8.7000e-003		0.1561	0.1561		0.1561	0.1561	0.0000	1,658.5350	1,658.5350	0.0477	0.0301	1,668.6956

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	0.4397					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.9398					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1505	1.2859	0.5472	8.2100e-003		0.1040	0.1040		0.1040	0.1040	0.0000	1,641.6000	1,641.6000	0.0315	0.0301	1,651.3552
Landscaping	0.2821	0.1082	9.3962	5.0000e-004		0.0521	0.0521		0.0521	0.0521		16.9350	16.9350	0.0162		17.3404
Total	**4.8122**	**1.3942**	**9.9434**	**8.7100e-003**		**0.1561**	**0.1561**		**0.1561**	**0.1561**	**0.0000**	**1,658.5350**	**1,658.5350**	**0.0477**	**0.0301**	**1,668.6956**

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	0.4397					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.9398					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1505	1.2859	0.5472	8.2100e-003		0.1040	0.1040		0.1040	0.1040	0.0000	1,641.6000	1,641.6000	0.0315	0.0301	1,651.3552
Landscaping	0.2821	0.1082	9.3962	5.0000e-004		0.0521	0.0521		0.0521	0.0521		16.9350	16.9350	0.0162		17.3404
Total	**4.8122**	**1.3942**	**9.9434**	**8.7100e-003**		**0.1561**	**0.1561**		**0.1561**	**0.1561**	**0.0000**	**1,658.5350**	**1,658.5350**	**0.0477**	**0.0301**	**1,668.6956**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

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

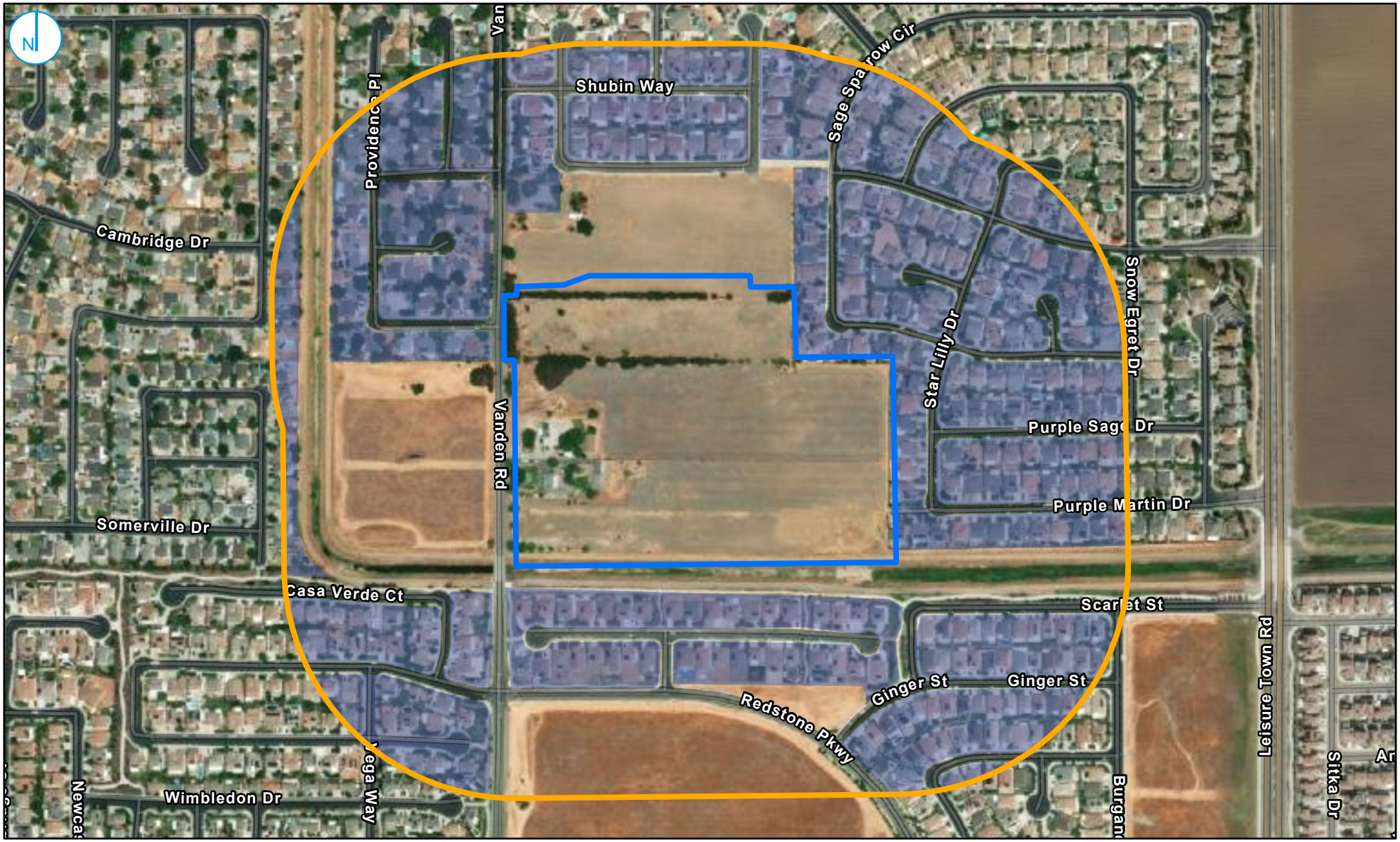
User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX C
FIGURES

PROJECT: 1690022356 | DATED: 4/27/2022 | DESIGNER: LLI



Project Boundary
1000ft Buffer Area
Residential Parcels

0 500 1,000 2,000 Feet

PROJECT SITE AND SENSITIVE RECEPTORS

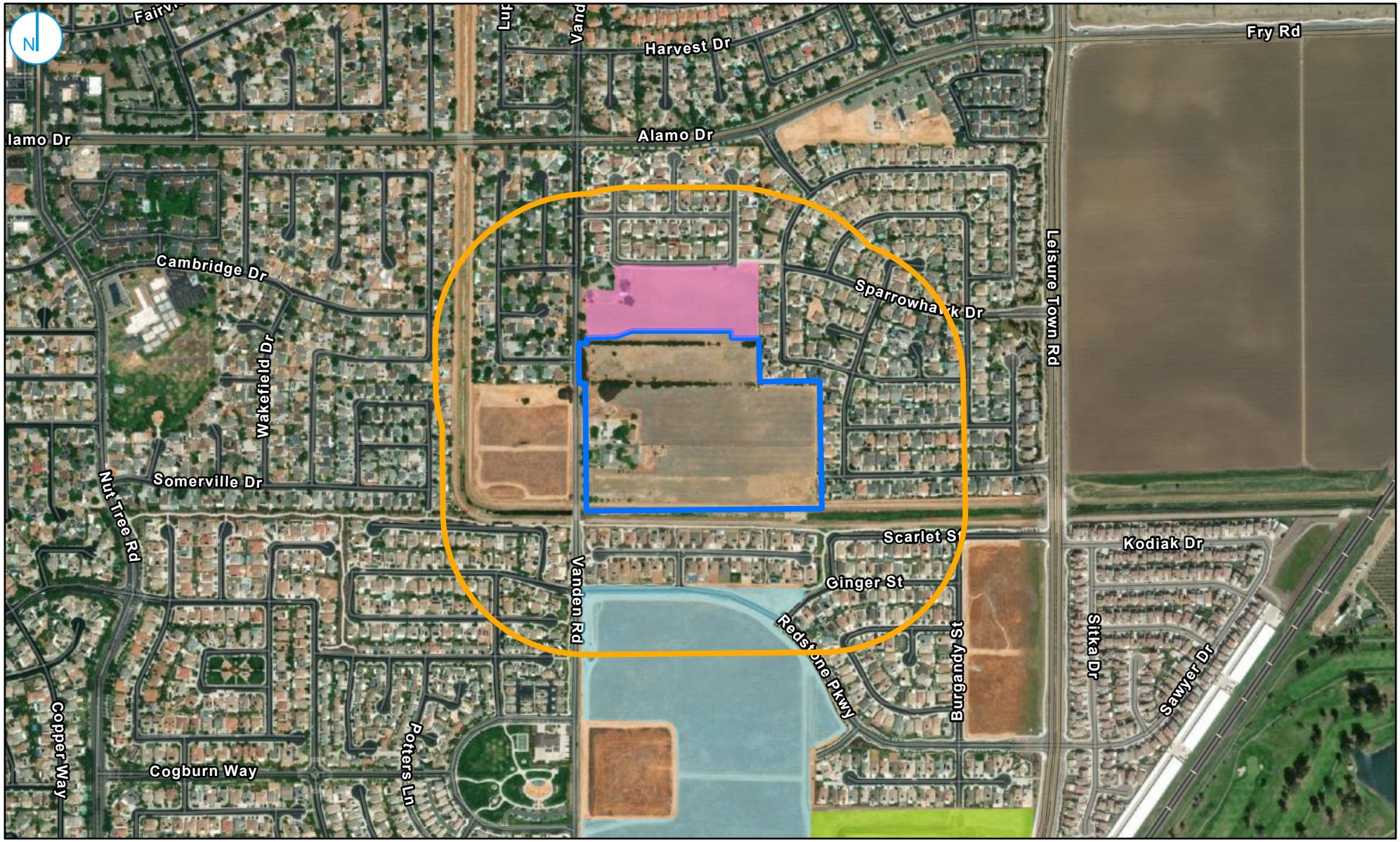
Discovery Builders - Vanden Estates
Vacaville, California

FIGURE 01

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1690022356 | DATED: 4/27/2022 | DESIGNER: LLI



Project Boundary
1000ft Buffer Area
Vanden Gate
Southtown Phase 3
Morningside Vanden Meadows

0 500 1,000 2,000 Feet

NEARBY CONSTRUCTION PROJECTS

Discovery Builders - Vanden Estates
Vacaville, California

FIGURE 02

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL

APPENDIX B

BIOLOGICAL RESOURCES ASSESSMENT

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BIOLOGICAL RESOURCES ASSESSMENT FOR THE

VANDEN ESTATES PROJECT

SOLANO COUNTY, CALIFORNIA

Prepared for:

Discovery Builders, Inc.
4021 Port Chicago Highway
Concord, CA 94520

Prepared by:

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4435 First St. PMB 312
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November 2021
Revised July 2022

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Figures

Attachments

Abbreviations Used

CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
FESA	Federal Endangered Species Act
MBTA	Migratory Bird Treaty Act
HCP	Habitat Conservation Plan
SCWA	Solano County Water Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1 Introduction

The following biological resources assessment report provides a detailed assessment of potential sensitive natural resources located within and/or adjacent to the Discovery Builders, Inc. (DBI) proposed Vanden Estates project site (Project Site). This assessment includes a literature review, site reconnaissance characterizing existing conditions, impact analysis and proposed mitigation measures.

2 Project Location

The Project Site is located in Vacaville and is bounded by Vanden Road on the west, the Alamo Place Subdivision to the east, Alamo Creek to the south and the previously approved Vandengate Subdivision to the north (Figure 1). The Project Site includes 3 parcels – the 5 acre Zocchi property APN 0137-010-070, the 10+/- acre Orr property APN 0137-01-060 and the 10+/- acre Neukirch property APN 0137-010-0508 (Figure 2). The Project Site is relatively flat with the exception of a former spoils/disposal area located on the southeast corner of the Neukirch property. Existing residential units and associated outbuildings are present on the Orr and Neukirch properties, the Zocchi project does not have any structures.

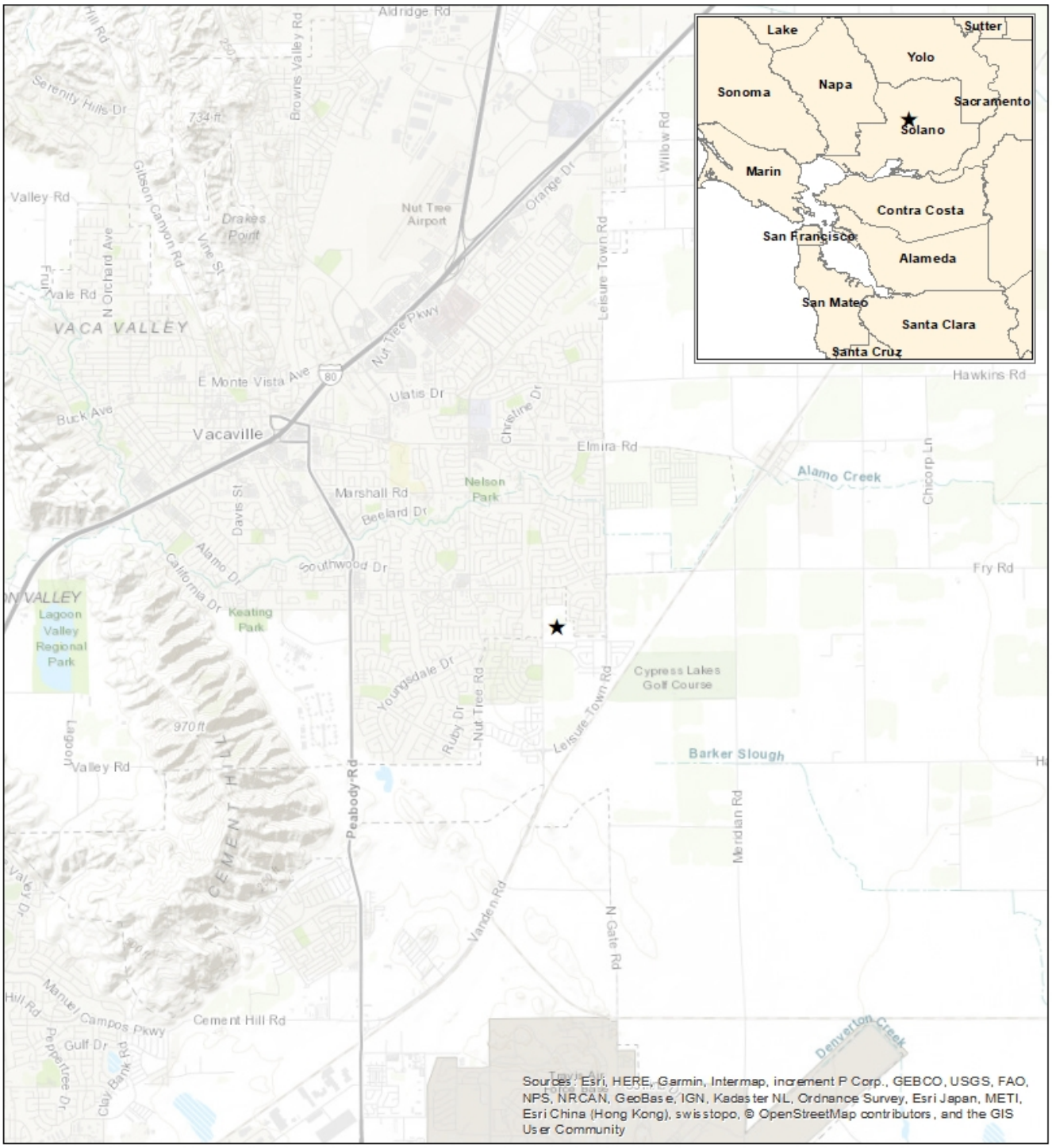
The Project Site occurs within a matrix of open space, former agricultural lands and dense residential development. Alamo Creek, an engineered channel with a wide maintenance access road occurs to the south. An existing sewer line travels east/west on the Neukrich property. The proposed project includes the development of medium density homes and associated infrastructure within the Project Site. The Project Site is designated in the City of Vacaville's General Plan as Designated Planned Development. The Solano Habitat Conservation Plan mapped the land use/habitat as irrigated agriculture.

3 Methods

The analysis presented in this report included a review of existing information regarding biological resource conditions known to occur in the project region and a field survey to evaluate conditions at the Project Site.

3.1 Literature Review and Database Queries

Existing biological resource conditions within and adjacent to the Project Site were investigated prior to and following field surveys. A query of federally listed wildlife species for the Project Site was obtained from the USFWS's Sacramento Endangered Species Office IPac website (Attachment C, USFWS 2021a). Additional information about the locations of known occurrences of sensitive species in the vicinity of the Project Site was compiled from the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) within 5 miles of the Project Site (Attachment D). The California Rare Plant Inventory was searched for special status plant species within the Fairfield North, Mt. Vaca, Dozier, Dixon, Allendale and Elmira U.S. Geological Survey 7.5-minute quadrangles (Attachment E).



★ Project Location

Figure 1. Vicinity Map
Vanden Estates Project
Discovery Builders, Inc.

N

0 0.5 1 2 Miles

SBI
Swain Biological Inc.

Figure 2. Project Site
Vanden Estates Project
Discovery Builders, Inc.

3.2 Field Survey

A visual reconnaissance survey of the Project Site and surrounding areas were conducted by biologist Leslie Koenig on October 14, 2021. During the field survey the biologist walked the entire Project Site in meandering transects to evaluate biological resource conditions at the site.

3.3 Species Considered for Analysis

The potential for special status wildlife or plant species to occur within the Project Site was classified using descriptors and guidelines described below. Tables 1 and 2 in Attachment A includes descriptions of the special status plant and animal species that were identified through research and database queries along with an evaluation of their potential to occur on the Project Site. Assessments of potential are based on knowledge of the species potential to occur within the region based on each species habitat requirements.

Present – Reconnaissance-level, focused, or protocol-level surveys documented the occurrence or observation of a species at the project site.

Likely to occur (on site) – The species has a strong likelihood to be found in the project site prior to or during construction but has not been directly observed to date during project surveys. The likelihood that a wildlife species may occur is based on the following considerations: suitable habitat that meets the life history requirements of the species is present on or near the project site; migration routes or corridors are near or within the project site; records of presence are documented on or near the project site; and there is an absence of invasive predators. The main assumption is that records of occurrence have been documented within or near the project site, the project sites falls within the current range of the species, suitable habitat is present, but it is undetermined whether the habitat is currently occupied. The likelihood that a special status plant species may occur is based on the following considerations: the species is within the geographic range, habitat and soil types are found within the project site, and records of occurrence are documented within or near the project site.

Potential to occur - There is a possibility that the species can be found in the project site prior to or during construction but has not been directly observed to date. The likelihood that a wildlife species has the potential to occur is based on the following conditions: suitable habitat that meets the life history requirements of the species is present on or near the project site; migration routes or corridors are near or within the project site; and there is an absence of invasive predators (e.g., bullfrogs). The main assumption is that the project site falls within the range of the species, suitable habitat is present, but no extant records of occurrence are located within or near the project site and it is undetermined whether the habitat is currently occupied. The likelihood that a special status plant species has the potential to occur is based on the following considerations: the species is within the geographic range, and habitat and soil types are found within the project site, however no records are located within or near the project site and it is undetermined whether the species is currently present at the project site.

Unlikely to occur – The species is not likely to occur in the project site. For wildlife species this based on the following considerations: lack of suitable habitat and features that are required to satisfy the life history requirements of the species (e.g., absence of foraging habitat; lack of reproductive areas, and lack of

sheltering areas); presence of barriers to migration/dispersal; presence of predators or invasive species that inhibit survival or occupation (e.g., the presence of bullfrogs or invasive fishes); lack of hibernacula, hibernation areas, or estivation areas on site. For plant species this is based on the following considerations: the species is within the geographic range but the project site lacks habitat and soil types or (2) suitable habitat and soils types are present but the site is highly disturbed which precludes the potential for the species or (3) suitable habitat and soil types are present but the species was not observed during surveys conducted during the appropriate bloom period for the species.

Not Expected – Suitable habitat does not exist in the project site, the species is restricted to or known to be present only within a specific area outside of the project site, or focused or protocol-level surveys did not detect the species

4 Existing Environmental Setting

4.1 Existing Land Cover

The approximately 25 acre Project Site is mapped by the Solano HCP as irrigated agriculture within planned future development areas. Within the three parcels the majority of the land cover is annual grassland with wild oats (Avena sp.), non-native fennel (*Foeniculum vulgare*), perennial pepperweed (*Lepidium latifolium*), and Bermuda grass (*Cynodon dactylon*) dispersed throughout. Conditions per property are outlined below.

Zocchi Property – 5 acres

The property is weedy, disced grassland with Bermuda grass, Himalayan blackberry, and perennial pepperweed. Along the west, north and south property boundaries a dense windbreak of trees and shrubs is present including acacia, locust, Fremont cottonwood, non-native ash, common hawthorn and blackberry. No structures are present.

Orr Property – 10 acres

The 10 acre property is weedy, disced grassland with wild oats, perennial pepperweed, and pampas grass (*Cortaderia selloana*) observed. The north boundary shares the windbreak with the Zocchi property with a former orchard of walnut and diseased elms in the northwestern corner. There is an existing home with a garage, barn and outbuildings on the property with ornamental landscaping present.

Neukirch Property – 10 acres

The 10 acre property is weedy, disced grassland with wild oats, perennial pepperweed, and fennel observed. The dense windbreak is not present although a row of maples are present on the southern end of the property adjacent to the Alamo Creek maintenance road. There is an existing home, garage and several outbuildings with maples, palms, London plain sycamores, ash, elm, redwood and other ornamentals. There is a shed on the southeastern corner at the top of the former spoils/disposal area. An existing sewer line runs east/west through the property.

4.2 Potentially Jurisdictional Aquatic Resources

The National Wetlands Inventory (USFWS 2021b) shows Alamo Creek as the only aquatic feature in the vicinity. There are two irrigation ditches on the properties that were observed during the field visit. These features are presumed to have been created in uplands to convey irrigation water for the Solano Irrigation District (Figure 2). A discussion of the features is below.

Alamo Creek

Alamo Creek, also known as New Alamo Channel, is an unlined earthen channel that currently functions as a flood control channel adjacent to the southern boundary of the property. In the late 1960s the Soil Conservation Service, now the Natural Resources Conservation Service, created the channel as part of the Ulatis Flood Control Project to alleviate recurring flooding in the Ulatis Watershed (West Yost Associates 2008). The channel is now owned and maintained by the Solano County Water Agency. The Alamo Creek constructed flood control channel starts just downstream of Nut Tree Road and continues to the confluence with Ulatis Creek east of Highway 113. Ulatis Creek confluences with the Sacramento River downstream. Alamo Creek, Ulatis Creek and the Sacramento River are all traditionally navigable waterways.

Westerly Irrigation Ditch

On the west side of the Orr property there is an earthen irrigation ditch that surrounds the existing residential development. The ditch connects to a drain which is no longer functional. The preliminary title report shows an easement for the creation of irrigation features on the westerly side of the property. The easement is granted to the Solano Irrigation District in 1975 and it is presumed that the irrigation feature observed is associated with that easement. The irrigation ditch was unvegetated at the time of the assessment. No water was observed in the westerly irrigation feature and the ditch bottom was dry. Evidence of water flow such as scour was not observed. No indicators of wetland hydrology or wetland vegetation were observed.

The westerly irrigation ditch is presumed to be a feature created in the uplands for the historical purposes of conveyance of irrigation water, is not a wetland, is not tributary to or connected to any jurisdictional features and is therefore non-jurisdictional.

Easterly Irrigation Ditch

On the east side of the Orr property there is an earthen irrigation ditch that follows the property boundary adjacent to the fence that separates the property from the Alamo Place Subdivision. The ditch follows the Orr and Neukirch property boundary south until it ends in a culvert pipe that connects the irrigation ditch to Alamo Creek. The culvert pipe is above the Ordinary High Water Mark and outfalls immediately below the top of bank of the flood control channel. The preliminary title report shows an easement for the creation of irrigation features on the easterly side of the property. The easement is granted to the Solano Irrigation District in 1968 and it is presumed associated irrigation features were constructed shortly thereafter. The irrigation ditch was vegetated with upland grasses at the time of the assessment. No water was observed in the easterly irrigation feature and the ditch bottom was dry. Evidence of water flow such as scour was not observed. No indicators of wetland hydrology or wetland vegetation were observed. Based on the title report and USGS topo maps from 1917 and 1953, it is presumed the feature was created in uplands in the 1960s

for irrigation purposes it is not assumed to be associated with a stream or other formerly jurisdictional feature. However, the easterly irrigation ditch may be jurisdictional to the Corps given the connectivity of the feature to Alamo Creek.

4.3 General Wildlife Species

The disked annual grassland on the Project Site provides habitat for a variety of common wildlife species. The species most likely to utilize the Project Site are those commonly associated with and tolerant of human disturbance. Small mammals such as field mice (*Peromyscus maniculatus*), house mice (*Mus musculus*) and California voles (*Microtus californicus*) are common residents of California annual grasslands. Small numbers of pocket gopher (*Thomomys bottae*) burrows were observed throughout the Project Site. Larger mammals that are adapted to urban disturbance, such as raccoons (*Procyon lotor*), Virginia's opossum (*Didelphis virginiana*) and coyotes (*Canis latrans*) may forage on site.

A variety of birds species may utilize the grassland on the Project site for foraging, including both grassland and urban adapted species such as the mourning dove (*Zenaida macroura*), house finch (*Haemorhous mexicanus*), rock pigeon (*Columbia livia*), white-crowned sparrow (*Zonotrichia leucophrys*), savannah sparrow (*Passerculus sandwichensis*), common raven (*Corvus corax*), and Anna's hummingbird (*Calypte anna*). Common grassland and urban birds such as the western meadowlark (*Sturnella neglecta*), red-winged blackbird (*Agelaius phoeniceus*), and lesser goldfinch (*Spinus psaltria*) may utilize the Project site for nesting. Rarer grassland obligates, including the loggerhead shrike (*Lanius ludovicianus*) and grasshopper sparrow (*Ammodramus savannarum*) that are sensitive to disturbance and require large tracts of grassland habitat are not expected to occur on site as breeders but may use the grassland for foraging. Raptors frequently forage over annual grassland habitat. The trees in the residential areas and within the windbreak could support nesting raptors.

A small number of common amphibian and reptile species may also utilize the disked annual grassland on site. Species likely to occur on the Project Site include western fence lizards (*Sceloporus occidentalis*) and gopher snakes (*Pituophis catenifer*). Sierran chorus frogs (*Pseudacris regilla*) may occur on site during wet conditions, however, no habitat was observed that would support breeding.

5 Sensitive Biological Resources

The following discussion describes the sensitive biological resources that have the potential to be present within the Project Site based on the literature review results. Sensitive biological resources include habitats and/or individual species that have special recognition by federal, state or local conservation agencies. For purposes of this analysis, special-status species are defined as animals that are protected under the California and Federal Endangered Species Acts (CESA and FESA) or other regulations, and species that are considered rare by the scientific community. Special-status species and habitats include:

- Animals and plants listed or proposed for listing as threatened or endangered under the CESA (Fish and Game Code §2050 et seq.; 14 CCR §670.1et seq.) or the FESA (50 CFR 17.11);

- Animals and plants that are candidates for possible future listing as threatened or endangered under the FESA (50 CFR 17; FR Vol. 64, No. 205, pages 57533-57547, October 25, 1999); and under the CESA (California Fish and Game Code §2068);
- Animals and plants that meet the definition of endangered, rare, or threatened under the California Environmental Quality Act (CEQA) (14 CCR §15380) that may include species not found on either State or Federal Endangered Species lists;
- Animals that are designated as "species of special concern" by CDFW;
- Animal species that are designated as “fully protected” under California (Fish and Game Code 3511, 4700, 5050, and 5515).
- Bat Species that are designated on the Western Bat Working Group’s (WBWG) Regional Bat Species Priority Matrix as: “Red or High.” These species are considered to be “imperiled or are at high risk of imperilment.”
- Sensitive Natural Communities Natural Communities with ranks of S1-S3
- Plant species designated by the California Native Plant Society (CNPS) as having a California Rare Plant Rank (CRPR) of 1, 2, 3, or 4. The CRPRs are defined as follows:
    - 1A Plants considered extinct.
    - 1B Plants rare, threatened, or endangered in California and elsewhere.
    - 2A Plants considered extinct in California but more common elsewhere.
    - 2B Plants rare, threatened, or endangered in California but more common elsewhere.
    - 3 Plants about which more information is needed - review list.
    - 4 Plants of limited distribution - watch list.

5.1 Results

A total of 26 special status wildlife species and 25 special status plant species were identified through the literature review and database queries as having the potential to occur. Of these, no special status plant species and seven special status wildlife species were determined to be present, likely to occur, or have potential to occur within the Project Site based on further evaluation. In addition, common nesting birds, raptors, and bat species have the potential to be present and utilizing in the trees and/or structures for roosting and/or nesting. These species are discussed further below.

5.2 Special Status Plants

A total of 25 plants were identified as occurring, or historically occurring based on database searches. A CNPS six-quadrangle search listed all 25 special-status plant species that are known to occur presently or historically within the general vicinity of the project area. The CNDDB search identified 17 plants, with all species overlapped with the CNPS dataset. After comparing geographic range and habitat preferences for each species with the geographic location, habitat types, and soil types found within the survey area, no special-status plant species were identified to have the potential to occur at the Project Site. The complete list of plant species evaluated is provided in Table 1 and Figure 3 in Attachment A.

5.3 Special-Status Wildlife

The complete list of wildlife species that were identified based on database searches within the project area is provided in Attachment A. Species that were determined to have the potential to occur in the Project Site are discussed below.

Birds

The Project Site includes open, disked fields that supports potential foraging habitat for special status grassland bird species. In addition to the federal and State protections listed below, all species are protected by the federal Migratory Bird Treaty Act and the California Fish and Game Code, which prohibit take of individuals (including active nests).

Burrowing owl (*Athene cunicularia*); *CDFW Species of Special Concern, Solano HCP Covered Species*

The burrowing owl is a small owl (typically ten inches tall) associated with open grasslands. In California, burrowing owls occur in extensive grassland habitats that support California ground squirrels but also occur in urban areas and on the urban rural edge where suitable open habitat is present. Ground squirrel burrows are utilized by the burrowing owl for both nesting and roosting and they may also use culverts or other rubble if it provides a safe roost site. The species occurs in flat or gently sloping open grassland or sparse scrubland habitats. High quality habitat consists of annual and perennial grasslands, with sparse or nonexistent tree or shrub cover, and areas of short vegetation. These areas provide foraging habitat and allow burrowing owls to detect predators. Burrowing owls typically nest between February and August. After nesting is completed, adult owls may remain in their nesting burrows or in nearby burrows, or they may migrate (Gorman et al. 2003); young birds disperse across the landscape from 0.1 to 35 miles from their natal burrows (Rosier et al. 2006). Burrowing owl populations have declined substantially in the San Francisco Bay area in recent years, with declines estimated at 4 to 6 percent annually (DeSante et al. 2007).

The Project Site is located within the Solano HCP Irrigated Agriculture Conservation Area for Burrowing Owls (LSA 2012). No suitable burrows to support the species (i.e. at least 4 inches in diameter) were observed on the Project Site or adjacent lands. Culverts and concrete debris are present that could potentially be utilized for roosting. There are 12 presumed extant CNDDB records of the burrowing owl within five miles of the properties. The two nearest records are approximately 0.9 miles from the Project Site. Occurrence Number 722 is to the southeast where two adults and two juveniles were observed using a concrete rubble pile as a roosting site. Occurrence Number 2047 is to the northeast and includes adults observed in a burrow in the agricultural ditch in 2017. No observations of burrowing owls occur on the Project Site however the site serves as suitable foraging habitat and owls could roost if they found suitable burrows or burrow like structures to utilize.

Swainson's hawk (*Buteo swainsoni*); CDFW Threatened, Solano HCP Covered Species

The Swainson's hawk occurs in grassland and scrubland habitats associated with riparian areas, and in urban/suburban and agricultural areas that either support populations of prey species occur near areas that do (Grinnell and Miller 1944, Steinhart 1990). Swainson's hawks forage primarily on small mammals (Ryser 1985) and are frequently observed foraging behind farm equipment (Steinhart 1990). Swainson's

hawks occur as breeders and migrants in California, with breeding occurring primarily in the Central Valley, Great Basin, and Mojave Desert. Nests are built in tall trees in a variety of habitats, including riparian, grassland, oak woodland, agricultural. and urban areas, although nests in urban areas must occur in close proximity to suitable foraging habitat. Nesting typically begins in late-March and early-April (England et al. 1997). Incubation lasts ~34 days, with young leaving the nest approximately 6 weeks after hatching (Bechard et al. 2020).

The Project Site is located within the Solano HCP Irrigated Agriculture Conservation Area for Swainson's hawk (LSA 2012). No active nests were observed on the Project Site or adjacent lands. However, trees on the property could provide suitable nest sites and known nest sites are within the vicinity. There are 38 presumed extant CNDDB records of the Swainson's hawk within five miles of the properties. The nearest record (Occurrence Number 316) is 0.75 miles southwest on the Cypress Lakes Golf Course of an active nest in 1990. Swainson's hawks were not observed during surveys, however, the site serves as suitable foraging habitat and hawks could nest in the trees on the site.

White tailed kite (*Elanus leucurus*); *CDFW Fully Protected*

The white-tailed kite occurs in nearly all lowlands in California, except the southeast deserts. The core of the white-tailed kite's breeding range in the U.S. is California, with nearly all areas up to the western Sierra Nevada foothills and southeast deserts occupied (Dunk 1995). They require relatively open habitat for foraging, and trees (isolated or within stands) for nesting and roosting. White-tailed kite nest in trees, composed of small twigs and lined with grass, hay or leaves (Dunk 1995). White-tailed kites breed in lowland grasslands, agriculture, wetlands, oak-woodland and savannah habitats, and riparian areas associated with open areas. The presence of white-tailed kites is closely tied to the presence of prey species, particularly voles (*Microtus californicus*). Prey base may be the most important factor in determining habitat quality for white-tailed kites (Dunk and Cooper 1994, Skonieczny and Dunk 1997).

The Project Site includes suitable foraging habitat and the trees within the windbreak and on the residential areas could provide suitable nesting habitat. There are two CNDDB records of the white-tailed kite within five miles of the property and one unprocessed CNDDB report from 2016 of an active nest on the Cypress Lake Golf Course that is approximately 0.63 miles southeast of the Project Site.

Common Raptor Species

A variety of common raptor species may forage on the Project Site. Red-tailed hawks and American kestrels frequently occur within urban areas and American kestrels were observed foraging during the site assessments. Raptors including American kestrels, red-tailed hawks, Cooper's hawks and red-shouldered hawks among other raptors could use the trees and or dense shrub habitat on the properties as nesting habitat.

Mammals

The Project Site includes open grassland habitat and is adjacent to the aquatic habitat within Alamo Creek that both provide suitable foraging habitat for bat species. Roosting habitat is present in the dense foilage,

cracks and fissures of trees on site and within cracks and crevices of structures on the properties. Common bat species and individual special-status bat species, such as the pallid bat (*Antrozous pallidus*) or western red bat (*Lasiurus blossevillii*), may forage over the Project Site and adjacent open habitats and may use the trees and structures on site for roosting.

6 Jurisdictional Aquatic Features

The eastern irrigation ditch within the Project Site will require a formal jurisdictional delineation to confirm the jurisdictional status. The feature is presumed to be a former irrigation ditch that was constructed in upland to convey irrigation water and is not a wetland. Based on the site visit observations and review of historical maps and aerials, the ditch does not meet the criteria of a wetland and is believed to not be a former tributary stream.

The connectivity of the feature to Alamo Creek which is a traditional navigable waterway will require further evaluation and consultation with the Army Corps of Engineers to determine the jurisdictional status. If the irrigation feature is determined to be jurisdictional then regulatory permits to address compliance with Section 404 and 401 of the Clean Water Act for impacts to the feature will be required.

7 Species Specific Avoidance and Minimization Measures

The following avoidance and minimization measures apply to the Solano HCP Covered Species. In addition to these species-specific measures, general avoidance measures from the Solano HCP Chapter 6, Section 6.3.1 should also be included as applicable prior to and during construction. Compensatory mitigation for these species, if required, is not discussed in this assessment.

Burrowing Owl. To avoid and minimize impacts on burrowing owls and potential burrows the following measures from the Solano HCP are recommended:

Avoidance and Minimization Measure BO 1: Pre-Construction Surveys. Between February 1 and August 31, an Approved Biologist shall conduct pre-construction surveys in known or suitable habitat areas to identify and subsequently avoid nesting areas for burrowing owls. Surveys shall be conducted within 15 days of the anticipated start of construction, and shall follow standard Solano HCP protocols. If a lapse in project-related construction work of 15 days or longer occurs during the nesting season, additional pre-construction surveys shall be required before project work may be reinitiated.

Avoidance and Minimization Measure BO 2: Exclusion. If burrowing owls or suitable nesting habitat are identified on site during the initial pre-application surveys, applicants shall allow vegetation to grow over the entire project site (except for required fuel breaks) to a height of 36 inches or more above the ground, unless impracticable due to surrounding or adjacent land uses. The increased vegetation height, if in place by the beginning of the nesting season (e.g., retention of previous year's growth or planting during the previous winter), will discourage burrowing owl use of the site.

Avoidance and Minimization Measure BO 3: Construction Buffers and Exclusion. If Avoidance and Minimization Measure BO 2 cannot be implemented or is not effective, the following measures shall be implemented for new construction activities:

1. During the non-breeding season (September 1 through January 31), a circular exclusion zone with a radius of 160 ft shall be established around occupied burrows. If a buffer cannot be established (except as provided below), burrowing owls shall be evicted from the entire construction area using passive relocation techniques. One-way doors shall be installed in all suitable burrows, left in place for a minimum of 48 hours, and monitored daily to evaluate owl exclusion and to ensure doors are functioning properly. Burrows shall then be excavated, using hand tools whenever possible, and refilled to prevent reoccupation. Sections of flexible plastic pipe shall be inserted into burrows during excavation to maintain an escape route for any animals inside the burrow.

2. During the breeding season (February 1 through August 31), an Approved Biologist shall establish a circular exclusion zone with a radius of 250 ft around each occupied burrow. No construction-related activity (e.g., site grading, staking, surveying, any use of construction equipment) shall occur in the exclusion zone during the breeding season. Once the breeding season is over, passive relocation may proceed as described in Condition 1 above.

3. Construction buffer widths may be reduced from the 250 ft wide breeding season buffers and 160 ft wide non-breeding season buffers in accordance with the following requirements:

    a. A site-specific analysis prepared by an Approved Biologist indicates that the nesting pair(s) or wintering owl(s) would not be adversely affected by construction activities. Solano County Water Agency (SCWA), in consultation with the HCP Technical Review Committee, must approve this analysis in writing before construction can proceed.

    b. Monitoring by an Approved Biologist is conducted for a sufficient time (during all construction activities for a minimum of 10 consecutive days following the initiation of construction), the nesting pair does not exhibit adverse reactions to construction activities (e.g., changes in behavioral patterns, reactions to noise), and the burrows are not in danger of collapse due to equipment traffic.

    c. Monitoring is continued at least once a week through the nesting/wintering cycle at that site, and no change in behavior by the owls is observed. This longer-term monitoring may be reduced to a minimum of 2 hours in the morning and 2 hours in the afternoon during construction activities; however, additional and more frequent monitoring may be required if any adverse reactions are noted.

    d. Monitoring reports are submitted to SCWA.

If adverse effects are identified, construction activities shall cease immediately, and construction shall not be resumed until the Approved Biologist, in consultation with SCWA, has determined that construction may continue under modified restrictions or that nesting activity is complete.

Avoidance and Minimization Measure BO 4: Active Relocation. Active relocation of burrowing owls may be implemented as part of the Burrowing Owl Conservation Program if the relocation action is approved by SCWA in consultation with the HCP Technical Review Committee. Active relocation may be used on sites where there is no adjacent habitat for owls to move into if passively relocated or in order to establish owls on a reserve in the Valley Floor Grassland or Inner Coast Range Conservation Areas. Active relocation would be subject to the following requirements:

1. A biological assessment report shall be prepared for the reserve site where owls will be relocated. The assessment will discuss in detail the suitability of the site to support both foraging and nesting burrowing owls.

2. A conservation easement shall be placed on the reserve site prior to attempted relocations.

3. A Burrowing Owl Management Plan for the reserve site shall be prepared and approved by SCWA, in consultation with the HCP Technical Review Committee.

4. An assessment of the potential impacts to other burrowing owls in the vicinity shall be made. The proposed relocation must be found to have no impacts on the existing owl populations.

5. Impacts to other Covered Species shall be avoided at the reserve site.

6. A funding source shall be secured to fund the relocation, habitat maintenance, and monitoring of the relocated burrowing owls.

7. Approved Biologists shall be retained to carry out the monitoring program and prepare reports that will be submitted to SCWA.

Swainson's Hawk. To avoid and minimize impacts on Swainson's hawks and potential nest trees the following measures from the Solano HCP are recommended:

Avoidance and Minimization Measure SH 3: Pre-Construction Nest Surveys. Between March 1 and August 31, an Approved Biologist shall conduct pre-construction surveys to identify and subsequently avoid nesting areas for Swainson's hawk. Surveys shall be conducted within 15 days of the anticipated start of construction, and shall be designed and of sufficient intensity to document nesting within 0.25 mi (1,320 ft) of planned work activities. If a lapse in project-related construction work of 15 days or longer occurs, additional pre-construction surveys shall be required before project work may be reinitiated. Note: Swainson's hawk in the region is typically incubating during June and active nests can be difficult to find

(SHTAC 2000). As such, June surveys may not be acceptable for determining the absence of Swainson's hawk nests.

Avoidance and Minimization Measure SH 4: Active Nest Buffers. Construction work (including grading, earthmoving, and any operation of construction equipment) shall not occur within a 0.25 mi buffer zone around an active Swainson's hawk nest except as provided below. Construction work may commence in the buffer zone when an Approved Biologist has confirmed that nesting activity is complete (e.g., Swainson's hawk young have fully fledged and are capable of flight and have left the nest, or the adults have abandoned the nest for a minimum of 7 days and there is no evidence of re-nesting activity). Nest trees may be removed between September 16 and February 1 when nests are unoccupied.

The size of nest site buffer zones may be reduced only under the following conditions:

1. A site-specific analysis prepared by an Approved Biologist indicates that the nesting pair under consideration are not likely to be adversely affected by construction activities1 (e.g., the nest is located in an area where the hawks are habituated to human activity and noise levels comparable to anticipated construction work). SWCA, in consultation with the HCP Technical Review Committee, must approve this analysis before construction may begin within 0.25 mi of a nest.
2. Monitoring by an Approved Biologist is conducted for a sufficient time (during all construction activities for a minimum of 10 consecutive days following the initiation of construction), and the nesting pair does not exhibit adverse reactions to construction activities (e.g., changes in behavioral patterns, reactions to construction noise).
3. Monitoring is continued at least once a week through the nesting cycle at that nest. This longer-term monitoring may be reduced to a minimum of 2 hours in the morning and 2 hours in the afternoon during construction activities; however, additional and more frequent monitoring may be required if any adverse reactions are noted.
4. Monitoring reports are submitted to SCWA.

If adverse effects are identified, construction activities shall cease immediately and construction shall not be resumed until the Approved Biologist, in consultation with SCWA, has determined that construction may continue under modified restrictions or that nesting activity is complete.

Nesting and Migratory Birds and Raptors. To avoid and minimize impacts on nesting and migratory birds and raptors and to comply with the federal Migratory Bird Treaty Act pre-construction surveys will be conducted and construction avoidance measures will be implemented if necessary.

Preconstruction Survey: The Project Site shall be surveyed prior to construction to evaluate nesting bird habitat. If work is scheduled to take place between February 1 and August 31, a pre-construction nesting bird survey will be conducted by a qualified biologist within 14 days of construction, covering a radius of 300 feet for raptors and 100 feet for other migratory birds at all locations.

Avoidance and Minimization: If an active bird nest is found within these buffers, species-specific measures shall be prepared by a qualified biologist and implemented to prevent abandonment of the active nest. If an active nest is present, a minimum exclusion buffer of 100 feet shall be maintained during construction, depending on the species and location. The perimeter of the nest setback zone shall be fenced or adequately demarcated with stakes and flagging, and construction personnel and activities restricted from the area. A survey report by a qualified biologist verifying that no active nests are present, or that the young have fledged, shall be submitted prior to initiation of grading in the nest-setback zone. A qualified biologist shall monitor construction activities that occur near active nest areas to ensure that no inadvertent impacts on these nests occur.

Special Status Bats. To avoid and minimize impacts on roosting bats the following measures shall be implemented:

Focused Habitat Assessment: Prior to tree and structure removal a focused habitat assessment shall be conducted by a qualified bat biologist to determine if the subject trees and structures to be removed have potential habitat and if any signs of use by bats is observed. If suitable and/or occupied habitat or if signs of recent previous occupation is determined as part of the habitat assessment for special status bats, a tree removal and demolition plan will be developed. The qualified biologist will develop the appropriate plan for eviction, exclusion and compensatory mitigation if necessary in coordination with CDFW.

Preconstruction Surveys: If suitable habitat is determined as part of the habitat assessment for special status bats but occupied habitat is not observed, a preconstruction survey shall be required immediately prior to tree and structure removal to evaluate whether the site conditions have changed. Preconstruction surveys are used to determine what avoidance and minimization requirements are triggered before construction and whether construction monitoring is necessary.

Avoidance and Minimization: If the species is discovered or if evidence of recent prior occupation is established, tree and structure removal shall be scheduled such that it minimizes impacts on special status bats. Hibernation sites with evidence of prior occupation shall be sealed before the hibernation season (November–March), and nursery sites shall be sealed before the nursery season (April–August). If the site is occupied, then the action shall occur either prior to or after the hibernation season for hibernacula and after August 15 for nursery colonies. Tree and structure removal shall not take place as long as the site is occupied.

8 References

Bechard, M. J., C. S. Houston, J. H. Sarasola, and A. S. England (2020). Swainson's Hawk (Buteo swainsoni), version 1.0. In Birds of the World (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.swahaw.01

California Department of Fish and Wildlife (CDFW). 2021. California Natural Diversity Database. October 2021.

California Native Plant Society (CNPS), Rare Plant Program. 2021. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Database query for the Fairfield North, Mt. Vaca, Dozier, Dixon, Allendale and Elmira U.S. Geological Survey 7.5-minute quadrangles. Website http://www.rareplants.cnps.org [accessed October 2021].

DeSante, D.F., E.D. Ruhlen, and R. Scalf. 2007. The distribution and relative abundance of burrowing owls in California during 1991–1993: Evidence for a declining population and thoughts on its conservation. *In* Barclay, J.H., K.W. Hunting, J.L. Lincer, J. Linthicum, and T.A. Roberts (Eds.). 2007. Proceedings of the California Burrowing Owl Symposium, November 2003. Bird Populations Monographs No. 1. The Institute for Bird Populations and Albion Environmental, Inc. Point Reyes Station, CA.

Dunk, J. R. 1995. White-tailed Kite (Elanus leucurus), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.whtkit.01

Dunk, J.R. and R.J. Cooper. 1994. Territory-size regulation in black-shouldered kites. Auk 111(3): 588-595.

England, A., J. Estep, and W. Holt. 1995. Nest-site selection and reproductive performance of urban-nesting Swainson's hawks in the Central Valley of California. J. Raptor Res. 29:179-186.

Gorman, L.R., D.K. Rosenberg, N.A. Ronan, K.L. Haley, J.A. Gervais, and V. Franke. 2003. Estimation of reproductive rates of burrowing owls. J. Wildl. Manage. 67:493-500.

Grinnell, J. and A.H. Miller. 1944. The distribution of the birds of California. Pacific Coast Avifauna. No. 27.

LSA. 2012. Solano Habitat Conservation Plan, Volume 1, Public Draft. Prepared for Solano County Water Agency. October 2012. Available online at: https://www.scwa2.com/solano-multispecies-habitat-conservation-plan/

Rosier, J.R., N.A. Ronan, and D.K. Rosenberg. 2006. Post-breeding dispersal of burrowing owls in an extensive California grassland. American Midland Naturalist 155:162-167.

Ryser, F.A. 1985. Birds of the Great Basin: A Natural History. Univ. Nevada Press, Reno, NV.

Skonieczny, M.F. and J. R. Dunk. 1997. Hunting synchrony in white-tailed kites. J. Raptor Res. 31(1): 79-81.

Steinhart, P. 1990. California's Wild Heritage, Threatened and Endangered Animals in the Golden State. California Department of Fish and Game. California Academy of Sciences. Sierra Club Books.

US Fish and Wildlife Service (USFWS). 2021a. Environmental Conservation Online System, IPaC database query for the Vanden Estates Project Site. October 2021.

U.S. Fish and Wildlife Service (USFWS). 2021b. National Wetland Inventory (NWI). Online GIS database. Available at https://www.fws.gov/wetlands/. Accessed October 2021.

U.S. Geologic Survey (USGS). 2021. TopoView, National Geologic Map Database Project Online Viewer. https://ngmdb.usgs.gov/topoview/viewer/

West Yost and Associates. 2008. Ulatis System Drainage Study Prepared for Solano County Water Agency, March 2008. Accessed online at https://www.scwa2.com/wp-content/uploads/2020/12/U50.Ulatis_System_Drainage_Study.March_2008-ID-112448.pdf

Attachment A. Species Potential to Occur Evaluation

BIOLOGICAL RESOURCES ASSESSMENT FOR THE

VANDEN ESTATES PROJECT

SOLANO COUNTY, CALIFORNIA

Attachment A. Species Potential to Occur Evaluation

Table 1. Special Status Plant Species with Potential to Occur in the Project Area

Scientific Name**	Common Name	Status*			Habitat	Potential for Occurrence
		FESA	CESA/ NPPA	CRPR		
Astragalus tener var. tener	alkali milk-vetch			1B.2	Occurs in playas, alkaline flats, vernally moist meadows, and vernal pools in alkaline soils at elevations less than 60 meters (196 feet).	**Not expected.** No habitat suitable to support this species is present.
Atriplex cordulata var. cordulata	heartscale			1B.2	Chenopod scrub (most commonly on fine-textured, alkaline and/or saline soils in areas of impeded drainage), Meadows and seeps, Valley and foothill grassland (sandy)	**Not expected.** No habitat suitable to support this species is present.
Atriplex depressa	brittlescale			1B.2	Alkaline clay soils, barren areas within alkali grassland, alkali meadow, and alkali scrub. Occasionally on the margins of alkali vernal pools. Occurs at elevations less than 320 meters (1050 feet).	**Not expected.** No habitat suitable to support this species is present.
Centromadia parryi ssp. parryi	pappose tarplant			1B.2	Grassland, coastal salt marshes, alkaline springs, seeps less than 400 meters (1312 feet).	**Unlikely to Occur.** Grassland present but not in association with other microhabitat features. Survey was conducted in October, the end of the potential bloom period and was not observed.

Attachment A. Species Potential to Occur Evaluation

Scientific Name**	Common Name	Status*			Habitat	Potential for Occurrence
		FESA	CESA/ NPPA	CRPR		
Centromadia parryi ssp. rudis	Parry's rough tarplant			4.2	Grassland, edges of marshes and vernal pools, disturbed sites, elevation less than 500 meters (1640 feet).	**Unlikely to Occur.** Disturbed grassland present but not in association with other microhabitat features. Survey was conducted in October, the end of the potential bloom period and was not observed.
Chloropyron molle ssp. hispidum	hispid salty bird's-beak			1B.1	Meadows and seeps, Playas, Valley and foothill grassland, alkaline. Elevations below 170 meters (560 feet).	**Not expected.** Grassland habitat present however alkaline soils and other microhabitats not present.
Delphinium recurvatum	recurved larkspur			1B	Alkaline soils in chenopod scrub, cismontane woodland, and valley and foothill grassland, elevation between 10 to 1110 meters (35 and 3640 feet).	**Not expected.** No habitat suitable to support this species is present.
Downingia pusilla	dwarf downingia			2.2	Valley and foothill grassland (mesic), vernal pools, elevation below 1390 meters (4560 feet).	**Not expected.** No habitat suitable to support this species is present.
Extriplex joaquinana	San Joaquin spearscale			1B.2	Chenopod scrub, Meadows and seeps, Playas, Vernal pools, alkaline soils; typically occurs in alkali grassland and alkali meadow, or on the margins of alkali scrub. Elevation below 950 meters (3115 feet).	**Not expected.** No habitat suitable to support this species is present.

Attachment A. Species Potential to Occur Evaluation

Scientific Name**	Common Name	Status*			Habitat	Potential for Occurrence
		FESA	CESA/ NPPA	CRPR		
Fritillaria pluriflora	adobe-lily			1B.2	Chaparral, cismontane woodland, and valley and foothill grassland. Often in adobe soils. Elevation from 190 to 680 meters (652 to 2230 feet).	**Not expected.** No habitat suitable to support this species is present and outside of elevational range.
Hesperevax caulescens	hogwallow starfish			4.2	Occurs in wetlands within foothill woodland, valley and foothill grassland (mesic, clay), and wetland-riparian including vernal pools (shallow). Elevations below 480 meters (1575 feet).	**Not expected.** No habitat suitable to support this species is present.
Isocoma arguta	Carquinez goldenbush			1B.1	Valley and foothill grassland, alkaline soils, near drainages and on tops and sides of mounds in swale habitat. Elevation below 30 meters (100 feet).	**Unlikely to occur.** Disturbed annual grassland present although alkaline soils are not. On the edge of the elevational range. Species was not observed during surveys conducted in October during bloom period.
Lasthenia conjugens	Contra Costa goldfields	FE		1B.1	Cismontane woodland, Playas (alkaline), Valley and foothill grassland, Vernal pools. Elevations between 5 to 210 meters (15 to 690 feet).	**Not expected.** No habitat suitable to support this species is present.
Lasthenia ferrisiae	Ferris' goldfields			4.2	Occurs in wetlands, alkaline, clay soils, and vernal pools. Elevations between 65 to 620 meters (215 to 2000 feet).	**Not expected.** No habitat suitable to support this species is present and outside of elevational range.

Attachment A. Species Potential to Occur Evaluation

Scientific Name**	Common Name	Status*			Habitat	Potential for Occurrence
		FESA	CESA/ NPPA	CRPR		
Lasthenia glabrata ssp. coulteri	Coutler's goldfields			1B.1	Coastal salt marshes, playas, valley and foothill grassland, vernal pools, usually found on alkaline soils in playas, sinks, and grasslands. Elevation below 700 meters (2295 feet).	**Not expected.** No habitat suitable to support this species is present.
Legenere limosa	legenere			1B.1	Vernal pools and wetlands. Elevation below 280 meters (920 feet).	**Not expected.** No habitat suitable to support this species is present.
Myosurus minimus ssp. apus	little mousetail			3.1	Vernal pools (alkaline) within valley and foothill grassland. Elevations between 20 to 170 meters (65 to 560 feet).	**Not expected.** No habitat suitable to support this species is present.
Navarretia leucocephala ssp. bakeri	Baker's navarretia			1B.1	Occurs in wetlands within cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, and vernal pools. Elevations below 450 meters (1475 feet).	**Not expected.** No habitat suitable to support this species is present.
Orcuttia inaequalis	San Joaquin Orcutt grass	FT	SE	1B.1	Vernal pools within valley grassland, freshwater wetlands, wetland riparian.	**Not expected.** No habitat suitable to support this species is present.

Attachment A. Species Potential to Occur Evaluation

Scientific Name**	Common Name	Status*			Habitat	Potential for Occurrence
		FESA	CESA/ NPPA	CRPR		
Perideridia gairdneri ssp. gairdneri	Gairdner's yampah			4.2	Mesic areas in grassland, chaparral, coniferous forest. Elevations between 5 and 1800 meters (15 to 5905 feet).	**Not expected.** No habitat suitable to support this species is present.
Plagiobothrys hystriculus	beareded popcorn flower			1B.1	Vernal pools and swales within valley and foothill grassland (mesic) and vernal pool margins. Elevation less than 50 meters (164 feet).	**Not expected.** No habitat suitable to support this species is present.
Puccinellia simplex	California alkali grass			1B.2	Coastal salt marsh, wetland riparian, saline flats and mineral springs. Elevation between 5 and 1390 meters (15 to 4560 feet).	**Not expected.** No habitat suitable to support this species is present.
Symphyotrichum lentum	Suisun Marsh aster			1B.2	Marshes and swamps (brackish and freshwater). Elevations -4 to 5 meters (-10 to 15 feet).	**Not expected.** No habitat suitable to support this species is present.
Trifolium amoenum	two-fork clover/ showy Indian clover	FE		1B.2	Vernal pool obligate. Found in dry meadows along the margins of volcanic ash substrate vernal pools and lakes, and in open, wet ground in forest openings. Elevations between 35 to 210 meters (115 to 690 feet).	**Not expected.** No habitat suitable to support this species is present.

Attachment A. Species Potential to Occur Evaluation

Scientific Name**	Common Name	Status*			Habitat	Potential for Occurrence
		FESA	CESA/ NPPA	CRPR		
Trifolium hydrophilum	saline clover			1B.2	Occurs in mesic, alkaline sites within marshes and swamps, valley and foothill grasslands, and vernal pools. Elevations below 45 meters (150 feet).	**Not expected.** No habitat suitable to support this species is present.

*Status:
Federal Endangered Species Act (FESA) Designations: (FE) Federally Endangered, (FT) Federally Threatened
California Endangered Species Act (CESA) / Native Plant Protection Act (NPPA) Designations: (SE) State Endangered, (ST) State Threatened, (SCE) Candidate Endangered, (SCT) Candidate Threatened, (SR) State Rare.
California Native Plant Society (CNPS) Rare Plant Rank (CRPR): (1A) Presumed extinct in California; (1B) Rare, threatened, or endangered in California and elsewhere; (2) Rare, threatened, or endangered in California, but more common elsewhere; (3) More information is needed; (4) Limited distribution, watch list. Threat Rank: 0.1 Seriously threatened in California (more than 80% of occurrences threatened / high degree and immediacy of threat); 0.2 Fairly threatened in California (20 to 80% occurrences threatened/moderate degree and immediacy of threat); 0.3 Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)
**Species list developed from CNDDB Records, IPaC species list, and CNPS Rare Plant Inventory.

Attachment A. Species Potential to Occur Evaluation

Table 2. Special Status Wildlife Species with Potential to Occur within the Project Area

Scientific Name	Common Name	Status*			Habitat	Potential for Occurrence within Project Site
		FESA	CESA	CDFW		
Invertebrates						
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	FT			Elderberry shrubs over 1" diameter in riparian and upland habitats in the Central Valley up to 3000 ft. elevation	**Not expected.** No elderberry shrubs observed. No habitat suitable to support this species is present.
Elaphrus viridis	Delta green ground beetle	FT			Associated with vernal pool complexes and areas adjacent to other seasonal wetlands in the grassland land cover type. The beetle is only known to occur in areas with high clay-content soils.	**Not expected**. Vernal pool complexes are absent from the Project site.
Crustaceans						
Branchinecta conservatio	Conservancy fairy shrimp	FE			Found in vernal pools that form in depressions in grassland habitats and ditches in the Central Valley, Solano, and Sacramento counties.	**Not expected.** Vernal pool complexes not observed during surveys. Drainage ditches on and adjacent to site are not expected to retain water beyond storm events. Not within Solano HCP mapped clay or hard pan habitat. One known record occurs within five miles of the property, at Travis Air Force Base.
Branchinecta lynchi	vernal pool fairy shrimp	FT			Usually associated with vernal pools but can also be found in association with other ephemeral habitats including alkali pools, seasonal drainages, stock ponds, vernal swales, rock outcrops, and artificially created ephemeral habitats (e.g. roadside ditches and depressions in firebreaks)	**Not expected.** Vernal pool complexes not observed during surveys. Drainage ditches on and adjacent to site are not expected to retain water beyond storm events. Not within Solano HCP mapped clay or hard pan habitat. There are 11 CNDDB occurrences within five miles of the Project site, with the majority occurring in or near Travis Air Force Base.

Attachment A. Species Potential to Occur Evaluation

Scientific Name	Common Name	Status*			Habitat	Potential for Occurrence within Project Site
		FESA	CESA	CDFW		
Branchinecta mesovallensis	midvalley fairy shrimp				Endemic to California Central Valley grassland vernal pools, seasonally ponded areas within vernal swales, rock outcrop ephemeral pools, playas, and alkali flats, roadside ditches, and railroad toe drains.	**Not expected.** Vernal pool complexes not observed during surveys. Drainage ditch on and adjacent to site are not expected to retain water beyond storm events. Not within Solano HCP mapped clay or hard pan habitat. Three known records occur within five miles of the property, at or near Travis Air Force Base.
Lepidurus packardi	vernal pool tadpole shrimp	FE			Occur in ephemeral freshwater habitats, including alkaline pools, clay flats, vernal lakes, vernal pools, vernal swales, and other seasonal wetlands	**Not expected.** Vernal pool complexes not observed during surveys. Drainage ditch on and adjacent to site are not expected to retain water beyond storm events. Not within Solano HCP mapped clay or hard pan habitat. There are six CNDDB occurrences within five miles of the property, the majority of which occur on or near Travis Air Force Base.
Fish						
Hypomesus transpacificus	Delta Smelt	FT	SE		Endemic to California; occurs only in the brackish and freshwaters of the Sacramento-San Joaquin River Delta. Exhibits seasonal migration within the estuary, moving upstream before spawning.	None. No habitat suitable to support this species is present.

Attachment A. Species Potential to Occur Evaluation

Scientific Name	Common Name	Status*			Habitat	Potential for Occurrence within Project Site
		FESA	CESA	CDFW		
Amphibians						
Ambystoma californiense	California tiger salamander	FT	ST		Ponds and vernal pools in grassland; and oak woodland.	**Unlikely to occur.** Disked grasslands on the property provide suitable upland migration habitat with gopher burrows observed. Suitable breeding habitat does not present on the property. Nearest suitable breeding habitat is at a stormwater detention basin approximately one mile south of the project site at the corner of Vanden Road and Leisure Town Road but is separated by barriers including recent residential development. There are 12 records within five miles of the site, the closest CNDDB record is located at an active development site where 2 larvae were observed in a manmade pool in 2005. The property is not mapped within the Solano HCP as known or potential suitable habitat for the species.
Rana boylii	Foothill yellow-legged frog; West/Central Clade		SE		Streams and rivers with rocky substrates and sunny banks in forests, chaparral, and woodlands at elevations from 0' – 6,000'. Sometimes found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools.	**Not expected.** No suitable stream habitat occurs on the Project site. There are no extant CNDDB records within a five-mile radius of the project site.

Attachment A. Species Potential to Occur Evaluation

Scientific Name	Common Name	Status*			Habitat	Potential for Occurrence within Project Site
		FESA	CESA	CDFW		
Rana draytonii	California red-legged frog	FT		SSC	Requires slow moving or still water for juvenile development. Occurs in freshwater marshes; stock ponds; and riparian habitats. May aestivate in rodent burrows or cracks during dry periods.	**Unlikely to occur.** Disked grasslands on the property provide suitable upland migration habitat with gopher burrows observed. Suitable breeding habitat not present on the property. Nearest suitable breeding habitat is at a stormwater detention basin approximately one mile south of the project site at the corner of Vanden Road and Leisure Town Road but is separated by barriers including recent residential development. There are no CNDDB records within five miles of the property and the site is not mapped within the Solano HCP as known or potential suitable habitat for the species.
Reptiles						
Emys marmorata	western pond turtle			SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams & irrigation ditches, usually with aquatic vegetation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5km from water for egg laying.	**Unlikely to occur.** No suitable pond habitat is present within the Project site. The reach of the Alamo Creek near the Project site is a confined to concrete and earth lined ditches with steep slopes. There are three CNDDB records within five miles of the property. All three records are located over three miles from the Project site. Known occurrences and potentially suitable aquatic habitat are separated and separated from the site by urban development and barriers such as the railroad and major roads.

Attachment A. Species Potential to Occur Evaluation

Scientific Name	Common Name	Status*			Habitat	Potential for Occurrence within Project Site
		FESA	CESA	CDFW		
Thamnophis gigas	giant gartersnake	FT	ST		Associated with aquatic habitats. Often occurs in or near agricultural wetlands and other waterways such as irrigation and drainage canals; sloughs; ponds; small lakes; low gradient streams; rice fields; freshwater marshes; and adjacent uplands in the Central Valley.	**Not Expected**. No habitat suitable to support this species is present. No CNDDB records within five miles of the property.
Birds						
Agelaius tricolor	tricolored blackbird		ST (nesting colony)		Emergent wetlands; grasslands; and agricultural fields. Breeds near fresh water; preferably in emergent wetlands in cattails or tules; but also in thickets of willow; wild rose; blackberry; or tall herbaceous species.	**Not expected (nesting), potential to occur (foraging).** Foraging habitat present throughout the grasslands of the project area. Nesting habitat, (i.e., dense stands of emergent vegetation or blackberry thickets) is not present on or adjacent to the property. There are three CNDDB record within five miles of the property. The nearest record occurs 0.9 mile south of the Project site, in a detention basin.
Ammodramus savannarum	grasshopper sparrow			SSC (nesting)	Breeds and forages in extensive meadows, fallow fields, and pastures.	**Not expected (nesting), potential to occur (foraging).** Grassland at the Project Site provides suitable foraging habitat. However the proximity of the property to suburban development and regular disking of the site limit its suitability to the species, which prefers large tracts of relatively intact grassland.

Attachment A. Species Potential to Occur Evaluation

Scientific Name	Common Name	Status*			Habitat	Potential for Occurrence within Project Site
		FESA	CESA	CDFW		
Aquila chrysaetos	golden eagle			FP (nesting and wintering)	Open to semi-open country; in prairies; tundra; open coniferous forest and barren areas; especially in hilly or mountainous regions. Typically nest on cliffs, steep escarpments, trees or in human-made structures, including windmills, observation towers, nesting platforms, and electrical transmission towers in grassland, chaparral, shrubland, forest, and other vegetated areas.	**Not expected (nesting), potential to occur (foraging)**. Grassland on the Project Site provides suitable foraging habitat. Large trees on the properties may provide potential nesting habitat. The proximity of the site to dense urban development reduces the potential for golden eagles to nest on or near the Project site. There are no CNDDB records within five miles of the Project Site.
Asio flammeus	short-eared owl			SSC (nesting)	Requires dense vegetation; tall grasses, brush, ditches, and wetlands are used for resting and roosting cover. Found in open, treeless areas with elevated sites for perches, and dense vegetation for roosting and nesting.	**Not expected (nesting), potential to occur (foraging)** Suitable foraging habitat is present throughout the Project Site, dense brushy habitat for nesting is not present.
Athene cunicularia	burrowing owl			SSC (burrow sites and some wintering sites)	Open, dry annual or perennial grasslands with low-growing vegetation and on the margins of disturbed/developed habitats. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	**Potential to occur (nesting and foraging).** Suitable foraging habitat present. No ground squirrel burrows of appropriate size for nesting observed on the Project Site, which is regularly disked, culverts and concrete rubble is present that could be used as roost locations. There are 12 presumed extant CNDDB records within five miles of the property. The Project Site is located within the Solano HCP Irrigated Agriculture Conservation Area for Burrowing Owls.

Attachment A. Species Potential to Occur Evaluation

Scientific Name	Common Name	Status*			Habitat	Potential for Occurrence within Project Site
		FESA	CESA	CDFW		
Buteo swainsoni	Swainson's hawk		ST (nesting)		Nests in scattered trees or along riparian systems adjacent to agricultural fields or pastures; which are their primary foraging areas. Preferred nest trees are valley oak; cottonwood; willow; sycamore; and walnut.	**Potential to occur (nesting and foraging).** Marginally suitable foraging habitat is present. Large trees suitable for nesting are present on the Project Site and 38 presumed extant CNDDB records occur within five miles of the property, the nearest record is 0.75 miles away. The Project Site is located within the Solano HCP Irrigated Agriculture Conservation Area for Swainson's hawks
Circus hudsonius	northern harrier			SSC (nesting)	Sloughs; wet meadows; marshlands; swamps; prairies; plains; grasslands; and shrublands; large forest openings; open; low woody or herbaceous vegetation for nesting and hunting; nest on ground.	**Potential to occur (nesting and foraging)** Suitable foraging habitat is present throughout the Project Site. Dense ground cover to support nesting is present on the Zocchi property and there is an unprocessed CNDDB record approximately 0.4 miles to the southwest of confirmed nesting in dense tall grass in 2010.
Elanus leucurus	white-tailed kite			FP (nesting)	Open grasslands; meadows; or marshes for foraging close to isolated; dense topped trees for nesting and perching.	**Potential to occur (nesting and foraging).** Suitable foraging habitat is present. Large trees were observed that could support nesting.

Attachment A. Species Potential to Occur Evaluation

Scientific Name	Common Name	Status*			Habitat	Potential for Occurrence within Project Site
		FESA	CESA	CDFW		
Lanius ludovicianus	Loggerhead Shrike			SSC (nesting)	Nests in tall shrubs and dense trees; forages in grasslands, marshes, and ruderal habitats.	**Potential to occur (nesting and foraging).** Shrubs and trees on the Project Site provide suitable nesting habitat. Grassland is present that provides suitable foraging habitat, although the species typically prefers larger tracts of relatively intact grassland.
Rallus obsoletus obsoletus	California Ridgway's rail	FE	SE		Salt-water and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay.	**Not expected**. No habitat suitable to support this species is present.
Mammals						
Antrozous pallidus	Pallid bat			SSC	Regionally found in low elevation arid or semi-arid areas near water. Their day roost is often in a warm horizontal opening (e.g. rock cracks, attics); the night roost is often in the open, near foliage; and the hibernation roost is often in buildings, caves, or cracks in rocks.	**Potential to occur.** Suitable roosting habitat for the species is present in trees and structures on the Project Site. Grassland and adjacent Alamo Creek provide suitable foraging opportunities.
Corynorhinus townsendii	Townsend's big-eared bat			SSC	Found in pine forests and arid desert scrub, almost always near hibernation caves and mines, or near roosting areas. Prefer large open areas for roosting.	**Not Expected.** No suitably cavernous roost habitat is present on or near the Project Site.

Attachment A. Species Potential to Occur Evaluation

Scientific Name	Common Name	Status*			Habitat	Potential for Occurrence within Project Site
		FESA	CESA	CDFW		
Lasiurus blossevillii	western red bat			SSC	Typically solitary, roosting primarily in the foliage of trees or shrubs. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. There may be an association with intact riparian habitat (particularly willows, cottonwoods, and sycamores).	**Potential to occur.** Suitable roosting habitat for the species is present in trees and structures on the Project Site. Grassland and adjacent Alamo Creek provide suitable foraging opportunities.
Taxidea taxus	American badger			SSC	Open areas; plains and prairies; farmland and woodland edges. Constructs deep burrows for the pursuit of prey and for sleeping.	**Not expected.** No suitable burrows were observed in or adjacent to the Project Site. Suitably extensive intact grassland habitat is not present in the Project Site and is by dense residential development.

*Status:
Federal Endangered Species Act (FESA) Designations: (FE) Federally Endangered, (FT) Federally Threatened, (FPE) Federally Proposed for listing as Endangered, (FPT) Federally Proposed for listing as Threatened, (FPD) Federally proposed for delisting, (FC) Federal candidate species
California Endangered Species Act (CESA) / Native Plant Protection Act (NPPA) Designations: (SE) State Endangered, (ST) State Threatened, (SCE) Candidate Endangered, (SCT) Candidate Threatened, (SR) State Rare.
California Department of Fish and Wildlife (CDFW) Designations:(SSC) Species of Special Concern, (FP) Fully Protected Species
**Species list developed from CNDDB Records, IPaC species list, Solano HCP, and CDFW Special Animals List.

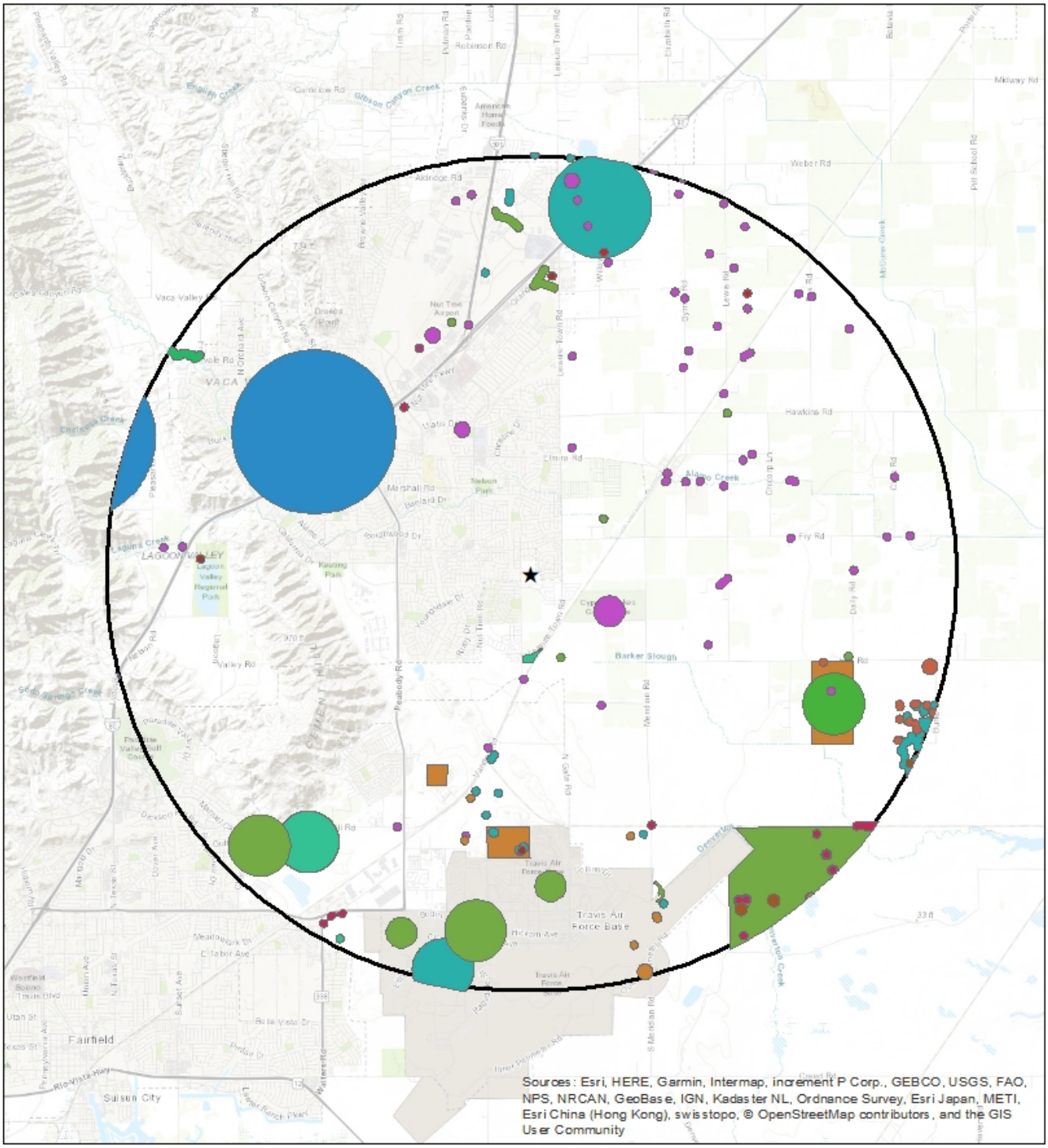


Figure 3. CNDDB Animals
Vanden Estates Project
Discovery Builders, Inc.

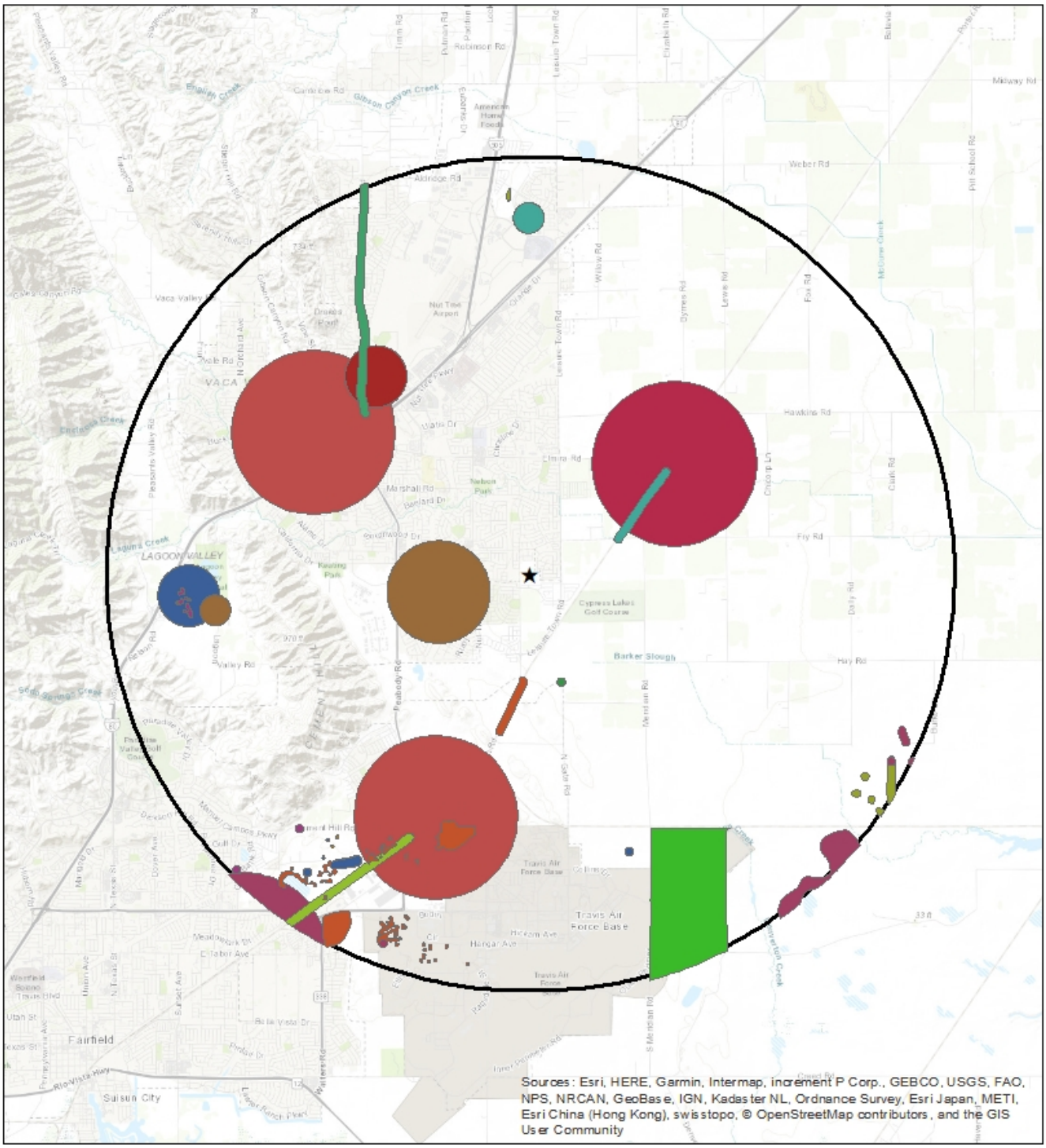


Figure 4. CNDDB Plants
Vanden Estates Project
Discovery Builders, Inc.

Attachment B. Representative Photos

BIOLOGICAL RESOURCES ASSESSMENT FOR THE

VANDEN ESTATES PROJECT

SOLANO COUNTY, CALIFORNIA

Attachment C. USFWS IPac Species List

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Attachment D. CNDDB Rare Find Report

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Attachment E. CNPS Rare Plant Inventory Results

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APPENDIX C

CULTURAL RESOURCES EVALUATION

(REDACTED DUE TO CONFIDENTIAL

STATUS)

APPENDIX D

GEOTECHNICAL INVESTIGATION

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Geotechnical Investigation

Vanden Road Residential Development

5742, 5750, and 7038 Vanden Road

Vacaville, California

Report No. 455488 has been prepared for:

Discovery Builders, Inc.

4021 Port Chicago Highway, Concord, California 94520

February 23, 2022

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GEOTECHNICAL INVESTIGATION
VANDEN ROAD RESIDENTIAL DEVELOPMENT
5742, 5750, AND 7038 VANDEN ROAD
VACAVILLE, CALIFORNIA

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed Vanden Road Residential Development to be constructed at 5742, 5750, and 7038 Vanden Road in Vacaville, California. The site location is shown on the Vicinity Map, Figure 1. The purpose of our investigation was to evaluate the geologic and subsurface conditions and to provide geotechnical recommendations for design of the proposed project.

We received and reviewed a set of plans titled "Vanden Estates, Vesting Tentative Map, City of Vacaville, Solano County, California," prepared by Bellecci & Associates, Inc. dated July 21, 2021. Additionally, we received a report titled "Geotechnical Exploration, 5790 Vanden Road (43 Units), APN 136-080-080 and 136-080-090, 9.3 Acres, Vacaville, California," prepared by Engeo Incorporated dated September 13, 2006.

1.1 Project Description

We understand that the project will consist of developing the site with 114 single-family residences with associated streets, perimeter sounds walls, retaining walls, and underground utilities. The site consists of three parcels totaling approximately 25 acres and listed as APN 0137-010-050, 0137-010-060, and 0137-010-070. We understand that the proposed residences will be constructed on post-tensioned (PT) mat slab foundations. Based on the development, generally minor grading will be required with the exception of the southeast corner of the site, which will require moderate grading with cuts of up to approximately 12 feet. The layout of the proposed development is shown on the Site Plan, Figure 2.

Structural loads have not been provided to us; therefore, we assumed that structural loads will be representative for this type of construction.

1.2 Scope of Services

Our scope of services was presented in our agreements with you dated April 6, 2021. To accomplish this work, we have provided the following services:

- Exploration of subsurface conditions drilling four borings in the area of the proposed improvements and retrieving samples for observation and laboratory testing. We also advanced three Cone Penetration Tests (CPTs).
- Evaluation of the physical and engineering properties of the subsurface soils by visually classifying the samples and performing various laboratory tests on selected samples.
- Engineering analysis to evaluate structure foundations, site earthwork, slabs-on-grade, and retaining walls.
- Preparation of this report to summarize our findings and to present our conclusions and recommendations.

2.0 SITE CONDITIONS

2.1 Site Reconnaissance

Our Staff Engineer performed a reconnaissance of the site on October 27, 2021. The rectangular shaped project site is occupied by three parcels 0137-010-050, 0137-010-060, and 0137-010-070 and is bounded by Vanden Road to the west, existing residences to the east, an undeveloped parcel to the north, and Alamo Creek to the south. The site is gently sloping west to east, except for the southeast corner of the site by proposed Lots 43 and 44 that has a moderate slope. The site is mostly undeveloped with some trees, except for parcels 0137-010-050 and 0137-010-060, which are occupied by single family residences along the western portion of the site. The parcels were subdivided with chain link fences.

Additionally, the field exploration locations were marked, and notification was provided to Underground Service Alert (USA) prior to beginning fieldwork to identify public and/or private underground utilities. We also contracted a private utility locator to reduce the risk of damaging unidentified underground utilities.

2.2 Exploration Program

Subsurface exploration was performed on November 10, 2021 and February 11, 2022 using conventional, truck-mounted hollow-stem auger drilling equipment to investigate, sample, and log subsurface soils. Four hollow-stem auger exploratory borings were drilled to depths ranging from approximately 30 to 35 feet. Three CPTs were advanced to depths ranging from approximately 50 to 95½ feet. Our borings and CPTs were permitted and backfilled in accordance with Solano County Environmental Health Services Department guidelines. The approximate locations of the explorations are shown on the Site Plan, Figure 2. The logs of the borings and CPTs and details regarding our field investigation are included in Appendix A; laboratory tests are discussed in Appendix B.

2.3 Subsurface Conditions

In general, our borings generally encountered stiff to hard fat clay to a depth of approximately 4½ feet, underlain by interbedded layers of medium stiff to hard lean clay, and medium stiff sandy lean clay to depths ranging from approximately 16½ to 21½ feet. Below the depths of 16½ to 21½ feet, our borings encountered interbedded layers of medium dense to dense clayey sand and medium dense poorly graded sand with clay, and very stiff to hard clay to depths ranging from 30 to 35 feet. Soils inferred in our CPTs were interpreted to include interbedded layers of clay, silty clay, clayey silt, sandy silt, and sand to a depth of 95½ feet, the maximum depth explored.

Two Plasticity Index (PI) tests were performed on fat clay samples from borings EB-1 and EB-4, respectively, from a depth of 2 feet. The tests resulted in PIs of 34 and 31 for borings EB-1 and EB-4 respectively, indicating high plasticity and expansion potential of the near surface soils.

2.4 Ground Water

Free ground water was encountered in all of our borings between approximately 16 and 21 feet below the ground surface (bgs). Based on pore pressure dissipation measurements, our CPTs inferred ground water between approximately 13½ and 15 feet bgs. The California Geological Survey (CGS) has not mapped the area for historically high ground water levels. The previous explorations by Engeo, 2006 for the adjacent lot north of the site, encountered ground water between the depths of approximately 11 and 13 feet bgs. Based on the above information, we judged a ground water depth of 11 feet bgs to be appropriate for design purposes. Fluctuations in the level of the ground water may occur due to variations in rainfall, underground drainage patterns, and other factors not evident at the time measurements were made.

3.0 GEOLOGIC HAZARDS

A brief qualitative evaluation of geologic hazards was made during this investigation. Our comments concerning these hazards are presented below.

3.1 Fault Rupture

The San Francisco Bay Area is one of the most seismically active regions in the United States. The significant earthquakes that occur in the Bay Area are generally associated with crustal movement along well-defined active fault zones of the San Andreas Fault system, which regionally trend in a northwesterly direction.

The site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone (known formerly as a Special Studies Zone). The nearest known active fault is the Rio Vista Fault, which is located approximately 2½ kilometers southwest of the project site. The potentially active Great Valley Thrust Fault is located about 2½ kilometers west of the site. Fault rupture through the site, therefore, is not anticipated.

3.2 Maximum Estimated Ground Shaking

Based on Equation 11.8-1 of ASCE 7-16, we judge a maximum considered earthquake geometric mean peak ground acceleration of 0.61g to be appropriate for geotechnical analyses for the project site.

3.3 Future Earthquake Probabilities

Although research on earthquake prediction has greatly increased in recent years, seismologists cannot predict when or where an earthquake will occur. The U.S. Geological Survey's Working Group on California Earthquake Probabilities (WGCEP, 2014) estimates there is a 72 percent chance of at least one magnitude 6.7 earthquake occurring in the San Francisco Bay region between 2014 and 2044. This result is an important outcome of WGCEP's work because any major earthquake can cause damage throughout the region. The 1989 Loma Prieta earthquake demonstrated this potential by causing severe damage in Oakland and San Francisco, more than 50 miles from the fault epicenter.

Although earthquakes can cause damage at a considerable distance, shaking will be very intense near the fault rupture. Therefore, earthquakes located in urbanized areas of the region have the potential to cause much more damage than the 1989 Loma Prieta earthquake.

3.4 Liquefaction

3.4.1 General Background

The site is partially located within an area zoned by the State of California as having potential for seismically induced liquefaction hazards (CGS, 2019). During cyclic ground shaking, such as earthquakes, cyclically-induced stresses may cause increased pore water pressures within the soil matrix, which results in liquefaction. Liquefied soil may lose shear strength that may lead to large shear deformations and/or flow failure (Youd et al., 2001). Liquefied soil can also settle as pore pressures dissipate following an earthquake. Limited field data is available on this subject; however, settlement on the order of 2 to 3 percent of the thickness of the liquefied zone has been measured in some cases.

Soils most susceptible to liquefaction are loose to moderately dense, saturated, non-cohesive soils with poor drainage, such as sands and silts with interbedded or capping layers of relatively low permeability soil.

3.4.2 Analysis and Results

Our liquefaction analyses were based on a design ground water depth of 11 feet below the existing site grades. As discussed in the subsurface description above, several sand and silt layers were encountered below the design ground water depth. These layers were evaluated to assess liquefaction potential and the effects liquefaction may have on the proposed structures. No liquefaction analyses were performed on layers above the design ground water depth.

Our liquefaction analysis followed the methods based on Robertson method (2009) in accordance with guidelines set forth in the CGS Special Publication 117A (2008). The Robertson method for CPT analysis update simplified procedures presented by Seed and Idriss (1971). In broad terms, these methods are used to calculate a factor of safety against liquefaction triggering by comparing the resistance of the soil to cyclic shaking to the seismic demand that can be caused during seismic events.

The resistance to cyclic shaking is quantified by the Cyclic Resistance Ratio (CRR), which is a function of soil density, layer depth, ground water depth, earthquake magnitude, and soil behavior. Our CPT tip pressures were corrected for the overburden and fines content. The CPT method utilizes the soil behavior type index (I_C) and the exponential factor "n" applied to the Normalized Cone Resistance "Q" to evaluate how plastic the soil behaves. The Cyclic Stress Ratio (CSR) is used to quantify the stresses that are anticipated to develop during cyclic shaking. The formula for CSR is shown below:

$$CSR = 0.65\,(a_{max}/g)(\sigma_{vo}/\sigma'_{vo})r_d$$

Where a_{max} is the peak horizontal acceleration at the ground surface generated by an earthquake, g is the acceleration of gravity, σ_{vo} and σ'_{vo} are total and effective overburden stresses, respectively, and r_d is a stress reduction coefficient. We evaluated the liquefaction potential of the potentially liquefiable layers using a peak ground acceleration of 0.61g (based on the maximum considered earthquake geometric mean peak ground acceleration, Section 21.5.3 of ASCE 7-16) and moment magnitude of 6.6 (USGS 2014).

The factor of safety (FS) against liquefaction can be expressed as the ratio of the CRR to CSR. If the FS for a soil layer is less than 1.0, the soil layer is considered liquefiable during a moderate to large seismic event.

$$FS = CRR/CSR$$

Soils that have I_c greater than 2.6 or CPT tip resistance greater than 160 tons per square foot (tsf) are considered either too plastic or too dense to liquefy, respectively. Such soil layers have been screened out of analysis and are not presented below. Our analyses indicate that the sand and silt layers encountered below the design ground water between the depths of approximately 15½ to 47 feet may theoretically liquefy, resulting in approximately 1-inch to 2 inches of total settlement in the upper 50 feet. Volumetric change and settlement were estimated using the Zhang, Robertson, and Brachman (2002) method. We estimate differential settlements from liquefaction will be on the order of 1-inch in 50 horizontal feet. A discussion of estimated settlements is presented in the "Foundations" section of this report.

3.4.3 Potential for Ground Rupture/Sand Boils

The methods of analysis used to estimate the total settlement assume that there is no possibility of surface ground rupture. For liquefaction induced sand boils or fissures to occur, the pore water pressure induced within the liquefied strata must be large enough to break through the surface layer. There is approximately 15½ feet of non-liquefiable material overlying the potentially liquefiable strata at the site. Based on the work by Youd and Garris (1995), there is an adequate thickness of non-liquefiable material capping the liquefiable layers at the site to prevent ground rupture.

3.5 Dry Seismic Settlement

If near-surface soils vary in composition both vertically and laterally, strong earthquake shaking can cause non-uniform densification of loose to medium dense cohesionless soil strata. This results in movement of the near-surface soils. Our explorations did not encounter any cohesionless soil layers above the design groundwater level. Therefore, we judge the probability of significant differential settlement of non-saturated cohesionless soil layers at the site to be low.

3.6 Lateral Spreading

Lateral spreading typically occurs as a form of horizontal displacement of relatively flat-lying alluvial material toward an open or "free" face such as an open body of water, channel, or excavation. In soils this movement is generally due to failure along a weak plane and may often be associated with liquefaction. As cracks develop within the weakened material, blocks of soil displace laterally towards the open face. Cracking and lateral movement may gradually propagate away from the face as blocks continue to break free. Generally, failure in this mode is analytically unpredictable since it is difficult to evaluate where the first tension crack will occur.

A tributary area of the Alamo Creek borders the site along the entire south side of the site. Given the depth and non-continuous potentially liquefiable layers, the probability of lateral spreading occurring at the site during a seismic event is low.

3.7 Flooding

The site is located in a Federal Emergency Management Agency (FEMA) Zone A (2009), which is defined as "special flood hazard areas subject to inundation by the 1 percent annual chance flood." However, the southern portion of the site is located in a Zone AE (2009), which is defined as "special flood hazard areas, with base flood elevation (BFE) or Depth," with an elevation of 96 feet.

4.0 CORROSION EVALUATION

To evaluate the corrosion potential of the subsurface soils at the site, we submitted three samples collected during our subsurface investigations to an analytical laboratory for pH, resistivity, soluble sulfate and chloride content testing. The results of these tests are summarized in Table 1 below.

Table 1. Results of Corrosivity Testing

Sample	Depth (feet)	Chloride (mg/kg)	Sulfate (mg/kg)	pH	Resistivity (ohm-cm)	Estimated Corrosivity Based on Resistivity	Estimated Corrosivity Based on Sulfates
EB-1	2.0	<2	13	7.8	1,048	Severely	Negligible
EB-2	3.5	5	89	7.8	929	Severely	Negligible
EB-3	2.0	<2	6	7.6	1,040	Severely	Negligible

Notes: 1. mg/kg = milligrams per kilogram.

Many factors can affect the corrosion potential of soil including soil moisture content, resistivity, permeability and pH, as well as chloride and sulfate concentration. In general, soil resistivity, which is a measure of how easily electrical current flows through soils, is the most influential factor. Based on classification developed by William J. Ellis (1978), the approximate relationship between soil corrosiveness was developed as shown in Table 2 below.

Table 2. Relationship Between Soil Resistivity and Soil Corrosivity

Soil Resistivity (ohm-cm)	Classification of Soil Corrosiveness
0 to 900	Very Severely Corrosive
900 to 2,300	Severely Corrosive
2,300 to 5,000	Moderately Corrosive
5,000 to 10,000	Mildly Corrosive
10,000 to >100,000	Very Mildly Corrosive

Chloride and sulfate ion concentrations and pH appear to play secondary roles in affecting corrosion potential. High chloride levels tend to reduce soil resistivity and break down otherwise protective surface deposits, which can result in corrosion of buried metallic improvements or reinforced concrete structures. Sulfate ions in the soil can lower the soil resistivity and can be highly aggressive to Portland cement concrete (PCC) by combining chemically with certain constituents of the concrete, principally tricalcium aluminate. This reaction is accompanied by expansion and eventual disruption of the concrete matrix. Soils containing high sulfate content could also cause corrosion of the reinforcing steel in concrete. Table 4.2.1 of the American Concrete Institute (ACI, 2008) provides requirements for concrete exposed to sulfate-containing solutions as summarized in Table 3.

Table 3. Relationship Between Sulfate Concentration and Sulfate Exposure (Table 4.2.1 of ACI)

Water-Soluble Sulfate (SO_4) in soil, ppm	Sulfate Exposure
0 to 1,000	Negligible
1,000 to 2,000	Moderate[1]
2,000 to 20,000	Severe
over 20,000	Very Severe

[1]= seawater

Acidity is an important factor of soil corrosivity. The lower the pH (the more acidic the environment), the higher will the soil corrosivity be with respect to buried metallic structures. As soil pH increases above 7 (the neutral value), the soil is increasingly more alkaline and less corrosive to buried steel structures due to protective surface films which form on steel in high pH environments. A pH between 5 and 8.5 is generally considered relatively passive from a corrosion standpoint.

As shown in Table 1, the soil resistivity results ranged from 929 to 1,048 ohm-centimeters. Based on these results and the resistivity correlations presented in Table 2, the corrosion potential to buried metallic improvements may be characterized as severely corrosive. We recommend that a corrosion protection engineer be consulted about appropriate corrosion protection methods for buried metallic materials.

Based on our previous experience and Table 4.2.1 of the ACI, it is our opinion that sulfate exposure to PCC may be considered negligible for the native subsurface materials sampled.

5.0 CONCLUSIONS AND RECOMMENDATIONS

From a geotechnical engineering viewpoint, the proposed improvements may be constructed as planned, in our opinion, provided the design and construction are performed in accordance with the recommendations presented in this report.

5.1 Primary Geotechnical Concerns

The primary geotechnical concerns at the site are as follows:

- Strong seismic shaking
- The potential for liquefaction-induced settlement
- Highly expansive near surface soils
- Corrosion potential of the near-surface soils

We have prepared a brief description of the issues and present typical approaches to manage potential concerns associated with the long-term performance of the development.

5.1.1 Strong Seismic Shaking

We recommend that, at a minimum, the proposed improvements be designed in accordance with the seismic design criteria presented in Table 4.

5.1.2 Liquefaction-Induced Total Settlement

Our analyses indicate that the layers theoretically can liquefy, resulting in approximately 1-inch to 2 inches of total settlement in the upper 50 feet, with differential settlements from liquefaction on the order of 1-inch in a horizontal distance of 50 feet. The proposed improvements should be designed to accommodate the potential seismic and as well as static settlements. Detailed recommendations are presented in the Earthwork and Foundation sections of this report.

5.1.3 Highly Expansive Soils

To reduce the potential for damage to the planned improvements due to the presence of highly expansive surficial soils, we recommend slabs-on-grade and any flatwork have sufficient reinforcement and be supported on a layer of non-expansive fill. Detailed recommendations are presented in the following sections of this report.

5.1.4 Corrosion Potential of Near-Surface Soils

As discussed above, the corrosion potential to buried metallic improvements constructed within the native clay soils may be characterized as severely corrosive. A qualified corrosion engineer should be contacted to provide specific recommendations regarding corrosion protection for buried metal pipe or buried metal pipe fittings.

5.2 Plans, Specifications, and Construction Review

We recommend that our firm perform a plan review of the geotechnical aspects of the project design for general conformance with our recommendations. In addition, subsurface materials encountered in the relatively small diameter, widely spaced borings and CPTs may vary significantly from other subsurface materials on the site. Therefore, we also recommend that a representative of our firm observe and confirm the geotechnical specifications of the project construction. This will allow us to form an opinion about the general conformance of the project plans and construction with our recommendations. In addition, our observations during construction will enable us to note subsurface conditions that may vary from the conditions encountered during our investigation and, if needed, provide supplemental recommendations. For the above reasons, our geotechnical recommendations are contingent upon our firm providing geotechnical observation and testing services during construction.

6.0 EARTHWORK

6.1 Clearing and Site Preparation

The proposed project area should be cleared of all surface and subsurface improvements to be removed and deleterious materials including existing building foundations, slabs, irrigation lines, utilities, fills, pavements, debris, designated trees, shrubs, and associated roots. Abandonment of existing buried utilities is discussed below. Excavations extending below the planned finished site grades should be cleaned and backfilled with suitable material compacted as recommended in the "Compaction" section of this report. We recommend that backfilling of holes or pits resulting from demolition and removal of existing building foundations, buried structures or other improvements be carried out under our observation and that the backfill be observed and tested during placement.

After clearing, any vegetated areas within the proposed improvements should be stripped to sufficient depth to remove all surface vegetation and topsoil containing greater than 3 percent organic matter by weight. The actual stripping depth required depends on site usage prior to construction and should be established in the field by us at the time of construction. The stripped materials should be removed from the site or may be stockpiled for use in landscaped areas, if desired.

6.2 Removal of Existing Fill

If undocumented fill is encountered, it should be removed down to the native soil. If the fill material meets the requirements in the "Material for Fill" section below, it may be reused an engineered fill. Side slopes of fill removal excavations in building and pavement areas should be sloped at inclinations no steeper than 3:1 (horizontal:vertical) to minimize abrupt variations in fill thickness. All fill should be compacted in accordance with the recommendations for fill presented in the "Compaction" section of this report.

6.3 Abandoned Utilities

Abandoned utilities within the proposed project areas should be removed in their entirety. As an alternative, it may be feasible to abandon underground utilities in-place within the proposed project areas provided the utility does not conflict with new improvements, is completely grouted, and previous fills associated with the utility do not pose a risk to the structures. Existing underground utilities outside the proposed project areas may be removed or abandoned in-place by grouting or plugging the ends with concrete. The decision to abandon in-place versus removal should be based on the level of risk associated with the particular utility line.

Fills associated with underground utilities abandoned in-place may have an increased potential for settlement, and partially grouted or plugged pipelines will have a potential risk of collapse that may result in ground settlement, soil piping and leakage of pipeline constituents. The potential risks are relatively low for small diameter pipes (4 inches or less) above the ground water table and increasingly higher with increasing diameter.

6.4 Subgrade Preparation

After the site has been properly cleared, stripped, and necessary excavations have been made, exposed surface soils in those areas to receive fill, or slabs on grade should be scarified to a depth of 8 inches, moisture conditioned, and compacted in accordance with the recommendations for fill presented in the "Compaction" section. The finished compacted subgrade should be firm and relatively non-yielding under the weight of compaction equipment.

6.5 Material for Fill

All on-site soils below the stripped layer having an organic content of less than 3 percent by weight are suitable for use as fill at the site. In general, fill material should not contain rocks or lumps larger than 6 inches in greatest dimension, with 15 percent or less larger than 2½ inches in the greatest dimension.

Import fill material should be inorganic, have a PI of 20 or less and should have sufficient binder to reduce the potential for sidewall caving of foundation and utility trenches. Non-expansive fill (NEF) should have a PI of 15 or less. Samples of the proposed import fill should be submitted to us at least 10 working days prior to delivery to the site to allow for visual review and laboratory testing. This will allow us to evaluate the general conformance of the import fill with our recommendations.

Consideration should also be given to the environmental characteristics and corrosion potential of any imported fill. Suitable documentation should be provided for import material. In addition, it may be appropriate to perform laboratory testing of the environmental characteristics and corrosion potential of imported materials. Import soils should not be more corrosive than the on-site native materials, including pH, soluble sulfates, chlorides and resistivity.

6.6 Compaction

All fill, as well as scarified surface soils in those areas to receive fill, should be uniformly compacted to at least 90 percent relative compaction as determined by ASTM Test Designation D1557, latest edition, at a moisture content near the laboratory optimum, except for the native expansive clays. The native expansive clays should be compacted to between 87 and 92 percent relative compaction at a moisture content at least 5 percent over optimum. Fill should be placed in lifts no greater than 8 inches in uncompacted thickness. Each successive lift should be firm and relatively non-yielding under the weight of construction equipment.

In pavement areas, the upper 6 inches of subgrade and full depth of aggregate base should be compacted to at least 95 percent relative compaction (ASTM D1557, latest edition), except for the native expansive clays, which should be compacted as noted above. Aggregate base should be compacted at a moisture content near the laboratory optimum moisture content. Import soils with a PI between 15 to 20 should be compacted at a moisture content at least 3 percent over optimum.

6.7 Cut/Fill Transitions

In cases where cut/fill transitions occur below the proposed residences, we recommend that the cut/fill transition residences be constructed by over-excavating the upper 1 foot below the design grade, scarifying, moisture conditioning and recompacting the upper 12 inches in place prior to fill placement (total of 2 feet reworked). The transition area should extend laterally below the entire foundation footprint.

6.8 Wet Soils and Wet Weather Conditions

Earthwork such as subgrade preparation, fill placement and trench backfill may be difficult for soil containing high moisture content or during wet weather. If the soil is significantly above its optimum moisture content, it will become soft, yielding, and difficult to compact. Based on the results of our laboratory tests, the in-situ moisture contents of the near surface soils are generally near to above optimum moisture contents. If saturated soils are encountered, aerating or blending with drier soils to achieve a workable moisture content may be required. We recommend that earthwork be performed during periods of suitable weather conditions, such as the "summer" construction season.

There are several alternatives to facilitate subgrade preparation, fill placement and trench backfill if the soil is wet or earthwork is performed during the wet winter season.

- Scarify and air dry until the fill materials have a suitable moisture content for compaction,
- Over-excavate the fill and replace with suitable on-site or import materials with an appropriate moisture content,
- Install a layer of geo-synthetic (geotextile or geogrid) to reduce surface yielding and bridge over soft fill,
- Chemically treat the higher moisture content soils with quicklime (CaO), kiln-dust, or cement to reduce the moisture content and increase the strength of the fill.

The implementation of these methods should be reviewed on a case-by-case basis so that a cost-effective approach may be used for the specific conditions at the time of construction.

6.9 Trench Backfill

Bedding and pipe embedment materials to be used around underground utility pipes should be well graded sand or gravel conforming to the pipe manufacturer's recommendations and should be placed and compacted in accordance with project specifications, local requirements of the governing jurisdiction. General fill to be used above pipe embedment materials should be placed and compacted in accordance with local requirements or the recommendations contained in this section, whichever is more stringent.

On-site soils may be used as general fill above pipe embedment materials provided, they meet the requirements of the "Material for Fill" section of this report. General fill should be placed in lifts not exceeding 8 inches in uncompacted thickness and should be compacted to at least 90 percent relative compaction (ASTM D1557, latest edition) by mechanical means only. If expansive soil is used for trench backfill, it should be compacted to between 87 to 92 percent at a moisture content at least 5 percent over optimum. Water jetting of trench backfill should not be allowed. The upper 6 inches of general fill in all pavement areas subject to wheel loads should be compacted to at least 95 percent relative compaction.

Utility trenches located adjacent to footings should not extend below an imaginary 1:1 (horizontal: vertical) plane projected downward from the footing bearing surface to the bottom edge of the trench. Where utility trenches will cross beneath footing bearing planes, the footing concrete should be deepened to encase the pipe, or the utility trench should be backfilled with sand/cement slurry or lean concrete within the foundation-bearing plane.

Where relatively higher permeability sand or gravel backfill is used in trenches through lower permeability soils, we recommend that a cut-off plug of compacted clayey soil or a 2-sack cement/sand slurry be placed where such trenches enter the building and pavement areas. This would reduce the likelihood of water entering the trenches from the landscaped areas and seeping through the trench backfill into the building and pavement areas and coming into contact with subgrade soils.

6.10 Temporary Slopes and Trench Excavations

The contractor should be responsible for all temporary slopes and trenches excavated at the site and design of any required temporary shoring. Shoring, bracing, and benching should be performed by the contractor in accordance with the strictest governing safety standards. On a preliminary basis, site soils can be classified as Type C based on soil classification by OSHA. Therefore, a maximum slope 1.5:1

(horizontal: vertical) should be anticipated. A TRC representative should be retained to verify soil conditions in the field at the time of the excavation.

6.11 Surface Drainage

Positive surface water drainage gradients, at least 2 percent in landscaping and 0.5 percent in pavement areas, should be provided to direct surface water away from foundations and slabs towards suitable discharge facilities. Ponding of surface water should not be allowed on or adjacent to structures, slabs-on-grade, or pavements. Roof runoff should be directed away from foundation and slabs-on-grade. Downspouts may discharge onto splash-blocks provided the area is covered with concrete slabs or asphalt concrete pavements.

6.12 Landscaping Considerations

We recommend restricting the amount of surface water infiltrating these soils near structures and slabs-on-grade. This may be accomplished by:

- Selecting landscaping that requires little or no watering, especially within 3 feet of structures, slabs-on-grade, or pavements,
- Using low flow rate sprinkler heads, or drip irrigation systems
- Regulating the amount of water distributed to lawn or planter areas by installing timers on the sprinkler system,
- Providing surface grades to drain rainfall or landscape watering to appropriate collection systems and away from structures, slabs-on-grade, or pavements,
- Preventing water from draining toward or ponding near building foundations, slabs-on-grade, or pavements, and
- Avoiding open planting areas within 3 feet of the building perimeters.

We recommend that the landscape architect consider these items when developing the landscaping plans.

6.13 Construction Observation

A representative from our company should observe the geotechnical aspects of the grading and earthwork for general conformance with our recommendations including site preparation, selection of fill materials, and the placement and compaction of fill. To facilitate your construction schedule we request sufficient notification (48 hours) for site visits. The project plans and specifications should incorporate all recommendations contained in the text of this report.

7.0 FOUNDATIONS

As previously discussed, we recommend the proposed improvements be supported on post-tensioned mat foundations provided the estimated settlements discussed below are acceptable. Recommendations for post-tensioned mat foundations are presented in the sections below.

7.1 ASCE 7-16 Site Class and Site Seismic Coefficients

The 2019 California Building Code (CBC) outlines the procedure for seismic design of a structure. Based on subsurface explorations, the site is generally underlain by medium stiff to hard clays, silts, and medium dense to dense sand, which correspond to a soil profile type D. The 2019 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S_1 value greater than or equal 0.2.

However, Section 11.4.8 of ASCE 7-16 provides an exception from a site-specific ground motions study for certain structures on Site Class D. It is our understanding that requirements in Exception Note No. 2 in Section 11.4.8 of ASCE 7-16 may apply to this project. If the exception does not apply, a site-specific ground motion hazard analysis is required.

Table 4. ASCE 7-16/CBC 2019 Site Class and Site Seismic Coefficients

Latitude: 38.331066 N Longitude: -121.940754 W	**CBC Table/ Figure**	**Factor/ Coefficient**	**Value**
Soil Profile Type	Section 1613.2.2	Site Class	D
Mapped Spectral Response Acceleration for MCE at 0.2 second Period	Figure 1613.2.1(1)	S_s	1.34
Mapped Spectral Response Acceleration for MCE at 1 Second Period	Figure 1613.2.1(2)	S_1	0.47
Site Coefficient	Table 1613.2.3(1)	F_a	1.00
Site Coefficient	Table 1613.2.3(2)	F_v	Null – See Section 11.4.8
Adjusted MCE Spectral Response Parameter	Equation 16-36	S_{MS}	1.34
Adjusted MCE Spectral Response Parameter	Equation 16-37	S_{M1}	Null – See Section 11.4.8
Design Spectral Response Acceleration Parameter	Equation 16-38	S_{DS}	0.89
Design Spectral Response Acceleration Parameter	Equation 16-39	S_{D1}	Null – See Section 11.4.8

7.2 Post-Tensioned Mat Slab Recommendations

The proposed residences can be supported on post-tensioned mats bearing on prepared native soil or compacted fill. Before slab construction, the subgrade surface should be proof-rolled to provide a smooth, firm surface for slab support.

Post-tension mats should be designed with the criteria presented in Table 5 below, using an average allowable bearing pressure of 1,000 pounds per square foot (psf) for dead plus live loads, with maximum localized bearing pressures of 3,000 psf at column or wall loads. Allowable bearing pressures may be increased by one-third for all loads including wind or seismic. All mats should be designed with a thickened edge at least 12 inches wide and 12 inches thick. The thickened edge should be considered from top to bottom of mat. The structural engineer should determine the slab thickness and reinforcing in accordance with the anticipated use and loading of the slab.

Table 5. Post-Tension Mat Design Criteria

Condition	Center Lift	Edge Lift
Edge Moisture Variation (ft.)	8.0	4.2
Differential Soil Movement (in.)	1.0	1.5

The above design criteria are based on the procedure presented by the Post-Tensioning Institute (2007) using a Thornthwaite Moisture Index of 0, an estimated Plasticity Index of 34, 86 percent passing the No. 200 sieve and 52 percent smaller than 2 microns. We estimate that the total static settlement will be on the order of ½-inch for the mat slab foundation. We recommend that the mat be designed to accommodate ½-inch of differential settlement over a horizontal distance of 50 feet. Additionally, there is potential for 1-inch to 2 inches of liquefaction induced settlement at the site. The mat should also be designed to accommodate differential settlement on the order of 1-inch over a horizontal distance of 50 feet from liquefaction.

Lateral loads may be resisted by friction between the bottom of mats and the supporting subgrade. A maximum allowable frictional resistance of 0.3 may be used for design. If two layers of vapor retarder are used, we would recommend a maximum frictional resistance of 0.1 for design. In addition, lateral resistance may be provided by passive pressures acting against mat edges poured neat against competent soil. We recommend that an allowable passive pressure based on an equivalent fluid pressure of 300 pounds per cubic foot (pcf) be used in design. The upper 12 inches of soil should be neglected when determining lateral passive resistance.

According to the PTI manual, the following assumptions were made when using this design procedure:

- The site will be sloped such that the water flows away from the foundation for a distance of 5 ft from the perimeter,
- Downspouts should be tied directly into storm drains, swales or other means to direct excessive moisture away from the foundation,
- The foundation should not be constructed over a cut/fill transition in expansive or compressible soils without proper considerations for swell and/or settlement potential, and
- Stoops, patios, etc, should be cast independently of the slab foundation unless it is the foundation for a supporting member, such as a column. Include expansion material between slab and non-structural concrete.

In addition, since the post-tensioned mat is a flexible foundation system, consideration should be given to compatibility with roof trusses, load concentrations, brittle exterior siding, drainage and utility connections. The design procedures provided in the PTI manual are only valid if the above assumptions are taken into account. Proper site preparation and maintenance are vital to the success of the foundation design.

7.3 Moisture Protection Considerations

Since the long-term performance of concrete mat foundation and slabs-on-grade depends to a large degree on good design, workmanship, and materials, the following general guidelines are presented for consideration by the developer, design team, and contractor. The purpose of these guidelines is to aid in producing a concrete slab or mat of sufficient quality to allow successful installation of floor coverings and reduce the potential for floor covering failures due to moisture-related problems associated with the slab-

on-grade construction. These guidelines may be supplemented, as necessary, based on the specific project requirements.

- A minimum 15-mil thick vapor barrier meeting minimum ASTM E 1745, Class A requirements should be placed directly below the slab. The vapor barrier should extend to the edge of the slab. At least 2 inches of free-draining gravel, such as ½-inch or ¾-inch crushed rock with no more than 5 percent passing the ASTM No. 200 sieve, should be placed below the vapor barrier to serve as a capillary break (no sand). The crushed rock should be consolidated in place with vibratory equipment. The vapor barrier should be sealed at all seams and penetrations.

- The concrete water/cement ratio should not exceed 0.45. Midrange plasticizers could be used to facilitate concrete placement and workability.

- Water should not be added after initial batching, unless the slump of the concrete is less than specified, and the resulting water/cement ratio will not exceed 0.45.

- Polishing the concrete surface with metal trowels should not be permitted.

- All concrete surfaces to receive any type of floor covering should be moist-cured for a minimum of 7 days. Moist curing methods may include frequent sprinkling, or using coverings such as burlap, cotton mats, or carpet. The covering should be placed as soon as the concrete surface is firm enough to resist surface damage. The covering should be kept continuously wet and not allowed to dry out during the required curing period.

- Water vapor emission levels and pH should be determined before floor installation as required by the manufacturer of the floor covering materials. Measurements and calculations should be made according to ASTM F1869-98 and F710-98 protocol.

The guidelines presented above are based on information obtained from various technical sources, including the American Concrete Institute (ACI), and are intended to present information that can be used to reduce potential long-term impacts from slab moisture infiltration. It should be noted that the application of these guidelines does not affect the geotechnical aspects of the foundation performance.

8.0 RETAINING WALLS

8.1 Lateral Earth Pressures

Any proposed retaining walls should be designed to resist lateral earth pressures from adjoining natural materials, backfill, and surcharge loads. Provided that adequate drainage is provided as recommended below, we recommend that walls restrained from movement at the top be designed to resist an equivalent fluid pressure of 45 pcf plus a uniform pressure of 8H pounds per square foot, where H is the distance in feet between the bottom of the footing and the top of the retained soil. Restrained walls should also be designed to resist an additional uniform pressure equivalent to one-half of any surcharge loads applied at the surface. Any unrestrained retaining walls with adequate drainage should be designed to resist an equivalent fluid pressure of 45 pcf plus one-third of any surcharge loads.

The above lateral earth pressures assume level backfill conditions and sufficient drainage behind the walls to prevent build-up of hydrostatic pressure from surface water infiltration and/or a rise in the ground water level. If adequate drainage is not provided, we recommend an equivalent fluid pressure of 40 pcf be added to the values recommended above for both restrained and unrestrained walls. Damp proofing of the walls should be included in areas where wall moisture and efflorescence would be undesirable.

8.2 Seismic Lateral Earth Pressures

Walls greater than 6 feet in height need to be designed for seismic lateral loading. For our analysis, we have assumed that the walls will have flat, non-sloping backfill. We used the Mononobe-Okabe approach to approximate the increased earth pressures induced by earthquakes. As discussed in Section 3.2 of our report, a peak ground acceleration of 0.61g is expected at the site. We performed calculations using this ground acceleration and estimated an additional seismic increment of 16.5 pcf to be applied to in addition to the static lateral earth pressures given in Section 8.1 for flexible walls. For restrained walls, under seismic conditions the total pressure to be used in analysis (seismic plus static) should be the greater of at-rest pressure or the sum of the active pressure and the seismic increment acting in a triangular distribution. For unrestrained walls under seismic loading, the total pressure should be sum of the active pressure and the seismic increment acting in a triangular distribution.

8.3 Drainage

Adequate drainage may be provided by a subdrain system behind the walls. This system should consist of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with Class 2 Permeable Material per Caltrans Standard Specifications, latest edition. The permeable backfill should extend at least 12 inches out from the wall and to within 2 feet of outside finished grade. Alternatively, ½- to ¾-inch crushed rock may be used in place of the Class 2 Permeable Material provided the crushed rock and pipe are enclosed in filter fabric, such as Mirafi 140N or equivalent. The upper 2 feet of wall backfill should consist of relatively low permeable compacted on-site clayey soil. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or Enkadrain drainage matting may be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill. The drainage panel should be connected to the perforated pipe at the base of the wall, or to some other closed or through-wall system. Miradrain panels should terminate 24 inches from final exterior grade. The Miradrain panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil.

8.4 Backfill

Where surface improvements will be located over the retaining wall backfill, backfill placed behind the walls should be compacted to at least 95 percent relative compaction using light compaction equipment. Where no surface improvements are planned, backfill should be compacted to at least 90 percent. If heavy compaction equipment is used, the walls should be temporarily braced.

8.5 Foundation

Reinforced concrete retaining walls may be supported on conventional continuous footings bearing on natural, undisturbed soil or compacted fill. All footings should have a minimum width of 18 inches and footing bottoms should extend at least 24 inches below lowest adjacent finished grade.

Footings constructed in accordance with the above recommendations would be capable of supporting maximum allowable bearing pressures of 2,000 pounds per square foot (psf) for dead loads, 3,000 psf for combined dead and live loads, and 4,000 psf for all loads including wind or seismic. These allowable bearing pressures are based upon factors of safety of 3.0, 2.0, and 1.5 for dead, dead plus live, and seismic loads, respectively.

These maximum allowable bearing pressures are net values; the weight of the footing may be neglected for design purposes. All footings located adjacent to utility trenches should have their bearing surfaces below an imaginary 1:1 (horizontal:vertical) plane projected upward from the bottom edge of the trench to the footing.

All continuous footings should be reinforced with top and bottom steel to provide structural continuity and to help span local irregularities. Footing excavations should be kept moist by regular sprinkling with water to prevent desiccation. It is essential that we observe the all footing excavations before reinforcing steel is placed.

We estimate that total foundation movement under static loads will be less than ½-inch, with post-construction differential movement of less than ½-inch between adjacent footings. Additionally, there is potential for 1-inch to 2 inches of liquefaction induced settlement at the site. The footings should also be designed to accommodate differential settlement on the order of 1-inch over a horizontal distance of 50 feet from liquefaction.

8.6 Lateral Loads on Footings

Lateral loads may be resisted by friction between the bottom of footings and the supporting subgrade. A maximum allowable frictional resistance of 0.30 may be used for design. In addition, lateral resistance may be provided by passive pressures acting against footings poured neat against competent soil. We recommend that an allowable passive pressure based on an equivalent fluid pressure of 300 pounds per cubic foot (pcf) be used in design. The upper 12 inches of soil should be neglected when determining lateral passive resistance unless confined by pavements or flatwork.

9.0 PAVEMENTS

9.1 Asphalt Concrete

Based on the near-surface soils encountered during our explorations, which generally consisted of fat clay, we judged an R-value of 5 to be applicable for design based on a subgrade consisting of untreated on-site soils. Using estimated traffic indices for various pavement-loading requirements and untreated on-site soils, we developed the following recommended pavement sections based on Procedure 608 of the Caltrans Highway Design Manual, presented in Table 6.

Table 6. Recommended Asphalt Concrete Pavement Design Alternatives
Pavement Components
Design R–Value = 5

General Traffic Condition	Design Traffic Index	Asphalt Concrete (Inches)	Aggregate Baserock* (Inches)	Total Thickness (Inches)
Automobile	5.0	3.0	10.0	13.0
Parking Channel	5.5	3.0	12.0	15.0
Truck Access &	6.0	3.5	13.0	16.5
Parking Areas	6.5	4.0	14.0	18.0

*Caltrans Class 2 aggregate base; minimum R-value equal to 78.

The traffic indices used in our pavement design are considered reasonable values for the proposed development and should provide a pavement life of approximately 20 years with a normal amount of flexible pavement maintenance. The traffic parameters used for design were selected based on

engineering judgment and not on information furnished to us such as an equivalent wheel load analysis or a traffic study. Because the native soils at the site are highly expansive, some increased maintenance and reduction in pavement life should be expected. The traffic parameters used for design were selected based on engineering judgment and not on information furnished to us such as an equivalent wheel load analysis or a traffic study.

Because the full thickness of asphalt concrete is frequently not placed prior to construction traffic being allowed to use the streets (or parking lots), rutting and pavement failures can occur prior to project completion. To reduce this occurrence, we recommend that either the full design pavement section be placed prior to use by construction traffic, or a higher Traffic Index (TI) be specified where construction traffic will use the pavement.

In addition, it has been our experience that asphalt concrete pavements constructed over expansive soils and adjacent to non-irrigated open space areas may experience cracking parallel to the edge of the pavement. This is typically caused by seasonal shrinkage and swelling adjacent to non-irrigated edges of the pavement. The cracks typically occur within the first few years of construction and are typically located within a few to several feet of the edge of the pavement. The cracks, if they occur, can be filled with a bituminous sealant.

9.2 Exterior Portland Cement Concrete (PCC) Pavements

Recommendations for exterior PCC pavements are presented below in Table 7. Since the expected Average Daily Truck Traffic (ADTT) is not known at this time, we have provided alternatives for minimum pavement thickness. An allowable ADTT should be chosen that is greater than expected for the development.

Table 7. Recommended Minimum PCC Pavement Thickness

Allowable ADTT	Minimum PCC Pavement Thickness (inches)
0.8	5
13	5½
130	6

Our design is based on an R-value of 5 and a 28-day unconfined compressive strength for concrete of at least 3,500 pounds per square inch (psi), and a modulus of rupture of at least 550 psi .In addition, our design assumes that pavements are restrained laterally by a concrete shoulder or curb and that all PCC pavements are underlain by at least 6 inches of Class 2 aggregate base. We recommend that adequate construction and control joints be used in design of the PCC pavements to control the cracking inherent in this construction.

9.3 Pavement Cutoff

Surface water infiltration beneath pavements could significantly reduce the pavement design life. While the amount of reduction in pavement life is difficult to quantify, in our opinion, the normal design life of 20 years may be reduced to less than 10 years. Therefore, long-term maintenance greater than normal may be required.

To limit the need for additional long-term maintenance, it would be beneficial to protect at-grade pavements from landscape water infiltration by means of a concrete cut-off wall, deepened curbs,

redwood header, "Deep-Root Moisture Barrier," or equivalent. However, if reduced pavement life and greater than normal pavement maintenance are acceptable, the cutoff barrier may be eliminated. If desired to install pavement cutoff barriers, they should be considered where pavement areas lay downslope of any landscape areas that are to be sprinkled or irrigated, and should extend to a depth of at least 4 inches below the base rock layer.

9.4 Asphalt Concrete, Aggregate Base and Subgrade

Asphalt concrete and aggregate base should conform to and be placed in accordance with the requirements of Caltrans Standard Specifications, latest edition, except that ASTM Test Designation D1557 should be used to determine the relative compaction of the aggregate base. Pavement subgrade should be prepared and compacted as described in the "Earthwork" section of this report.

9.5 Flatwork and Sidewalks

We recommend that exterior slabs-on-grade, such as flatwork and sidewalks be at least 4 inches thick and be underlain by at least 12 inches of NEF or Class 2 aggregate base compacted to a minimum of 90 percent relative compaction in accordance with ASTM Test Method D1557, latest edition. If sidewalks are subject to wheel loads, they should be designed in accordance with the "Exterior Portland Cement Concrete Pavements" section of this report.

We recommend that exterior slabs be isolated from adjacent foundations and that adequate construction and control joints be used in design of the concrete slabs to control cracking inherent in concrete construction.

10.0 LIMITATIONS

This report has been prepared for the sole use of Discovery Builders, Inc., specifically for design of the proposed Vanden Road Residential Development in Vacaville, California. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in the San Francisco Bay Area at the time this report was written. No other warranty, expressed or implied, is made or should be inferred.

The opinions, conclusions and recommendations contained in this report are based upon the information obtained from our investigation, which includes data from widely separated discrete locations, and visual observations from our site reconnaissance along with our local experience and engineering judgment. The recommendations presented in this report are based on the assumption that soil and geologic conditions at or between borings and CPTs do not deviate substantially from those encountered or extrapolated from the information collected during our investigation. We are not responsible for the data presented by others.

We should be retained to review the geotechnical aspects of the final plans and specifications for conformance with our recommendations. The recommendations provided in this report are based on the assumption that we will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, TRC cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of TRC's report by others. Furthermore, TRC will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services and/or at the time another consultant is retained for follow up service to this report.

The opinions presented in this report are valid as of the present date for the property evaluated. Changes in the condition of the property will likely occur with the passage of time due to natural processes and/or the works of man. In addition, changes in applicable standards of practice can occur as a result of legislation and/or the broadening of knowledge. Furthermore, geotechnical issues may arise that were not apparent at the time of our investigation. Accordingly, the opinions presented in this report may be invalidated, wholly or partially, by changes outside of our control. Therefore, this report is subject to review and should not be relied upon after a period of three years, nor should it be used, or is it applicable, for any other properties.

11.0 REFERENCES

American Concrete Institute, 2008, *Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary*, An ACI Standard, first printing, January.

ASCE (American Society of Civil Engineers), 2016, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, ASCE/SEI Standard 7-16.

California Building Code, 2019, *Structural Engineering Design Provisions*, Vol. 2.

California Department of Conservation Division of Mines and Geology, 1998, *Maps of Known Active Fault Near-Source Zones in California and adjacent Portions of Nevada*, International Conference of Building Officials February, 1998.

Ellis, William J., 1978, Corrosion of Concrete Pipelines, Western States of Corrosion Seminar.

Federal Emergency Management Agency, 2009, *Flood Insurance Rate Map, Sonoma County, California and Incorporated Areas, Panel 279 of 730, Map Number 06095C0279E,* May 4.

Seed, H.B. and I.M. Idriss, 1971, *A Simplified Procedure for Evaluation soil Liquefaction Potential:* JSMFC, ASCE, Vol. 97, No. SM 9, pp. 1249 – 1274.

State of California Department of Transportation, 2006, *Highway Design Manual*, May.

United States Geological Survey, 2014, Geologic Hazards Science Center – 2014 USGS NSHM 2014 Dynamic, https://earthquake.usgs.gov/hazards/interactive/

U.S. Geological Survey, 2016, *US Seismic Design Maps, Earthquake Hazards Program*, http://earthquake.usgs.gov/designmaps/us/application.php.

WGCEP [Working Group on California Earthquake Probabilities], 2014, The Uniform California Earthquake Rupture Forecast, Version 2: U.S Geological Survey, Open File Report 2014-2044.

Youd, T.L. and C.T. Garris, 1995, *Liquefaction-Induced Ground-Surface Disruption:* Journal of Geotechnical Engineering, Vol. 121, No. 11, pp. 805 - 809.

Youd, T.L., Idriss, I.M., et al (2001), "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," ASCE Jounal of Geotechnical and Geoenvironmental Engineering, Vol 127, No. 10, October, 2001.

Zhang, G., Robertson. P.K., Brachman, R., 2002, *Estimating Liquefaction Induced Ground Settlements from the CPT*, Canadian Geotechnical Journal, 39: pp 1168-1180.

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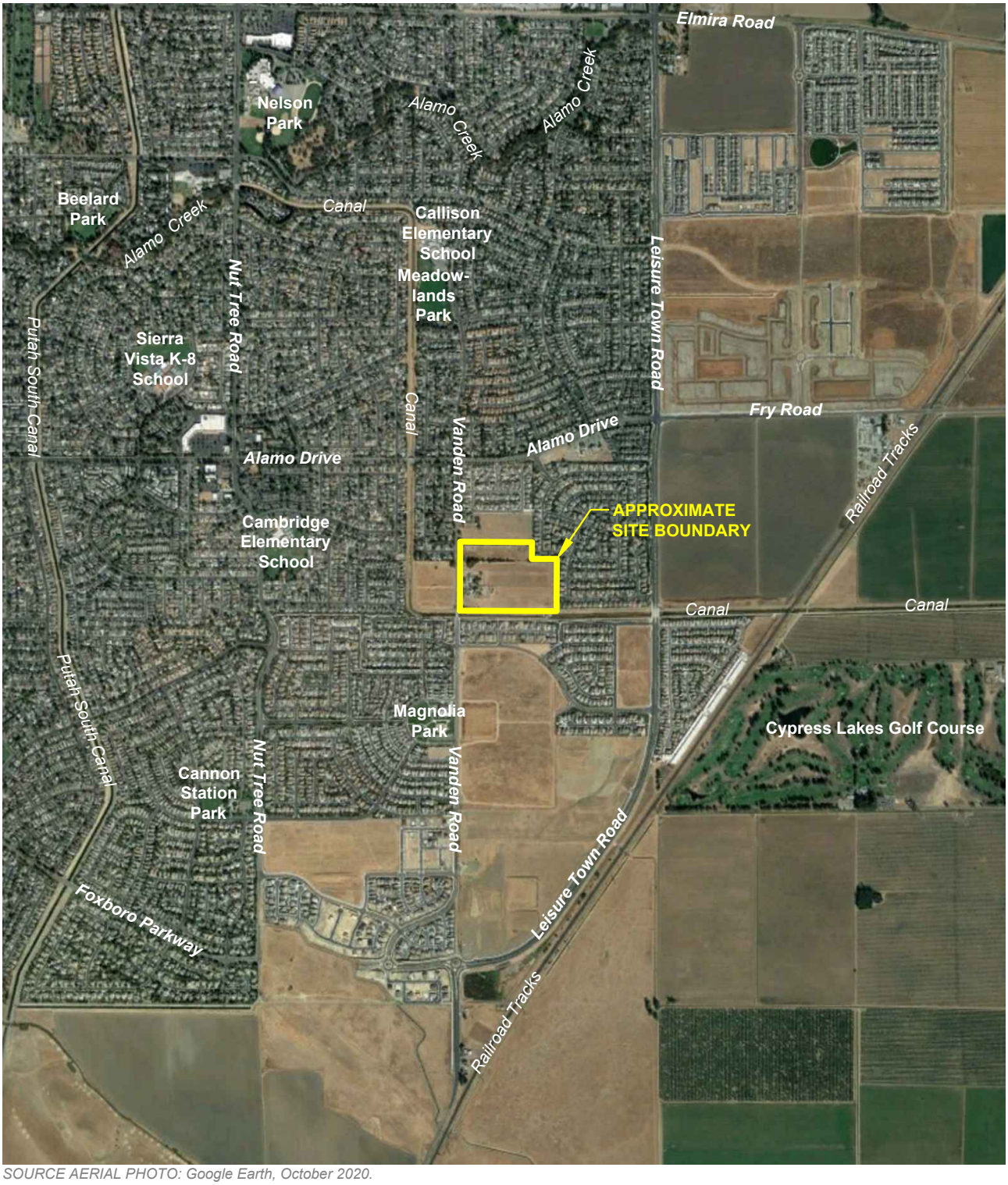

SOURCE AERIAL PHOTO: Google Earth, October 2020.

N

APPROXIMATE SCALE (FEET)

0 2,000 4,000

VICINITY MAP

Vanden Road Residential Development
5742, 5750, and 7038 Vanden Road
Vacaville, California

TRC | 455488 | **FIGURE 1**

FILE NAME: C:\Users\kquinnell\OneDrive - TRC\Documents\TRC\Vanden Rd Res Dev_Vacaville\Fig1_Vicinity Map.dwg | Layout Tab: 8x11

BREWSTER WAY

VILLAGE EAST UNIT 6 SUBDIVISION

VANDEN ROAD

DESIGNATED REMAINDER

VANDENGATE
APN 0137-010-080
& 0137-010-090

ALAMO PLACE SUBDIVISION

SAGE SPARROW CIRCLE

EB-1

B STREET

PROVIDENCE PLACE

ZOCCHI
APN 0137-010-070

CPT-1

DUAL PURPOSE BASIN

C STREET

EB-2

ORR
APN 0137-

EB-3

CPT-2

PURPLE SAGE DRIV

H STREET

E STREET

F STREET

MAVERICK DRIVE

G STREET

DUAL PURPOSE BASIN

ALAMO PLACE SUBDIVISION

CPT-3

NEUKIRCH
APN 0137-010-050

EB-4

PURPLE MARTIN DI

D STREET

ALAMO CREEK

LEGEND

Approximate locations of:

- Cone penetration test (CPT)
- Exploratory boring

N

APPROXIMATE SCALE (FEET)

0 150 300

SOURCE: Vanden Estates Vesting Tentative Map, City of Vacaville, Solano County, California, by Bellecci & Associates, Inc. July 2021.

SITE PLAN

Vanden Road Residential Development
5742, 5750, and 7038 Vanden Road
Vacaville, California

TRC | 455488 | **FIGURE 2**

FILE NAME: C:\Users\kquinnell\OneDrive - TRC\Documents\TRC\Vanden Rd Res Dev_Vacaville\Fig2_Site Plan.dwg | Layout Tab: 11x17

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APPENDIX A

FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using conventional, truck-mounted, hollow-stem auger drilling equipment and cone penetration test (CPT). Four 8-inch diameter exploratory borings were drilled on November 10, 2021 and on February 11, 2022 to a maximum depth of 35 feet. Three CPTs were advanced on November 24, 2021 to a maximum depth of 95½ feet. The approximate locations of the exploratory borings and CPTs are shown on Figure 2. The soils encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). The logs of the borings and CPTs, as well as a key to the classification of the soil are included in this report.

The locations of borings and CPTs were approximately determined by pacing from existing site boundaries. Elevations of the borings and CPTs were not determined. The locations of the borings and CPTs should be considered accurate only to the degree implied by the method used.

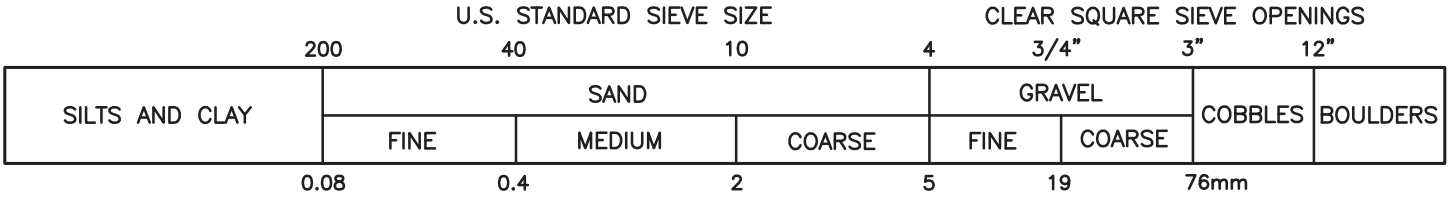
Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. Penetration resistance blow counts were obtained by dropping a 140-pound hammer 30 inches. Modified California 3.0-inch outside diameter (O.D.) samples and Standard Penetration Test (SPT) 2-inch O.D. samples were obtained by driving the samplers 18 inches and recording the number of hammer blows for each 6 inches of penetration. Unless otherwise indicated, the blows per foot recorded on the boring logs represent the accumulated number of blows required to drive the samplers the last two 6-inch increments. When using the SPT sampler, the sum of the last two 6-inch increments is the uncorrected SPT measured blow count. The various samplers are denoted at the appropriate depth on the boring logs and symbolized as shown on Figure A-1.

The attached boring and CPT logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring and CPT locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

* * * * * * * * * * * *

PRIMARY DIVISIONS			SOIL TYPE		SECONDARY DIVISIONS
COARSE GRAINED SOILS (MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVELS (MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE)	CLEAN GRAVELS (Less than 5% Fines)	GW		Well graded gravels, gravel–sand mixtures, little or no fines
			GP		Poorly graded gravels or gravel–sand mixtures, little or no fines
		GRAVEL WITH FINES	GM		Silty gravels, gravel–sand–silt mixtures, plastic fines
			GC		Clayey gravels, gravel–sand–clay mixtures, plastic fines
	SANDS (MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE)	CLEAN SANDS (Less than 5% Fines)	SW		Well graded sands, gravelly sands, little or no fines
			SP		Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH FINES	SM		Silty sands, sand–silt–mixtures, non–plastic fines
			SC		Clayey sands, sand–clay mixtures, plastic fines
FINE GRAINED SOILS (MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS (LIQUID LIMIT IS LESS THAN 50 %)		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL		Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS (LIQUID LIMIT IS GREATER THAN 50 %)		MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH		Inorganic clays of high plasticity, fat clays
			OH		Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			PT		Peat and other highly organic soils

DEFINITION OF TERMS



GRAIN SIZES

SAMPLERS

SAND AND GRAVEL	BLOWS/FOOT*
VERY LOOSE	0–4
LOOSE	4–10
MEDIUM DENSE	10–30
DENSE	30–50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	STRENGTH+	BLOWS/FOOT*
VERY SOFT	0–1/4	0–2
SOFT	1/4–1/2	2–4
MEDIUM STIFF	1/2–1	4–8
STIFF	1–2	8–16
VERY STIFF	2–4	16–32
HARD	OVER 4	OVER 32

CONSISTENCY

*Number of blows of 140 pound hammer falling 30 inches to drive a 2–inch O.D. (1–3/8 inch I.D.) split spoon (ASTM D–1586).
+Unconfined compressive strength in tons/sq.ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D–1586), pocket penetrometer, torvane, or visual observation.

KEY TO EXPLORATORY BORING LOGS

Unified Soil Classification System (ASTM D–2487)

TRC

FIGURE A–1

EXPLORATORY BORING: EB-1

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW STEM AUGER
LOGGED BY: JA
START DATE: 11-10-21 FINISH DATE: 11-10-21

PROJECT NO: 455488
PROJECT: VANDEN ROAD RESIDENTIAL DEVELOPMENT
LOCATION: Vacaville, CA
COMPLETION DEPTH: 35.0 FT.

This log is a part of a report by TRC, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
		SURFACE ELEVATION:						
	0	**FAT CLAY (CH)** hard, moist, dark brown, high plasticity Liquid Limit = 52, Plasticity Index = 34	CH	24		17	91	86
				35		16	106	
	5	**LEAN CLAY (CL)** hard, moist, light brown, medium plasticity	CL	44		19	97	
				48		22	94	
	10	very stiff		24		20	94	
	15	stiff		14		31	91	
	20	**CLAYEY SAND (SC)** medium dense, moist, brown, medium plasticity, fine to coarse sand	SC	22		27		
	25	**POORLY GRADED SAND WITH CLAY (SP-SC)** medium dense, moist, light brown, medium plasticity, fine to coarse sand	SP-SC	18		23		
	30	*Continued Next Page*						

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
▽ : FREE GROUND WATER MEASURED DURING DRILLING AT 16.0 FEET

LA_CORP.GDT 2/21/22 MV, CA*

EXPLORATORY BORING: EB-1 Cont'd

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW STEM AUGER
LOGGED BY: JA
START DATE: 11-10-21 FINISH DATE: 11-10-21

PROJECT NO: 455488
PROJECT: VANDEN ROAD RESIDENTIAL DEVELOPMENT
LOCATION: Vacaville, CA
COMPLETION DEPTH: 35.0 FT.

This log is a part of a report by TRC, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
				SP-SC					
			LEAN CLAY (CL) very stiff, moist, light brown, medium plasticity	CL	20	X	30		
	35		Bottom of boring at 35 feet						
	40								
	45								
	50								
	55								
	60								

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
▽: FREE GROUND WATER MEASURED DURING DRILLING AT 16.0 FEET

LA_CORP.GDT 2/21/22 MV, CA*

EXPLORATORY BORING: EB-2

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW STEM AUGER
LOGGED BY: JA
START DATE: 2-11-22 FINISH DATE: 2-11-22

PROJECT NO: 455488
PROJECT: VANDEN ROAD RESIDENTIAL DEVELOPMENT
LOCATION: Vacaville, CA
COMPLETION DEPTH: 35.0 FT.

This log is a part of a report by TRC, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
		SURFACE ELEVATION:						
	0	**FAT CLAY (CH)** stiff, moist, dark brown, high plasticity	CH	19		27	79	
				25		26	93	
	5	**LEAN CLAY (CL)** very stiff, moist, brown, medium plasticity	CL	36		23	97	
				47		23	97	
	10	**SANDY LEAN CLAY (CL)** medium stiff, moist, brown, medium plasticity, fine sand	CL	13		25	95	
	15	**LEAN CLAY (CL)** medium stiff, moist, light brown, medium plasticity, trace fine sand	CL	22		30	87	
	20	▽						
		CLAYEY SAND (SC) medium dense, moist, dark brown, medium plasticity, fine sand	SC	25		30		19
	25	**POORLY GRADED SAND WITH CLAY (SP-SC)** medium dense, moist, brown, medium plasticity, fine to medium sand	SP-SC	26		22		
	30	**LEAN CLAY (CL)** hard, moist, light brown, medium plasticity	CL					

Continued Next Page

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
▽: FREE GROUND WATER MEASURED DURING DRILLING AT 21.0 FEET

LA_CORP.GDT 2/21/22 MV, CA*

EXPLORATORY BORING: EB-2 Cont'd

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW STEM AUGER
LOGGED BY: JA
START DATE: 2-11-22 FINISH DATE: 2-11-22

PROJECT NO: 455488
PROJECT: VANDEN ROAD RESIDENTIAL DEVELOPMENT
LOCATION: Vacaville, CA
COMPLETION DEPTH: 35.0 FT.

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
			This log is a part of a report by TRC, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.							○ Pocket Penetrometer △ Torvane ● Unconfined Compression ▲ U-U Triaxial Compression 1.0 2.0 3.0 4.0
			LEAN CLAY (CL) hard, moist, light brown, medium plasticity	CL	65		27			
	35		Bottom of boring at 35 feet							
	40									
	45									
	50									
	55									
	60									

GROUND WATER OBSERVATIONS:
▽: FREE GROUND WATER MEASURED DURING DRILLING AT 21.0 FEET

LA_CORP.GDT 2/21/22 MV, CA*

EXPLORATORY BORING: EB-3

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW STEM AUGER
LOGGED BY: JA
START DATE: 2-11-22 FINISH DATE: 2-11-22

PROJECT NO: 455488
PROJECT: VANDEN ROAD RESIDENTIAL DEVELOPMENT
LOCATION: Vacaville, CA
COMPLETION DEPTH: 30.0 FT.

This log is a part of a report by TRC, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0	SURFACE ELEVATION:						
		FAT CLAY (CH) stiff, moist, dark brown, high plasticity	CH	26		26	83	
		very stiff		29		21	102	
	5	**LEAN CLAY (CL)** hard, moist, brown, medium plasticity	CL	66		18	101	
		very stiff		41		23	97	
	10							
		medium stiff		10		31	87	
	15							
		CLAYEY SAND (SC) medium dense, moist, brown, medium plasticity, fine sand	SC	21		26	90	24
	20	▽						
		dense		46		22		
	25							
				34		26		
	30	Bottom of boring at 30 feet						

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
▽: FREE GROUND WATER MEASURED DURING DRILLING AT 20.0 FEET

LA_CORP.GDT 2/21/22 MV, CA*

EXPLORATORY BORING: EB-4

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW STEM AUGER
LOGGED BY: JA
START DATE: 2-11-22 FINISH DATE: 2-11-22

PROJECT NO: 455488
PROJECT: VANDEN ROAD RESIDENTIAL DEVELOPMENT
LOCATION: Vacaville, CA
COMPLETION DEPTH: 35.0 FT.

This log is a part of a report by TRC, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
	0	SURFACE ELEVATION:						
	0	**FAT CLAY (CH)** stiff, moist, dark brown, high plasticity Liquid Limit = 51, Plasticity Index = 31	CH	18		23	97	86
		very stiff		45		21	99	
	5	**LEAN CLAY (CL)** hard, moist, brown, medium plasticity	CL	28 50/6		16	102	
				47		21	98	
	15	very stiff		44		18	105	
		SANDY LEAN CLAY (CL) medium stiff, moist, light brown, medium plasticity, fine to medium sand	CL	32		25	98	
	20	▽						
		POORLY GRADED SAND WITH CLAY (SP-SC) medium dense, moist, brown, medium plasticity, fine to medium sand	SP-SC	32		23	100	
	25							
				28		24		
	30							

Continued Next Page

Undrained Shear Strength (ksf)
○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression
1.0 2.0 3.0 4.0

GROUND WATER OBSERVATIONS:
▽ : FREE GROUND WATER MEASURED DURING DRILLING AT 20.0 FEET

LA_CORP.GDT 2/21/22 MV, CA*

EXPLORATORY BORING: EB-4 Cont'd

DRILL RIG: CME-75
BORING TYPE: 8-INCH HOLLOW STEM AUGER
LOGGED BY: JA
START DATE: 2-11-22 FINISH DATE: 2-11-22

PROJECT NO: 455488
PROJECT: VANDEN ROAD RESIDENTIAL DEVELOPMENT
LOCATION: Vacaville, CA
COMPLETION DEPTH: 35.0 FT.

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
			This log is a part of a report by TRC, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.							○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression; 1.0 2.0 3.0 4.0
			LEAN CLAY (CL) hard, moist, light brown, medium plasticity, trace fine sand	SP-SC / CL	34	☒	26			
	35		Bottom of boring at 35 feet							
	40									
	45									
	50									
	55									
	60									

GROUND WATER OBSERVATIONS:

▽: FREE GROUND WATER MEASURED DURING DRILLING AT 20.0 FEET

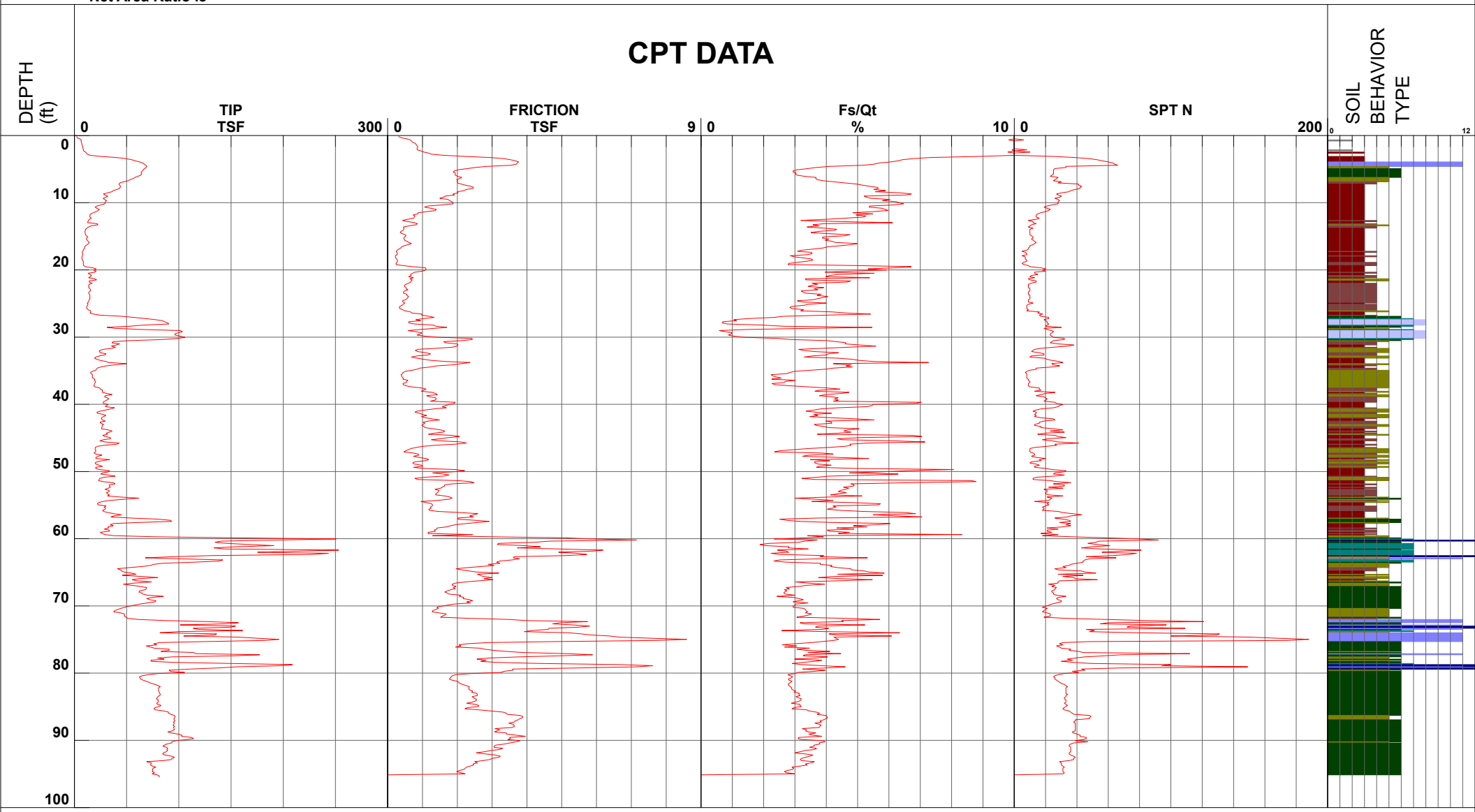
LA_CORP.GDT 2/21/22 MV, CA*

TRC Companies

Project	Zocchi Orr Neukirch	Operator	JM-IY	Filename	SDF(551).cpt
Job Number	PO 173471	Cone Number	DDG1589	GPS	
Hole Number	CPT-01	Date and Time	11/24/2021 8:29:50 AM	Maximum Depth	95.47 ft
EST GW Depth During Test		15.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

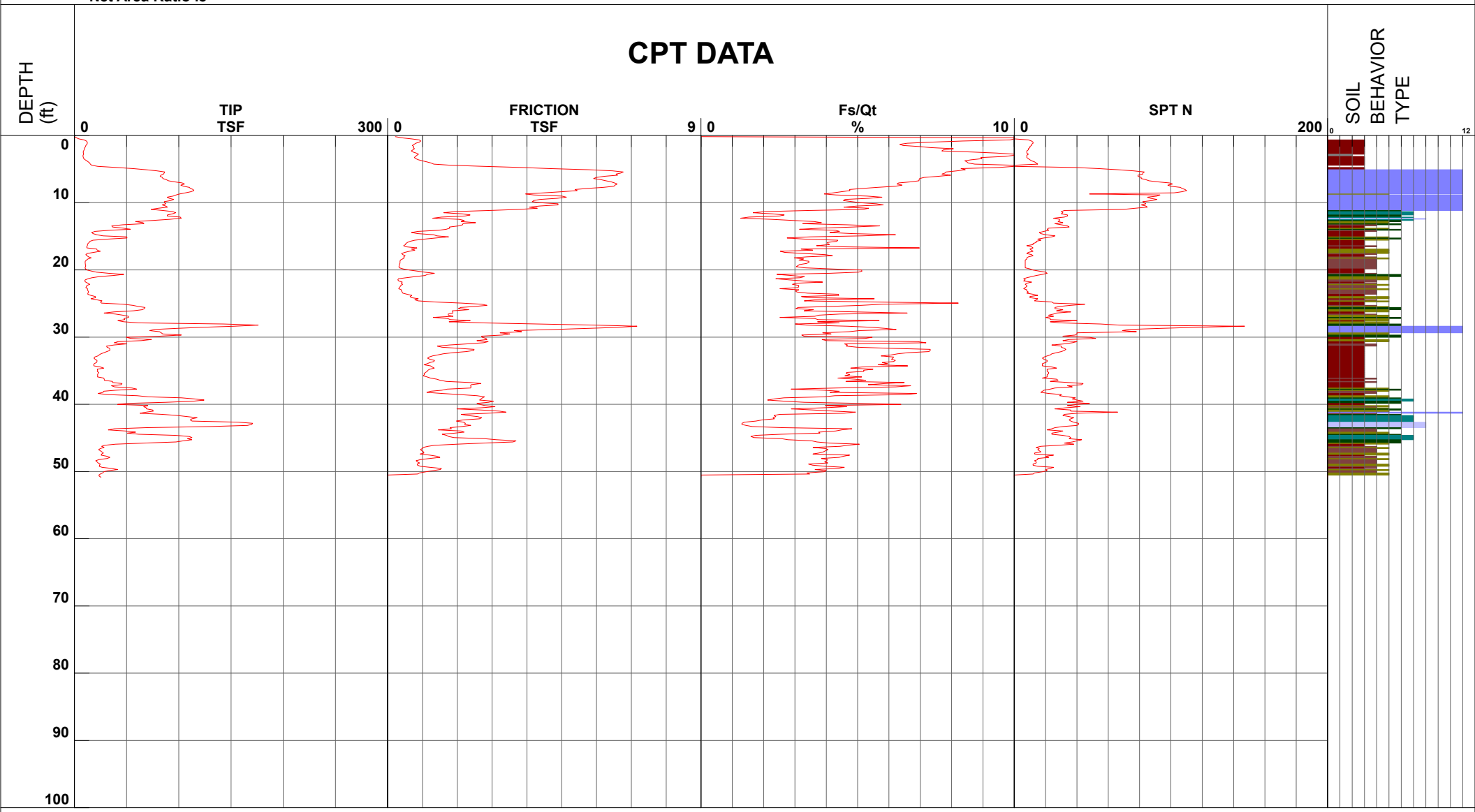
S*Soil behavior type and SPT based on data from UBC-1983

TRC Companies

Project	Zocchi Orr Neukirch	Operator	JM-IY	Filename	SDF(553).cpt
Job Number	PO 173471	Cone Number	DDG1589	GPS	
Hole Number	CPT-02	Date and Time	11/24/2021 11:26:34 AM	Maximum Depth	50.85 ft
EST GW Depth During Test		15.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

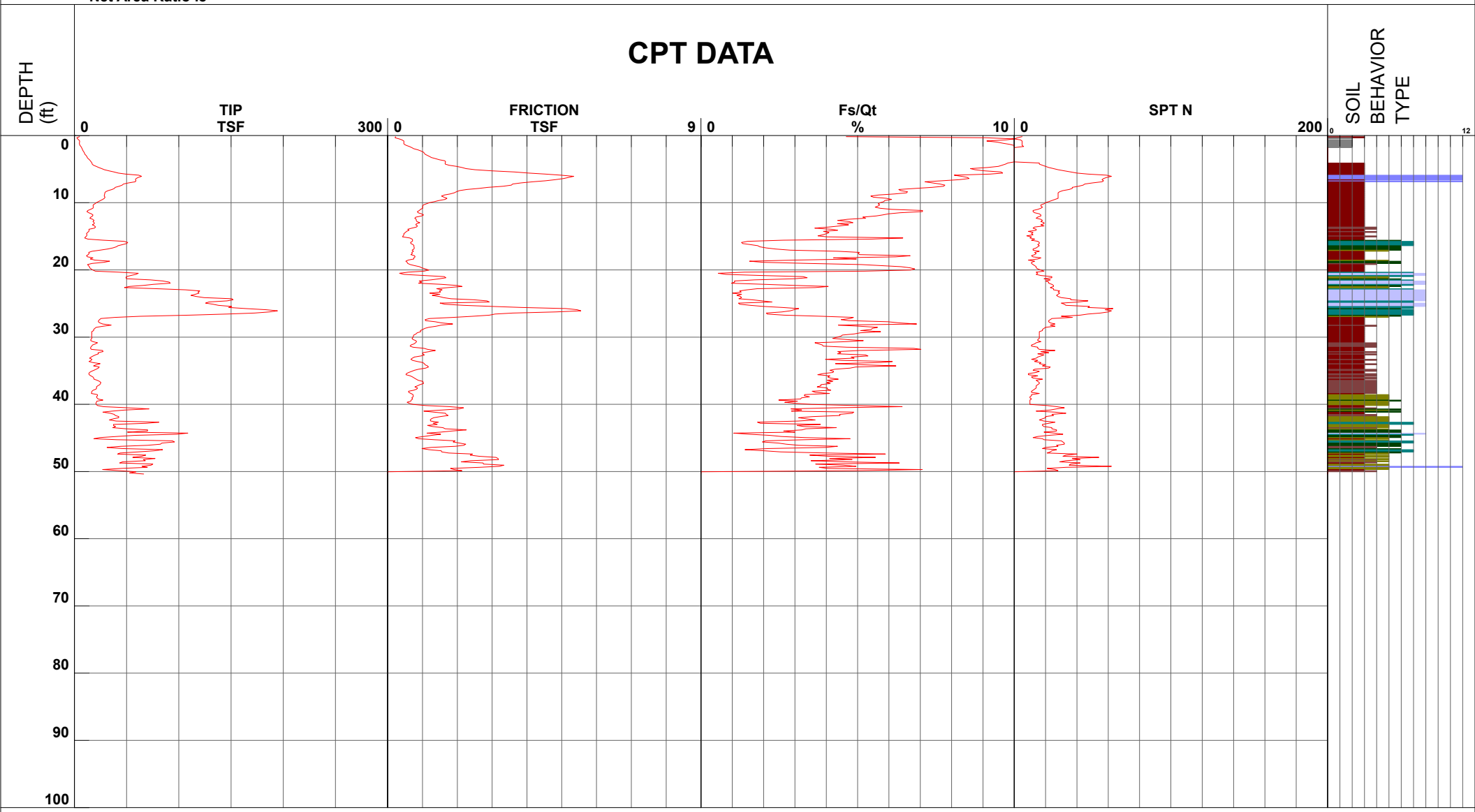
S*Soil behavior type and SPT based on data from UBC-1983

TRC Companies

Project	Zocchi Orr Neukirch	Operator	JM-IY	Filename	SDF(552).cpt
Job Number	PO 173471	Cone Number	DDG1589	GPS	
Hole Number	CPT-03	Date and Time	11/24/2021 10:28:05 AM	Maximum Depth	50.36 ft
EST GW Depth During Test		15.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

S*Soil behavior type and SPT based on data from UBC-1983

APPENDIX B

LABORATORY PROGRAM

The laboratory testing program was directed toward a quantitative and qualitative evaluation of the physical and mechanical properties of the soils underlying the site and to aid in verifying soil classification.

Moisture Content: The natural water content was measured (ASTM D2216) on samples of the materials recovered from the boring. These water contents are recorded on the boring log at the appropriate sample depths.

Dry Densities: In place dry density tests (ASTM D2937) were performed on samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring log at the appropriate sample depths.

Washed Sieve Analyses: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was determined on samples of the subsurface soils to aid in the classification of these soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

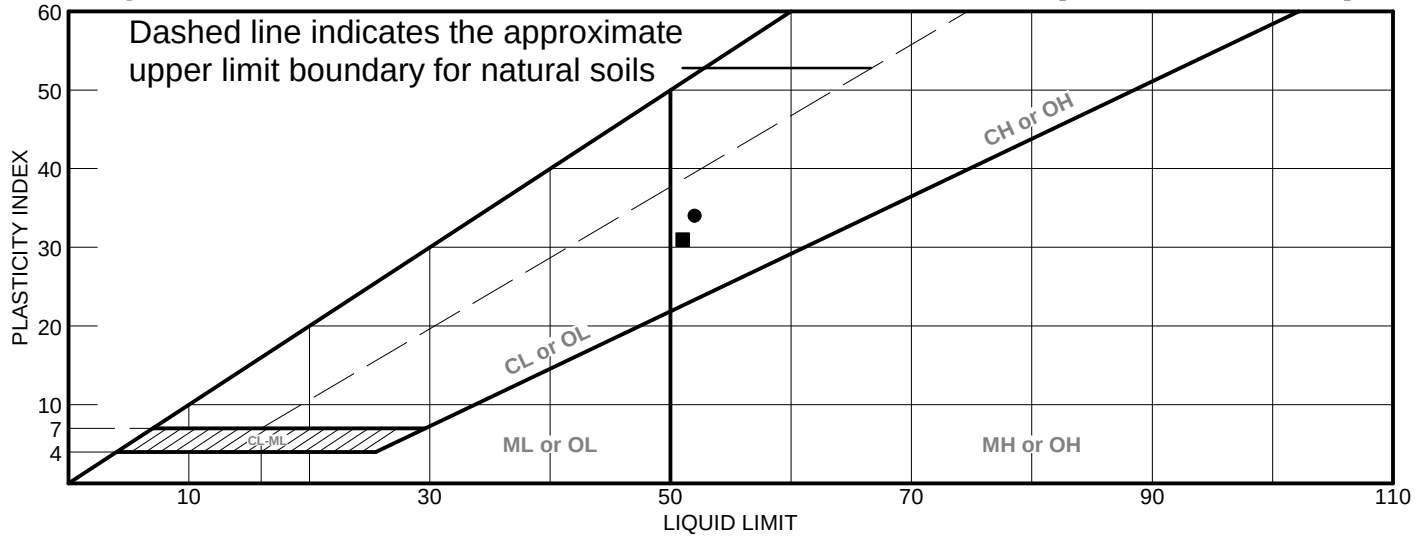
Plasticity Index: Two Plasticity Index (PI) test determinations (ASTM D4318) were performed on samples of the subsurface soils to measure the range of water contents over which these material exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of these tests are presented on the Plasticity Chart of this appendix and on the logs of the boring at the appropriate sample depths.

Soil Corrosion: Soil pH, electrical resistivity, sulfate and chloride concentrations were performed on three samples of the subsurface soils to aid in their classification. Results of these tests are included in this appendix.

Sieve and Hydrometer Analyses: Gradation and washed sieve analysis (ASTM D422 and D2217) was performed on a sample of the subsurface soil to aid in the soil classification. Results of this test are included in this appendix.

* * * * * * * * * * *

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D4318)



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Yellowish Brown Fat CLAY	52	18	34	99.4	86.3	CH
■	Dark Yellowish Brown Fat CLAY	51	20	31	99.4	85.7	CH

Project No. 028-3007 **Client:** TRC

Project: Vanden Rd Res Dev - 455488

● **Source:** EB-1 **Elev./Depth:** 2.0'

■ **Source:** EB-4 **Elev./Depth:** 2.0'

Remarks:

●

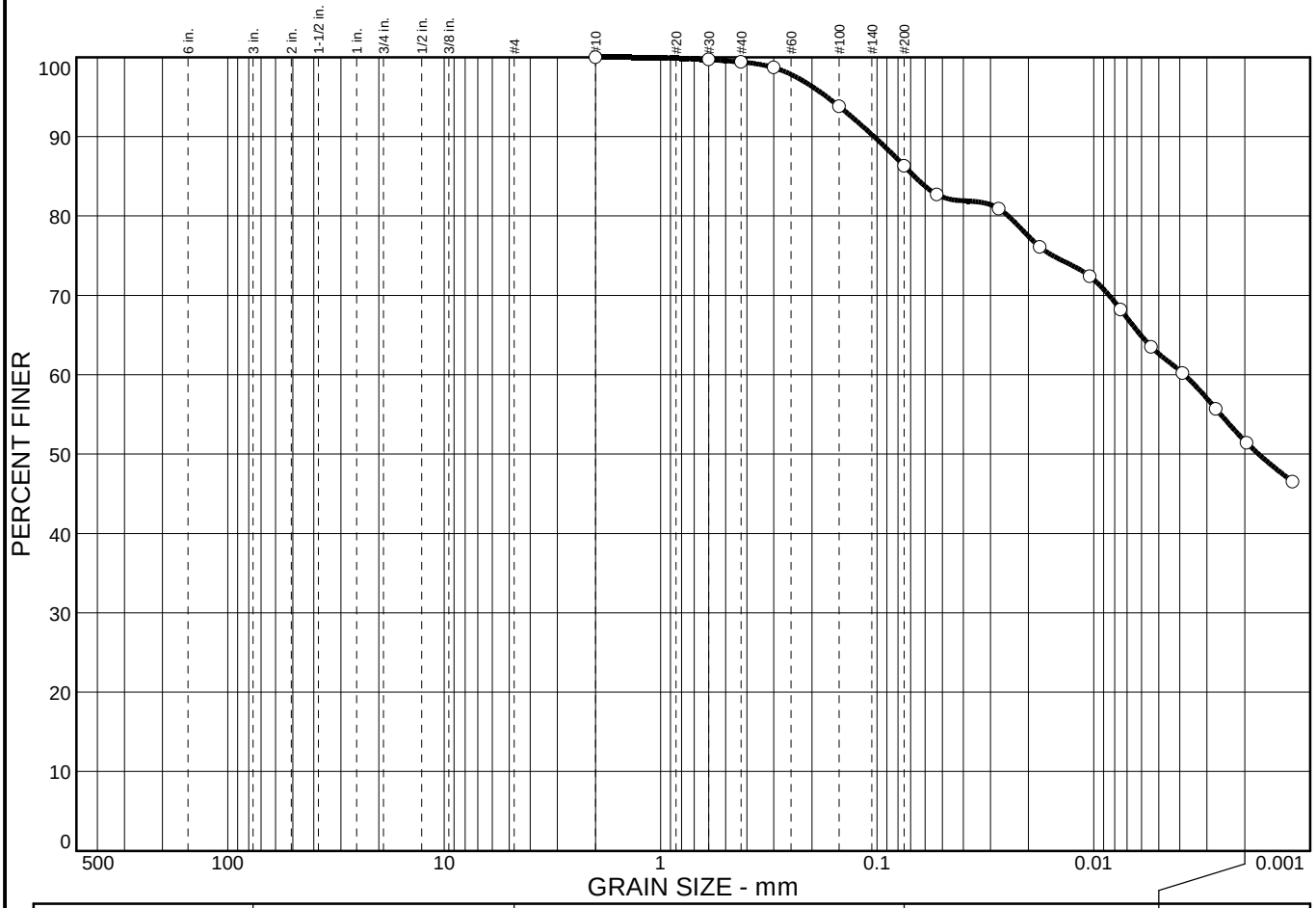
■

LIQUID AND PLASTIC LIMITS TEST REPORT (ASTM D4318)

COOPER TESTING LABORATORY

Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	13.7	34.7	51.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.7		
#40	99.4		
#50	98.7		
#100	93.8		
#200	86.3		
#270	82.7		
0.0274 mm.	80.9		
0.0177 mm.	76.1		
0.0104 mm.	72.4		
0.0075 mm.	68.2		
0.0054 mm.	63.5		
0.0039 mm.	60.2		
0.0027 mm.	55.7		
0.0020 mm.	51.4		
0.0012 mm.	46.5		

* (no specification provided)

Soil Description

Dark Yellowish Brown Fat CLAY

Atterberg Limits

PL= 18 LL= 52 PI= 34

Coefficients

D_{85}= 0.0673 D_{60}= 0.0038 D_{50}= 0.0017
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CH AASHTO=

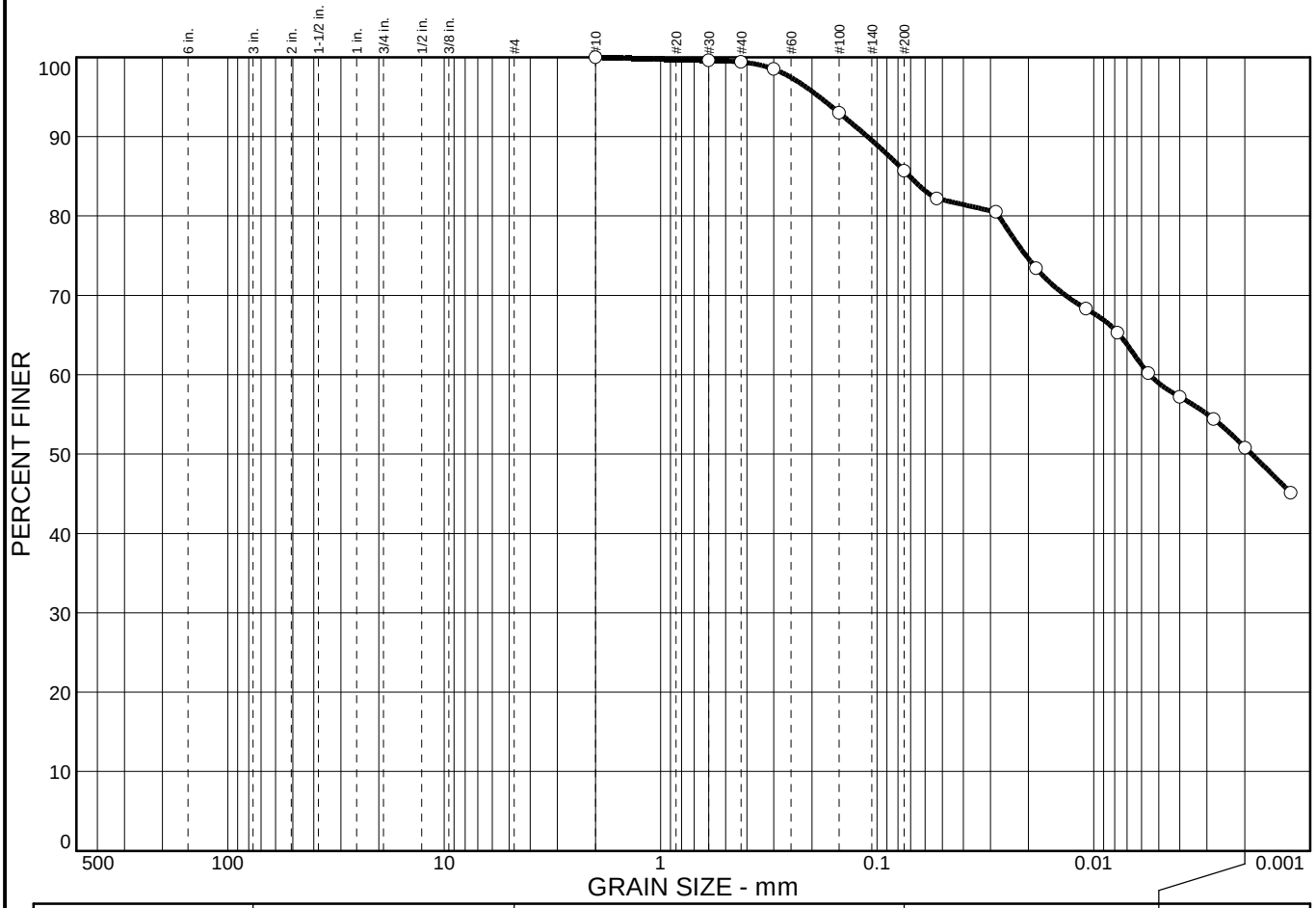
Remarks

Sample No.: **Source of Sample:** EB-1 **Date:** 11/22/21
Location: **Elev./Depth:** 2.0'

COOPER TESTING LABORATORY

Client: TRC
Project: Vanden Rd Res Dev - 455488
Project No: 028-3007 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	14.3	34.9	50.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#30	99.6		
#40	99.4		
#50	98.5		
#100	93.0		
#200	85.7		
#270	82.2		
0.0282 mm.	80.5		
0.0184 mm.	73.4		
0.0109 mm.	68.3		
0.0078 mm.	65.3		
0.0056 mm.	60.2		
0.0040 mm.	57.2		
0.0028 mm.	54.4		
0.0020 mm.	50.8		
0.0012 mm.	45.1		

* (no specification provided)

Soil Description

Dark Yellowish Brown Fat CLAY

Atterberg Limits

PL= 20 LL= 51 PI= 31

Coefficients

D_{85}= 0.0707 D_{60}= 0.0055 D_{50}= 0.0019
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CH AASHTO=

Remarks

Sample No.: **Source of Sample:** EB-4 **Date:** 11/22/21
Location: **Elev./Depth:** 2.0'

COOPER TESTING LABORATORY

Client: TRC
Project: Vanden Rd Res Dev - 455488
Project No: 028-3007 **Figure**

Corrosivity Tests Summary

CTL # 028-3007 **Date:** 11/17/2021 **Tested By:** PJ **Checked:** PJ
Client: TRC **Project:** Vanden Rd Res Dev **Proj. No:** 455488
Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP (Redox)		Sulfide	Moisture	Soil Visual Description
			As Rec.	Min	Sat.	mg/kg	mg/kg	%				Qualitative	At Test	
						Dry Wt.	Dry Wt.	Dry Wt.		E_H (mv)	At Test	by Lead	%	
Boring	Sample, No.	Depth, ft.	ASTM G57	Cal 643	ASTM G57	ASTM D4327	ASTM D4327	ASTM D4327	ASTM G51	ASTM G200	Temp °C	Acetate Paper	ASTM D2216	
EB-1	-	2.0	-	-	1,048	<2	13	0.0013	7.8	-	-	-	15.5	Dark Yellowish Brown Fat CLAY
EB-3	-	3.5	-	-	929	5	89	0.0089	7.8	-	-	-	22.6	Dark Yellowish Brown Sandy CLAY
EB-4	-	2.0	-	-	1,040	<2	6	0.0006	7.6	-	-	-	23.8	Dark Yellowish Brown Fat CLAY

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APPENDIX E

HAZARDOUS MATERIALS PHASE I ESA

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PHASE I ENVIRONMENTAL SITE ASSESSMENT

Zocchi, Orr, and Neukirch Parcels
Vanden Road
Vacaville, CA 95687
November 4, 2021

Zocchi, Orr, and Neukirch Parcels
463543

Prepared For:
Discovery Builders, Inc.
4021 Port Chicago Highway
Concord, CA 94520

Prepared By:
TRC
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Reviewed and Approved by:
Gary Lieberman / Senior Project Manager

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EXECUTIVE SUMMARY

TRC Environmental Corporation, Inc. (TRC) was retained by Discovery Builders, Inc (Discovery) (also known as "Client" or "User") to perform a Phase I Environmental Site Assessment (ESA) of the Orr, Neukirch, and Zocchi property located along Vanden Road in Vacaville, California (herein referred to as the "Site"). TRC's conducted the ESA in connection with the Client's planned business transaction involving the Site. The Phase I ESA described in this report was performed in accordance with the scope and limitations of the American Society for Testing and Materials Practice E 1527-13 *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM E 1527-13). Limiting conditions and/or deviations from the ASTM E 1527-13 standard are described in Sections 1.3 and 7.7 of this report.

The Site consists of Accessor Parcel Numbers (APN) 0137-010-050, -060, and -070, is approximately 25 acres in size, and is located along Vanden Road in Vacaville, California. The Orr and Neukirch parcels have residences and out-buildings present while the Zocchi parcel is currently unimproved.

TRC has performed a Phase I ESA in conformance with the scope and limitations of ASTM Practice E1527 of Orr, Neukirch, and Zocchi property, the Site. Any exceptions to or deletions from this practice are described in Sections 1.3 and 7.7 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the Site.

The following observations were noted during the preparation of this report. None of these observations are considered to be a REC.

Observation No. 1

Miscellaneous gasoline, automotive oil, paint, cleaning chemicals, and automotive repair chemicals stored in containers less than five gallons stored in the garage and barn of the Orr Parcel and the garage and shop of the Neukirch Parcel. No spills or mismanagement of these materials were noted.

Observation No. 2

One pole-mounted transformer was observed on the Orr Parcel. Markings indicating whether the transformer fluids main contain polychlorinated bi-phenols were not evident. This transformer appears to be utility owned (PG&E).

Observation No. 3

One mound of fill material was observed in the southeastern corner of the Neukirch Parcel. The source of this fill is unknown.

Observation No. 4

Active drinking water wells are located on the Orr and Neukirch Parcels. In addition, there is abandoned drinking water well located on the Orr Parcel. These wells would need to be properly abandoned under permit if no longer being utilized.

Observation No. 5

Active septic systems are present on the Orr and Neukirch Parcels. These systems would need to be properly abandoned under permit if no longer being utilized.

This Executive Summary is part of this complete report; any findings, opinions, or conclusions in this Executive Summary are made in context with the complete report. TRC recommends that the User read the entire report for supporting information related to findings, opinions, and conclusions.

Legal Notice

TRC has prepared this Phase I ESA for Discovery (hereinafter "Client" or "User"). This document was prepared by TRC solely for the benefit of the Client and the User. With regard to third-party recipients of this document, neither TRC, nor the Client, nor the User, nor any of their respective parents, affiliates, or subsidiaries, nor any person acting on their behalf: (a) makes any warranty, expressed or implied, with respect to the use of any information or methods disclosed in this document; or (b) assumes any liability with respect to the use of any information or methods disclosed in this document. Any third-party recipient of this document, by its acceptance or use of this document, releases TRC, the Client, the User, and their parents, affiliates, and subsidiaries from any liability for direct, indirect, economic, incidental, consequential, or special loss or damage whether arising in contract, warranty, express or implied, tort, or otherwise, and irrespective of fault, negligence, and strict liability.

1.0 INTRODUCTION

TRC Environmental Corporation (TRC) has prepared this Phase I Environmental Site Assessment (ESA) for Discovery (hereinafter "Client" or "User"). This report was prepared for and may be relied upon by Client and User for the purposes set forth herein; it may not be relied on by any party other than the Client and User. TRC will consider authorization for third-party reliance on this report if requested by the Client. TRC reserves the right to deny reliance on this report by third parties.

1.1 Purpose and Scope of Services

The following Phase I ESA was performed for the property located at Orr, Neukirch, and Zocchi property located along Vanden Road in Vacaville, California (hereinafter the "Site"). A Site location map is included as **Figure 1**. This Phase I ESA has been prepared by TRC in accordance with the American Society for Testing and Materials E 1527-13 *Standard Practice for Environmental Site Assessments: Phase I ESA Process* (ASTM E 1527-13) and is intended for the sole use of CLIENT per TRC's proposal dated August 6, 2021, authorized on October 22, 2021.

The purpose of this assessment is to identify *Recognized Environmental Conditions* (RECs) at the Site, as defined by the ASTM E 1527-13 standard. The completion of this Phase I ESA report may be used to satisfy one of the requirements for the User to qualify for the *innocent landowner*, *contiguous property owner*, or *bona fide prospective purchaser* liability protections pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), thereby constituting *all appropriate inquiries into the previous ownership and uses of the property consistent with good commercial or customary practice* as defined by 42 U.S.C. §9601(35)(B) of CERCLA.

TRC understands that this assessment is not funded with a federal grant awarded under the United States Environmental Protection Agency (U.S. EPA) Brownfields Assessment and Characterization program or for lending under the guidance of the Small Business Administration. The Scope of Services for this Phase I ESA included the following tasks:

- Site and vicinity reconnaissance;
- Site and vicinity description and physical setting;
- Historical source review and description of historic Site conditions;
- Interviews with owners, operators, and/or occupants of the Site, and/or local officials;
- Review of environmental databases and regulatory agency records;
- Review of previous environmental reports/documentation, as applicable;
- Review of environmental liens, if provided or authorized to obtain by the User; and
- Preparation of a report summarizing findings, opinions, and conclusions.

1.2 Additional Services

Items outside the scope of the ASTM E 1527-13 standard include but are not limited to the following:

- Asbestos-containing building materials
- Radon
- Lead-based paint
- Lead in drinking water
- Wetlands
- Regulatory compliance
- Cultural and historic resources
- Industrial hygiene
- Emerging contaminants
- Health and safety
- Ecological resources
- Endangered species
- Indoor air quality unrelated to *releases* of *hazardous substances* or *petroleum products* into the environment
- Biological agents
- Mold

No additional services were performed outside the scope of the ASTM E 1527-13 standard.

1.3 Deviations to ASTM E 1527-13 Standard

No significant deviations or deletions to the ASTM standard were made during this Phase I ESA.

2.0 SITE DESCRIPTION

2.1 Site Location and Legal Description

The approximately 25-acre Site is located at 5742, 5750, and 7038 Vanden Road in Vacaville, California, in a rural/mixed residential use area. The Site is described by the Solano County tax assessor as parcel numbers 0137-010-050, -060, and -070, is zoned as residential, and is currently owned by several different owners that include the Orr's, Neukirch's, and Zocchi's. A Site location map is included as **Figure 1**.

2.2 Site Improvements

Current on-Site improvements are listed in the following table. A Site layout plan is included as **Figure 2**.

Table 2.1 - Site Improvements

Site Feature	Description
Buildings (stories)	Two single-story homes, one single story barn, and one single-story shop.
Construction date(s)	Both homes constructed 1973-1975. Orr Parcel barn constructed 1991-1992. Neukirch Parcel shop constructed 1973-1975.
Exterior areas	Vegetated and unimproved.
On-Site roads/rail lines	N/A
Other large equipment	N/A
Potable water supply	On-Site production well
Sewage disposal system(s)	On-Site septic system
Heating/cooling system fuel source(s)	Natural gas/Wood
Back-up fuel source(s)	N/A
Electricity supplier(s)	Pacific Gas & Electric Company
Stormwater system	Sheet-flow eastward into the City of Vacaville's storm drain system

2.3 Current and Historic Site Use

2.3.1 Current Site Use(s)

The approximately 25-acre Site is currently residential or undeveloped fields.

2.3.2 Previous Owner and Operator Information

Based on information provided by the User (Section 3.0), the historical record review (Section 4.0), and/or interviews conducted during this Phase I ESA (Section 6.0), historic Site ownership and operator information are provided in the tables below.

Table 2.2 - Previous Operator Information

Site Owner	From	To
No tenants/addresses listed	Pre 1980	1986
5750 not listed	1986	1992
Timothy/Bill Orr (5750), Michael Neukirch (5742)	1992	2014
Adam Tabayoyon (5750), Michael Neukirch (5742)	2014	2017
Timothy Orr (5750), Michael Neukirch (5742)	2017	Present

Physical Setting

According to the United States Geological Survey, 2012, *7.5-Minute Topographic Map for Elmira* (refer to **Figure 1**), the Site is located approximately 5,000 feet to the south of Alamo Creek, the Site topographic elevation is approximately 96 feet above mean sea level, and local topography slopes to the east-southeast. The topographic downward slope observed at the Site during the Site reconnaissance is generally toward the east. Based on local topography and historical environmental reports provided to TRC, as applicable, the assumed direction of shallow groundwater flow likely mimics ground surface contours and generally flows to the east. However, a subsurface investigation would be required to determine actual groundwater flow direction.

The database radius report, supplied by Environmental Data Resources, Inc. (EDR) of Shelton, Connecticut, was reviewed to obtain information regarding the dominant soil composition in the Site vicinity. This information is summarized below:

Hydric Status:	Soil does not meet the requirements for a hydric soil.
Soil Surface Texture:	Clay loam
Soil Component Name:	Rincon
Deeper Soil Types:	Clay Loam

Hydric Status:	Soil does not meet the requirements for a hydric soil.
Soil Surface Texture:	Silty clay loam
Soil Component Name:	Capay
Deeper Soil Types:	Silty clay loam, clay, and clay loam

Please refer to the Geocheck Physical Setting Source Summary of the EDR report presented in **Appendix A** for further information regarding the soil composition in the Site vicinity. According to EDR, the Site is not located in a Federal Emergency Management Agency flood zone.

3.0 USER PROVIDED INFORMATION

According to the ASTM E 1527-13 standard, certain tasks that may help identify the presence of RECs associated with the Site are generally conducted by the Phase I ESA User. These tasks include providing or authorizing the *environmental professional* to obtain recorded land title records for environmental liens or activity and use limitations (AULs); providing specialized knowledge related to RECs at the Site (e.g., information about previous ownership or environmental litigation); providing commonly known or *reasonably ascertainable* information within the local community about the *property* that is material to RECs in connection with the *property*; and informing the *environmental professional* if, as believed by the User, the purchase price of the *property* is lower than the fair market value due to contamination. A list of requested information was included in TRC's signed proposal (see Section 1.1). Information provided by the User pursuant to that request is listed in Section 3.0. A copy of the User questionnaire is included in **Appendix B**.

3.1 Title and Judicial Records for Environmental Liens or AULs

After reviewing the EDR report (discussed in Section 4.2), local municipal records (Section 4.4), and the Regional Water Quality Control Board's (RWQCB) Geotracker website (Case # T0609507004) and the DTSC EnviroStor website (Section 4.4), no environmental liens were listed for the Site, and no evidence of AULs associated with the Site were identified.

3.2 Specialized Knowledge

The User was not aware of specialized knowledge related to RECs at the Site.

3.3 Property Value Reduction Issues

The User was not aware of property valuation reduction issues regarding the Site.

3.4 Commonly Known or Reasonably Ascertainable Information

No commonly known or reasonably ascertainable information was provided to TRC by the User.

3.5 Reason for Conducting Phase I ESA

TRC understands the User requires a Phase I for their planned purchase business transaction involving the Site.

4.0 RECORDS REVIEW

4.1 Historic Use Information

Information regarding Site and vicinity historic uses was obtained from various publicly available and practically reviewable sources including:

- Aerial photographs (scale: 1" = 500') dated 1937, 1952, 1968, 1974, 1984, 1993, 2006, 2009, 2012, and 2016;
- Topographic maps dated 1908, 1917, 1953, 1968, 1973, 1980, and 2012;
- City directories dated 1977, 1981, 1986, 1992, 1995, 2000, 2005, 2010, 2014, and 2017;
- Local municipal records;
- An environmental database report; and
- Interviews with Site representative(s) and regulatory agency official(s), as necessary.

Historical research documentation is included in **Appendix C**.

Sanborn Maps were originally produced for assessing fire insurance liability in urban areas in the United States. The maps provide detailed information (e.g., building construction, facility occupants, storage tank locations, and hazardous material storage areas), which can be used as a resource to document land use and structural change over time. EDR researched the availability of Sanborn Maps in the vicinity of the Site; however, EDR stated that Sanborn Map coverage does not exist for the Site or nearby surrounding area.

4.1.1 Site History

Operational History

Table 4.1 - Site History

Year	Site History
1937 to 1952	The Site property appears to be used for agricultural purposes; one residential structure present on the west side of the property.
1968 to 1974	By 1968, the original Site building constructed in the western portion of the Site has been removed and multiple new structures and farming equipment appear in the northwest corner of the property. By 1974, three residential structures appear on the western side of the property.
1984 to 2016	By 1984, one additional building was constructed in the western portion of the property. By 2006, structures and farming equipment located in the northwest portion of the property had been removed. The site has remained relatively unchanged to present.

It does not appear that topographic contours in the Site area have significantly changed during the time period reviewed. If significant changes had been noted, it could indicate significant filling or excavation activity.

4.1.2 Adjoining Property History

Table 4.2 - Adjoining Property History

Year	Adjoining Property History
North	Between 1937 and 1993, the adjoining property to the north consisted of farmland with a farmhouse and additional structures present. By 1968, the adjoining parcel appears to be divided into two parcels, and an additional farmhouse was constructed on the property. By 2012, the original farmhouse with multiple structures was removed and a residential community was constructed by 2016. The north adjoining property remains relatively unchanged since 2016.
East	Between 1937 and 1993, the adjoining property to the east consisted of farmland with no structures or equipment present. By 2006, a residential community was constructed and remains relatively unchanged since.
South	Between 1937 and 2006, the adjoining property to the south was farmland and occupied by a farmhouse and multiple structures and equipment. By 2009, vacant land remained as the farmhouse, structures, and equipment were removed from the property. The adjoining property to the south remains relatively unchanged since 2009.
West	Between 1937 and 1974, the adjoining property to the west beyond Vanden Road was farmland and occupied by a farmhouse. By 1984, the original farmhouse remains and a residential neighborhood is constructed. By 1993, the original farmhouse was removed and the residential neighborhood and farmland remain relatively unchanged since.

4.1.3 Surrounding Property History

Table 4.3 - Surrounding Property History

Year	Surrounding Property History
North	From at least 1937 to 1984, this area was developed as agricultural land. By 1993, residential communities were constructed with some farmland still present. The north surrounding property has remained relatively unchanged since 1993.
East	From at least 1937 to 1993, this area has consisted of agricultural land. By 2006, a residential community was constructed and has remained relatively unchanged since.
South	From at least 1937 to 2012, this area has consisted of agricultural land. By 2016, residential homes and roadways began to be constructed, remaining relatively unchanged since.
West	From at least 1937 to 1974, this area has consisted of agricultural land. By 1984, residential homes and roadways began to be constructed, remaining relatively unchanged since.

4.2 Database Report and Environmental Record Review

A database search report that identifies properties listed on state and federal databases within the ASTM-required radii of the Site was obtained from EDR and is included in **Appendix A**.

The environmental database report identified 3 records/listings for the Site and 4 other records/listings within the search radii of the Site. These properties included those that could be mapped and those that could not (i.e., orphan properties).

4.2.1 Subject Site

There are no listings for the subject Site.

4.2.2 Adjoining and Surrounding Property Record Review

TRC evaluated the following factors to determine whether additional environmental records should be reviewed with respect to the potential for contaminant migration from the adjoining and surrounding properties:

(1) Whether the property is upgradient or downgradient of the Site related to potential groundwater migration based on the local topography, and the assumed (or known) groundwater depth and southeasterly shallow groundwater flow direction;
(2) Whether the property is upgradient or downgradient of the Site related to potential vapor migration based on readily available information pursuant to the ASTM E 1527-13 standard including soil and geological characteristics; contaminant characteristics; contaminated plume migration data; and significant conduits that might provide preferential pathways for vapor migration such as major utility corridors, sanitary sewers, storm sewers, and significant natural conduits such as Karst terrain (vapor migration may also be influenced by the age and design of infrastructure features associated with these conduits);
(3) Property case status (i.e., whether the state environmental agency or applicable regulatory authority has issued a No Further Action letter or other similar closure document);
(4) Type of database and whether the presence of contamination is known; and
(5) The distance between the listed property and the Site.

Based on this evaluation, TRC limited the review of additional environmental records to the properties listed below because the potential for contamination to be migrating to the Site from the other properties identified by the database search is considered low.

4.2.2.1 Adjoining Properties

Information regarding adjoining properties (those which share a common property boundary with the Site) included in the database search report is summarized in the following table(s):

Site Facility Name(s) and/or Listed Address(es)	VANDEN II, VANDEN IT PROPERTY 5714 VANDEN ROAD
Approximate Location Relative to Site	Immediately southwest
EDR Map No(s).	A1 – A3
Database(s)	LUST, UST, Cortese, CERS

Description/ID No(s).	VANDEN II (EDR #A1) LUST Case: 391159 CORTESE Global ID: T0609507004 CERS Site ID: 232987 CERS ID: T0609507004 VANDEN II (EDR #A2) SOLANO CO. LUST: Facility ID: 800961 LUST: Global ID: T0609507004 VANDEN IT PROPERTY (EDR #A3) SOLANO CO. UST: Facility ID: 800961
Presumed Hydrogeologic Setting	Upgradient
Database Review Summary	VANDEN II (EDR #A1) LUST: LUST Cleanup Site – Status: Leak being confirmed CORTESE: LUST Cleanup Site, Completed - Case closed CERS: Leaking Underground Storage Tank Cleanup Site VANDEN II (EDR #A2) LUST: LUST Cleanup Site, Completed – Case Closed on 01/17/2014 On September 24, 2004, one 350-gallon gasoline UST and one 350 gallon diesel UST were removed. Two soil samples were collected below each tank at 6 6.5 feet bgs. No groundwater was encountered in the excavation. Up to 820 mg/Kg TPHg was reported in the soil at 6.5 feet bgs. In August 2013, 67 cubic yards of soil was removed from the former excavation area. Confirmation samples collected in the completed excavation reported low residual TPHd up to 6.6 mg/Kg. No TPHg, BTEX, or fuel oxygenates and additives were reported in the soils above laboratory reporting limits. VANDEN IT PROPERTY (EDR #A3) SOLANO CO. UST: Nothing to Report Based on regulatory status of the cases and observations of the properties during the surrounding area reconnaissance, there no evidence of environmental concerns that could impact the subject Site.

4.2.2.2 Surrounding Properties

Information regarding surrounding properties (those within the general vicinity of the Site) included in the database search report is summarized in the following table(s):

Site Facility Name(s) and/or Listed Address(es)	W4 OIL SERVICE 200 RED PHEASANT DR
Approximate Location Relative to Site	0.117 mi., NE
EDR Map No(s).	4

Database(s)	EDR HIST AUTO
Description/ID No(s).	W4 OIL SERVICE (EDR #4) EDR HIST AUTO: N/A
Presumed Hydrogeologic Setting	Downgradient
Database Review Summary	W4 OIL SERVICE (EDR #4) EDR HIST AUTO: Listed as a gasoline service station in 2008, 2009, 2010, 2011, 2012, 2013, and 2014 Based on lack of release records, its downgradient location, and observations of the property during the surrounding area reconnaissance, there no evidence of environmental concerns that could impact the subject Site.

Site Facility Name(s) and/or Listed Address(es)	PAPIN PROPERTY SCHOOL 5591 VANDEN ROAD
Approximate Location Relative to Site	0.457 mi., SSW
EDR Map No(s).	5
Database(s)	ENVIROSTOR, SCH
Description/ID No(s).	PAPIN PROPERTY SCHOOL SITE (EDR #5) ENVIROSTOR: Facility ID: 60000127 SCH: Facility ID: 60000127
Presumed Hydrogeologic Setting	Downgradient
Database Review Summary	PAPIN PROPERTY SCHOOL SITE (EDR #5) ENVIROSTOR/SCH: School Investigation – No Action Required on 07/07/2005 Based on the regulatory status of this case, it is not considered to pose an environmental concern to the subject Site.

Site Facility Name(s) and/or Listed Address(es)	KMEP ELMIRA BOOSTER LEISURE TOWN ROAD
Approximate Location Relative to Site	0.475 mi., SE
EDR Map No(s).	6
Database(s)	CPS-SLIC, CERS
Description/ID No(s).	KMEP ELMIRA BOOSTER STATION (EDR #6) CPS-SLIC: Global ID: SL0609590844 CERS: CERS ID: SL0609590844 Site ID: 227749

Presumed Hydrogeologic Setting	Downgradient
Database Review Summary	KMEP ELMIRA BOOSTER STATION CPS-SLIC: Cleanup Program Site, Completed – Case Closed on 02/21/2003 CERS: Cleanup Program Site Based on the regulatory status of this case, it is not considered to pose an environmental concern to the subject Site.

Site Facility Name(s) and/or Listed Address(es)	ARCO #5368 2500 NUT TREE PKWY
Approximate Location Relative to Site	0.58 mi., WNW
EDR Map No(s).	7
Database(s)	LUST, Cortese, HIST CORTESE, Notify 65, CERS
Description/ID No(s).	ARCO #5368 (EDR #7) LUST: Global ID: T0609595536, T0609500363 CORTESE: Global ID: T0609595536, T0609500363 HIST CORTESE: Reg ID: 480105 Notify 65: N/A CERS: CERS ID: T0609595536, T0609500363 Site ID: 243003, 256542
Presumed Hydrogeologic Setting	Upgradient
Database Review Summary	ARCO #5368 (EDR #7) LUST/CORTESE: Global ID: T0609500363, LUST Cleanup Site - Case Closed on 05/14/1996 Global ID: T0609595536, LUST Cleanup Site – Case Closed on 11/28/2007 HIST CORTESE: Nothing to report Notify 65: Nothing to report CERS: CERS ID: T0609595536, T0609500363 - Leaking Underground Storage Tank Cleanup Site Based on the regulatory status of this case, it is not considered to pose an environmental concern to the subject Site.

4.3 Previous Reports

The following environmental reports regarding were downloaded from the State Water Resources Control Board's GeoTracker database system for TRC's review:

- September 25, 2013, Soil Excavation Report, Prepared by Wallace Kuhl & Associates
- January 8, 2014, Low Threat Closure Request, Prepared by Wallace Kuhl & Associates

The investigations associated with the reports are for a property adjacent to the south of the Site and not specifically associated with the subject Site. The release did not extend beyond the property boundaries and the case received regulatory closure and is not considered an environmental concern to the subject Site.

4.4 Other Environmental Record Sources

Per the ASTM standard, local or additional state records were reviewed to enhance and supplement the ASTM-required federal and state records reviewed and discussed earlier in this report. These additional records include records related to septic systems, domestic water wells, monitoring wells, soil vapor profiles, building or demolition permits, certificates of occupancy, geotechnical reports, hazardous materials, hazardous materials management plans/business plans/permits/inspection reports/enforcement actions etc., and/or underground storage tanks inspections/permits/approvals/enforcement etc. Local sources that were contacted to obtain this information include the City of Vacaville, the Solano County Environmental Health Division, the Vacaville Fire Department, the State Water Resources Control Board's GeoTracker database system, and the Department of Toxic Substances Control's EnviroStor database system. Information from these sources is discussed in this report, as applicable.

Table 4.4 - Other Environmental Record Sources

Regulatory Agency/ Department	Available Information
City of Vacaville	No response
Solano County Environmental Health Division	The Solano County Environmental Health Division provided boring applications, permit forms, certificate of insurance documents, property information, tax assessor's map, boring location site map, and well completion reports for 5742 and 7038 Vanden Road.
Vacaville Fire Department	The Vacaville Fire Department provided the following information regarding the properties at 7038, 5750, and 5742 Vanden Road: • The rural residential properties were annexed into city limits in 2005-2006. These properties have septic tanks and wells at these locations. • The residential properties located at 5750 & 5742 Vanden Road were built in 1979

5.0 SITE RECONNAISSANCE

5.1 Methodology and Limiting Conditions

Mr. Cody Knopp-Sargoni, Staff Engineer conducted a Site reconnaissance of accessible areas on and around the Site on October 19, 2021 for the purpose of identifying potential RECs, and was accompanied by Kevin English, Director of Forward Planning and Land Acquisition of Discovery Builders, Inc., Billy Orr, owner of the Orr Parcel, and Gail Glover, owner of the Neukirch Parcel, who provided access to the property and answered questions during the reconnaissance. Photographs taken during the Site reconnaissance are provided in **Appendix D**. A Site layout plan is included as **Figure 2**.

5.2 Interior and Exterior Site Observations

Unless otherwise noted, the items listed in the table below appeared in good condition with no visual evidence of staining, deterioration, or a discharge of hazardous materials; and there are no records of a release in these areas. Items where further description is warranted are discussed in the section(s) following the table.

Table 5.1 - Interior and Exterior Site Observations

Item	Present (Current/ Historic/ Not Observed)	Description
Hazardous material storage or handling areas	Observed	(see Section 5.2.1)
Solid and liquid wastes including municipal wastes	Not Observed	(see Section 5.2.2)
USTs and associated piping	Not Observed	(see Section 5.2.3)
ASTs and associated piping	Not Observed	(see Section 5.2.4)
Drums and containers (≥5 gallons)	Not Observed	Miscellaneous gasoline, automotive oil, paint, cleaning chemicals, and automotive repair chemicals stored in containers less than five gallons stored in the garage and barn of the Orr Parcel and the garage and shop of the Neukirch Parcel.
Odors	Not Observed	
Pools of liquid, including surface water bodies and sumps (handling hazardous substances or substances likely to be hazardous only)	Not Observed	
PCBs/transformers	Observed	One pole-mounted transformer installed on the Orr Parcel.
Stains or corrosion	Not Observed	
Drains and sumps	Not Observed	
Pits, ponds, and lagoons	Not Observed	
Stressed vegetation	Not Observed	
Historic fill or other fill material	Observed	One mound of fill material located in the southeastern corner of the Neukirch Parcel.

Table 5.1 - Interior and Exterior Site Observations

Item	Present (Current/ Historic/ Not Observed)	Description
Wastewater (including stormwater or discharge into a drain, ditch, underground injection system, or stream on or adjacent to the Site)	Observed	Stormwater drainage ditches located on each of the Orr and Neukirch Properties.
Wells (including dry wells, irrigation wells, injection wells, abandoned wells, or other wells)	Observed	One active drinking water well located on each of the Orr and Neukirch Parcels. One abandoned drinking water well located on the Orr Parcel.
Septic systems or cesspools	Observed	One active septic system located on each of the Orr and Neukirch Parcels. Recreational Vehicle on the Orr Parcel may contain a septic and/or greywater tank.

5.2.1 Hazardous Substances

Hazardous substances including raw materials; finished products and formulations; hazardous wastes; hazardous constituents and pollutants including intermediates and byproducts that are currently present at the Site; and unidentified substance containers (when open or damaged, and containing unidentified substances suspected of being hazardous or petroleum products) are listed in the following table.

Table 5.2 - Current Site Hazardous Substances

Material Name	Approximate Quantity on Site During Reconnaissance (gallons/pounds)	Storage Containers and Conditions*
Liquefied Propane Gas	1,000 Gallons	One 500-Gallon LPG tank present on each of the Orr and Neukirch Parcels. Tank conditions were each fair.

* - Definition of conditions
Compromised: Obvious holes in container or visual evidence of a release.
Poor: Container appears dented, bulging, rusted, or visual evidence of spillage.
Fair: Container appears intact with visual traces of rust.
Good: No visual evidence of container damage.
Excellent: Container appears like new.

5.2.2 Solid and Liquid Wastes

No solid and/or liquid wastes are generated and stored on the Site.

5.2.3 USTs

No USTs were identified by the Key Site Manager or observed during the Site visit.

5.2.4 ASTs

No ASTs were identified by the Key Site Manager or observed during the Site visit.

5.3 Adjoining and Surrounding Properties Reconnaissance

5.3.1 Adjoining Properties

During the Site reconnaissance, TRC viewed the adjoining properties from the Site and publicly accessible areas (e.g., public roadways, etc.).

Table 5.6 - Adjoining Properties Reconnaissance

Direction from Site	Current Land Use Description
North	Vegetated and unimproved land.
East	Residential properties.
South	Solano County Water Agency Unnamed Canal followed by residential properties.
West	Vanden road followed by residential properties (Zocchi Parcel); Vanden Road followed by vegetated and unimproved land (Orr and Neukirch Parcels).

5.3.2 Surrounding Properties

Surrounding properties generally include residential to the north and west, and mixed residential and agricultural to the south and east.

6.0 INTERVIEWS

The following persons were interviewed to obtain historically and/or environmentally pertinent information regarding RECs associated with the Site.

- Kevin English, Director of Forward Planning and Land Acquisition of Discovery Builders, Inc. – *Key Site Manager* (as defined by the ASTM standard and identified by the property owner/User);
- Billy Orr, Owner of Orr Parcel with 45 years of experience at the Site; and
- Gail Glover, Owner of Neukirch Parcel with 45 years of experience at the Site.

The information provided by each is discussed and referenced in the text or provided below. Other references and sources of information are included in **Appendix E**.

7.0 FINDINGS, OPINIONS, AND CONCLUSIONS

Potential findings can include RECs, including CREC), HRECs, and *de minimis* conditions, pursuant to the ASTM E 1527-13 standard.

RECs are defined as the presence or likely presence of any *hazardous substances* or *petroleum products* in, on, or at a *property*: (1) due to any *release* to the environment; (2) under conditions indicative of a *release* to the *environment*; or (3) under conditions that pose a *material threat* of a future *release* to the *environment*.

CRECs are defined as RECs resulting from past *releases* of *hazardous substances* or *petroleum products* that have been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with *hazardous substances* or *petroleum products* allowed to remain in place subject to the implementation of required controls (e.g., *property* use restrictions, *AULs, institutional controls*, or *engineering controls*).

HRECs are defined as past *releases* of any *hazardous substances* or *petroleum products* that have occurred in connection with the *property* and have been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the *property* to any required controls (for example, *property* use restrictions, *AULs, institutional controls*, or *engineering controls*).

De minimis conditions are defined as conditions that generally do not present a threat to human health or the *environment* and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis conditions* are not RECs nor CRECs.

TRC has performed a Phase I ESA in conformance with the scope and limitations of ASTM E 1527-13 at the Orr, Neukirch, and Zocchi property located along Vanden Road in Vacaville, California (Site), see **Appendices F** and **G**. Deviations from this standard are described in Sections 1.3 and 7.6 of this report.

7.1 Findings and Opinions

The following observations were noted during the preparation of this report. None of these observations are considered to be a REC.

Observation No. 1

Miscellaneous gasoline, automotive oil, paint, cleaning chemicals, and automotive repair chemicals stored in containers less than five gallons stored in the garage and barn of the Orr Parcel and the garage and shop of the Neukirch Parcel. No spills or mismanagement of these materials were noted.

Observation No. 2

One pole-mounted transformer was observed on the Orr Parcel. Markings indicating whether the transformer fluids main contain polychlorinated bi-phenols were not evident. This transformer appears to be utility owned (PG&E).

Observation No. 3

One mound of fill material was observed in the southeastern corner of the Neukirch Parcel. The source of this fill is unknown.

Observation No. 4

Active drinking water wells are located on the Orr and Neukirch Parcels. In addition, there is an abandoned drinking water well located on the Orr Parcel. These wells would need to be properly abandoned under permit if no longer being utilized.

Observation No. 5

Active septic systems are present on the Orr and Neukirch Parcels. These systems would need to be properly abandoned under permit if no longer being utilized.

7.2 RECs and CRECs

This assessment has revealed no evidence of RECs (including CRECs) in connection with the Site.

7.3 HRECs

This assessment has revealed no evidence of HRECs in connection with the Site.

7.4 *De Minimis* Conditions

This assessment has revealed no evidence of *de minimis* conditions in connection with the Site.

7.5 Data Gaps

TRC has made an appropriate inquiry into the commonly known and reasonably ascertainable resources concerning the historic ownership and use of the Site back to the first development per 40 CFR Part 312.24 (*Reviews of Historical Sources of Information*). No data gaps were identified as a result of this assessment.

7.6 Limiting Conditions and Deviations

7.6.1 Accuracy and Completeness

The ASTM E 1527-13 standard recognizes inherent limitations for Phase I ESAs that apply to this report, including:

- Uncertainty Not Eliminated – No Phase I ESA can wholly eliminate uncertainty regarding the potential for RECs in connection with a property. Data gaps identified during this Phase I ESA are listed in Section 7.4.

- Not Exhaustive – A Phase I ESA is not an exhaustive investigation.

- Past Uses of the Property – A review of standard historical sources at intervals less than 5 years is not required.

The Client is advised that the Phase I ESA conducted at the Site is a limited inquiry into a property's environmental status, cannot wholly eliminate uncertainty, and is not an exhaustive assessment to discover every potential source of environmental liability at the Site. Therefore, TRC does not make a statement i) of warranty or guarantee, express or implied for any specific use; ii) that the Site is free of RECs or environmental impairment; iii) that the Site is "clean;" or iv) that impairments, if any, are limited to those that were discovered while TRC was performing the Phase I ESA. This limiting statement is not meant to compromise the findings of this report; rather, it is meant as a statement of limitations within the ASTM standard and intended scope of this assessment. Specific limiting conditions identified during the Site reconnaissance are described in Section 5.1. Subsurface conditions may differ from the conditions implied by surface observations and can be evaluated more thoroughly through intrusive techniques that are beyond the scope of this assessment. Information in this report is not intended to be used as a construction document and should not be used for demolition, renovation, or other construction purposes.

This report presents TRC's Site reconnaissance observations, findings, and conclusions as they existed at the time of the Site reconnaissance. TRC makes no representation or warranty that the past or current operations at the property are or have been in compliance with applicable federal, state, and local laws, regulations, and codes. TRC makes no guarantees as to the accuracy or completeness of information obtained from others during the course of this Phase I ESA report. It is possible that information exists beyond the scope of this assessment, or that information was not provided to TRC. Additional information subsequently provided, discovered, or produced may alter findings or conclusions made in this Phase I ESA report. TRC is under no obligation to update this report to reflect such subsequent information. The findings presented in this report are based upon reasonably ascertainable information and observed Site conditions at the time of the assessment.

This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not assessed. Regardless of the findings stated in this report, TRC is not responsible for consequences or conditions arising from facts that were not fully disclosed to TRC during the assessment.

An independent data research company provided the government agency database referenced in this report. Information regarding surrounding area properties was requested for approximate minimum search distances and was assumed to be correct and complete unless obviously contradicted by TRC's observations or other credible referenced sources reviewed during the assessment.

TRC is not a professional title insurance or land surveyor firm and makes no guarantee, explicit or implied, that any land title records acquired or reviewed, or any physical descriptions or

depictions of the property in this report, represent a comprehensive definition or precise delineation of property ownership or boundaries.

7.6.2 Warranties and Representations

This report does not warrant against: (1) operations or conditions which were not evident from visual observations or historical information provided; (2) conditions which could only be determined by physical sampling or other intrusive investigation techniques; (3) locations other than the client-provided addresses and/or legal parcel description; or (4) information regarding off-Site location(s) (with possible impact to the Site) not published in publicly available records.

7.6.3 Continued Validity/User Reliance

This report is presumed to be valid, in accordance with, and subject to, the limitations specified in the ASTM E 1527-13 standard, for a period of 180 days from completion, or until the Client obtains specific information that may materially alter a finding, opinion, or conclusion in this report, or until the Client is notified by TRC that it has obtained specific information that may materially alter a finding, opinion, or conclusion in this report. Additionally, pursuant to the ASTM E 1527-13 standard, this report is presumed valid if completed less than 180 days prior to the date of acquisition of the property or (for transactions not involving an acquisition) the date of the intended transaction.

7.6.4 Significant Assumptions

During this Phase I ESA, TRC relied on database information; interviews with Site representatives, regulatory officials, and other individuals having knowledge of Site operations; and information provided by the User as requested in our authorized Scope of Work. TRC has assumed that the information provided is true and accurate. Reliance on electronic database search reports is subject to the limitations set forth in those reports. TRC did not independently verify the information provided. TRC found no reason to question the validity of the information received unless explicitly noted elsewhere in this report. If other information is discovered and/or if previous reports exist that were not provided to TRC, our conclusions may not be valid.

8.0 REFERENCES

Table 8.1 - Reference Information

Description/Title of Document(s) Received or Agency Contacted	Date Information Request Filled/Date of Agency Contact	Information Updated	Reference Source
Regulatory database search and historical sources source discussed herein	October 1 - 6, 2021	N/A	EDR Inquiry Number: 6686888
Interview with Kevin English, Discovery	October 19, 2021	N/A	N/A
Interview with Billy Orr, Parcel Owner	October 19, 2021	N/A	N/A
Interview with Gail Glover, Parcel Owner	October 19, 2021	N/A	N/A
Provided prior environmental reports as discussed in Section 4.4	October 29, 2021	N/A	N/A

9.0 NON-SCOPE ITEMS

This Phase I ESA report was limited to those items in the ASTM E1527-13 standard. No ASTM E1527-13 non-scope services were performed as part of this Phase I ESA.

Appendix A:
Database Radius Report

Appendix B:
User Questionnaire

Appendix C:
Historical Research Documentation

Appendix D:
Photograph Log

Appendix E:
Other Reference Information

Appendix F:
TRC Staff and Environmental Professional Qualifications/Resumes

Appendix G:
Environmental Professional Statement

DEFINITION OF ENVIRONMENTAL PROFESSIONAL AND RELEVANT EXPERIENCE THERETO PURSUANT TO 40 CFR 312

(1) a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding conditions indicative of releases or threatened releases (see §312.1[c]) on, at, in, or to a property, sufficient to meet the objectives and performance factors in §312.20(e) and (f).

(2) Such a person must: (i) hold a current Professional Engineer's or Professional Geologist's license or registration from a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) and have the equivalent of 3 years of full-time relevant experience; or (ii) be licensed or certified by the federal government, a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) to perform environmental inquiries as defined in §312.21 and have the equivalent of 3 years of full-time relevant experience; or (iii) have a Baccalaureate or higher degree from an accredited institution of higher education in a discipline of engineering or science and the equivalent of 5 years of full-time relevant experience; or (iv) have the equivalent of 10 years of full-time relevant experience.

(3) An environmental professional should remain current in his or her field through participation in continuing education or other activities.

(4) The definition of environmental professional provided above does not preempt state professional licensing or registration requirements such as those for a professional geologist, engineer, or site remediation professional. Before commencing work, a person should determine the applicability of state professional licensing or registration laws to the activities to be undertaken as part of the inquiry identified in §312.21(b).

(5) A person who does not qualify as an environmental professional under the foregoing definition may assist in the conduct of all appropriate inquiries in accordance with this part if such person is under the supervision or responsible charge of a person meeting the definition of an environmental professional provided above when conducting such activities.

Relevant experience, as used in the definition of environmental professional in this section, means: participation in the performance of all appropriate inquiries investigations, environmental site assessments, or other site investigations that may include environmental analyses, investigations, and remediation which involve the understanding of surface and subsurface environmental conditions and the processes used to evaluate these conditions and for which professional judgment was used to develop opinions regarding conditions indicative of releases or threatened releases (see §312.1[c]) to the Site. TRC personnel resume(s) are included in **Appendix F**.

I declare that, to the best of my professional knowledge and belief, I meet the definition of environmental professional as defined in §312.10 of 40 CFR 312.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Signature of Environmental Professional: _____ Date: _____

APPENDIX F

NOISE AND VIBRATION ASSESSMENT

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Environmental Noise and Vibration Assessment

Vanden Estates Residential

City of Vacaville, California

July 27, 2022

Project #210912

Prepared for:

Discovery Builders Inc.
4021 Port Chicago Highway
Concord, CA 94520

Prepared by:

Saxelby Acoustics LLC

Luke Saxelby, INCE Bd. Cert.
Principal Consultant
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INTRODUCTION

The Vanden Estates project consists of the development of a 114-lot single-family subdivision on a previously vacant parcel. The project is located north of Redstone Parkway and east of Vanden Road in the City of Vacaville, California.

Figure 1 shows the project site plan. **Figure 2** shows an aerial photo of the project site.

ENVIRONMENTAL SETTING

BACKGROUND INFORMATION ON NOISE

Fundamentals of Acoustics

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range.

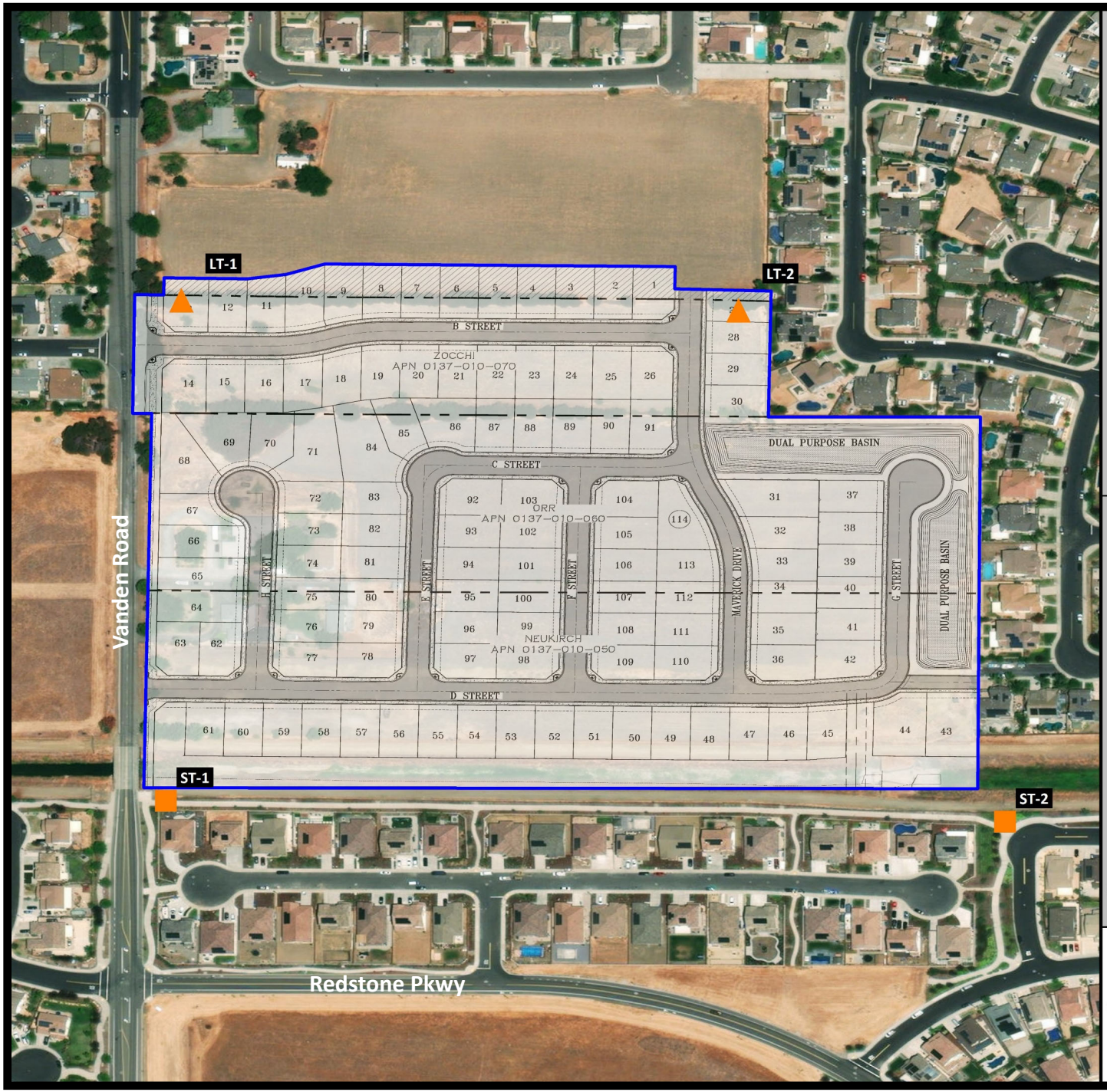
The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment.

Vanden Estates Residential

City of Vacaville, California

Figure 1

Project Site Plan



Vanden Estates Residential

City of Vacaville, California

Figure 2

Noise Measurement Sites

Legend

- Project Site
- Noise Measurement Site - Long Term
- Noise Measurement Site - Short Term

0 m 50 m 100 m 150 m

Projection: Geographic (Latitude/Longitude) / WGS84 / arc degrees
Rev. Date: 07/22/2022

SAXELBY ACOUSTICS
Acoustics · Noise · Vibration

The decibel scale is logarithmic, not linear. In other words, two sound levels 10-dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10-dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A-weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (DNL or L_{dn}) is based upon the average noise level over a 24-hour day, with a +10-decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 lists several examples of the noise levels associated with common situations. **Appendix A** provides a summary of acoustical terms used in this report.

TABLE 1: TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft.)	--100--	
Gas Lawn Mower at 1 m (3 ft.)	--90--	
Diesel Truck at 15 m (50 ft.), at 80 km/hr. (50 mph)	--80--	Food Blender at 1 m (3 ft.) Garbage Disposal at 1 m (3 ft.)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft.)	--70--	Vacuum Cleaner at 3 m (10 ft.)
Commercial Area Heavy Traffic at 90 m (300 ft.)	--60--	Normal Speech at 1 m (3 ft.)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source: Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. September, 2013.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1-dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- A change in level of at least 5-dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise–including stationary mobile sources such as idling vehicles–attenuate (lessen) at a rate of approximately 6-dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

EXISTING AND FUTURE NOISE AND VIBRATION ENVIRONMENTS

EXISTING NOISE RECEPTORS

Some land uses are considered more sensitive to noise than others. Land uses often associated with sensitive receptors generally include residences, schools, libraries, hospitals, and passive recreational areas. Sensitive noise receptors may also include threatened or endangered noise sensitive biological species, although many jurisdictions have not adopted noise standards for wildlife areas. Noise sensitive land uses are typically given special attention in order to achieve protection from excessive noise.

In the vicinity of the project site, sensitive land uses include existing single-family residential uses at all borders of the project site.

EXISTING GENERAL AMBIENT NOISE LEVELS

To quantify the existing ambient noise environment in the project vicinity, Saxelby Acoustics conducted continuous (24-hr.) noise level measurements at two locations on the project site and short-term noise level measurements at two locations. Noise measurement locations are shown on **Figure 2**. A summary of the noise level measurement survey results is provided in **Table 2**. **Appendix B** contains the complete results of the noise monitoring.

The sound level meters were programmed to record the maximum, median, and average noise levels at each site during the survey. The maximum value, denoted L_{max}, represents the highest noise level measured. The average value, denoted L_{eq}, represents the energy average of all of the noise received by the sound level meter microphone during the monitoring period. The median value, denoted L_{50}, represents the sound level exceeded 50 percent of the time during the monitoring period.

Larson Davis Laboratories (LDL) model 820 and 831 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with a CAL 200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

TABLE 2: SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

Location	Date	L_{dn}	Daytime L_{eq}	Daytime L_{50}	Daytime L_{max}	Nighttime L_{eq}	Nighttime L_{50}	Nighttime L_{max}
LT-1: 70 ft. to CL of Vanden Rd.	6/6/2022	59	56	48	73	52	47	68
LT-2: 960 ft. to CL of Vanden Rd.	6/6/2022	53	47	44	60	46	45	58
ST-1: 60 ft. to CL of Vanden Rd.	6/6/2022	N/A	59	50	74	N/A	N/A	N/A
ST-2: 1400 ft. to CL of Vanden Rd.	6/6/2022	N/A	43	37	68	N/A	N/A	N/A

Notes:

- *All values shown in dBA*
- *Daytime hours: 7:00 a.m. to 10:00 p.m.*
- *Nighttime Hours: 10:00 p.m. to 7:00 a.m.*
- *Source: Saxelby Acoustics 2022*

FUTURE TRAFFIC NOISE ENVIRONMENT AT OFF-SITE RECEPTORS

OFF-SITE TRAFFIC NOISE IMPACT ASSESSMENT METHODOLOGY

To assess noise impacts due to project-related traffic increases on the local roadway network, traffic noise levels are predicted at sensitive receptors for Existing and Existing Plus Project conditions.

Noise levels due to traffic are calculated using the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108). The model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site.

The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. To predict traffic noise levels in terms of L_{dn}, it is necessary to adjust the input volume to account for the day/night distribution of traffic.

Project trip generation volumes were provided by the project traffic engineer (Owens), truck usage and vehicle speeds on the local area roadways were estimated from field observations. The predicted increases in traffic noise levels on the local roadway network for Existing plus project conditions provided in terms of L_{dn}.

It should be noted that Saxelby Acoustics counted 22 light vehicles on Vanden Avenue in a 10-minute traffic count. No medium or heavy trucks were observed. However, 1% medium and 1% heavy trucks were conservatively assumed for project-area roadways.

Traffic noise levels are predicted at the sensitive receptors located at the closest typical setback distance along each project-area roadway segment. In some locations sensitive receptors may not receive full shielding from noise barriers or may be located at distances which vary from the assumed calculation distance.

Table 3 summarizes the modeled traffic noise levels at the nearest sensitive receptors along each roadway segment in the Project area. **Appendix C** provides the complete inputs and results of the FHWA traffic noise modeling.

TABLE 3: EXISTING TRAFFIC NOISE LEVELS AND PROJECT-RELATED TRAFFIC NOISE LEVEL INCREASES

Roadway	Segment	Predicted Exterior Noise Level (dBA L_{dn}) at Closest Sensitive Receptors		
		Existing No Project	Existing + Project	Change
Vanden Rd.	South of Alamo Dr.	53.0	53.5	0.5
Vanden Rd.	North of Alamo Dr.	57.9	58.4	0.5
Alamo Dr.	East of Vanden Rd.	58.2	58.3	0.1
Alamo Dr.	West of Vanden Rd.	62.9	63.0	0.1

Based upon the data in **Table 3**, the proposed project is predicted to result in an increase in a maximum traffic noise level increase of 0.5 dBA.

EVALUATION OF TRANSPORTATION NOISE ON PROJECT SITE – NOT A CEQA ISSUE

Saxelby Acoustics used the SoundPLAN noise model to calculate traffic noise levels at the proposed single-family uses due to traffic on Vanden Road. Inputs to the SoundPLAN noise model include topography, existing structures, roadways, proposed buildings, and the proposed 6-foot sound walls. Traffic noise levels were predicted for existing conditions with a +1 dBA adjustment for future conditions. The results of this analysis are shown graphically on **Figure 3**.

Vanden Estates Residential

City of Vacaville, California

Figure 3

Future Traffic Noise Levels (dBA L_{dn})

Signs and symbols

6-Foot Wall

Proposed Building

Levels in dB(A)

<= 60
60 - 61
61 - 62
62 - 63
63 - 64
64 - 65
> 65

1 : 2400

0 12.5 25 50 75 100 m

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Acoustics · Noise · Vibration

TYPICAL CONSTRUCTION NOISE LEVELS

During the construction of the proposed project, including roads, water and sewer lines, and related infrastructure, noise from construction activities would temporarily add to the noise environment in the project vicinity. As shown in **Table 4**, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet.

TABLE 4: CONSTRUCTION EQUIPMENT NOISE

Type of Equipment	Maximum Level, dBA at 50 feet
Auger Drill Rig	84
Backhoe	78
Compactor	83
Compressor (air)	78
Concrete Saw	90
Dozer	82
Dump Truck	76
Excavator	81
Generator	81
Jackhammer	89
Pneumatic Tools	85

Source: *Roadway Construction Noise Model User's Guide*. Federal Highway Administration. FHWA-HEP-05-054. January 2006.

TYPICAL CONSTRUCTION VIBRATION LEVELS

The primary vibration-generating activities associated with the proposed project would occur during construction when activities such as grading, utilities placement, and road construction occur. **Table 5** shows the typical vibration levels produced by construction equipment.

TABLE 5: VIBRATION LEVELS FOR VARIOUS CONSTRUCTION EQUIPMENT

Type of Equipment	Peak Particle Velocity at 15 feet (inches/second)	Peak Particle Velocity at 25 feet (inches/second)	Peak Particle Velocity at 50 feet (inches/second)
Large Bulldozer	0.191	0.089	0.031
Loaded Trucks	0.164	0.076	0.027
Small Bulldozer	0.006	0.003	0.001
Auger/drill Rigs	0.191	0.089	0.031
Jackhammer	0.075	0.035	0.012
Vibratory Hammer	0.151	0.070	0.025
Vibratory Compactor/roller	0.452	0.210 (Less than 0.20 at 26 feet)	0.074

Source: *Transit Noise and Vibration Impact Assessment Guidelines.* Federal Transit Administration. May 2006.

REGULATORY CONTEXT

FEDERAL

There are no federal regulations related to noise that apply to the Proposed Project.

STATE

There are no state regulations related to noise that apply to the Proposed Project.

LOCAL

City of Vacaville General Plan

Exterior and interior noise standards for residential land uses are established within the City of Vacaville General Plan Noise Element. Policies contained in the Noise Element applicable to the proposed project include:

Goals

Goal NOI-1 Maintain an acceptable noise environment in all areas of the city.

Goal NOI-2 Protect noise-sensitive uses from excessive noise.

Policies

Policy NOI-P1.1 Require an acoustical analysis for all proposed projects that would locate noise sensitive land uses where the projected ambient noise level is greater than the respective "normally acceptable" noise level as indicated on Table NOI-3 (**Table 6** below), and require mitigation of noise impacts that exceed the land use compatibility standards.

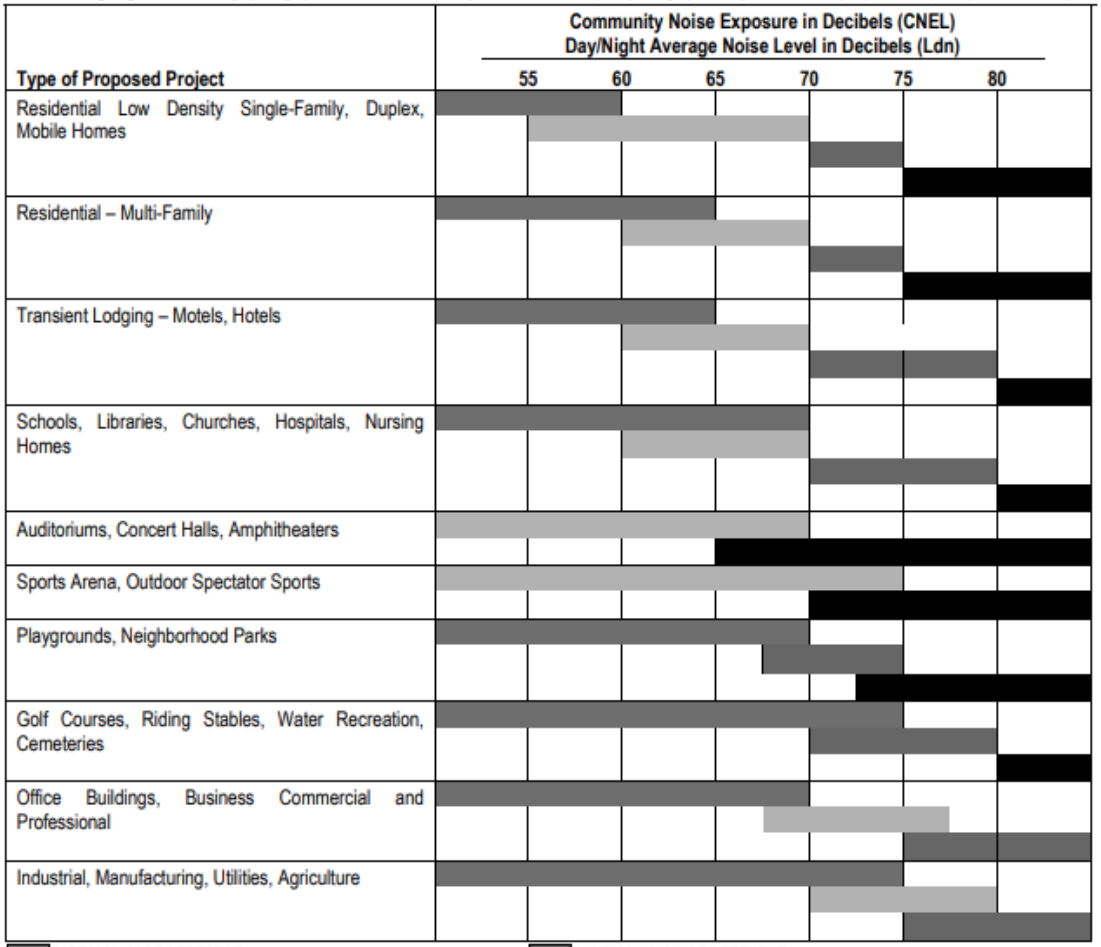
Policy NOI-P1.2 Require that noise created by new transportation and non-transportation noise sources be mitigated, to the extent that it is technically and economically feasible, to comply with the noise level standards of Table NOI-3 (**Table 6**).

Policy NOI-P2.5 Encourage the use of open space, earthen berms, parking, accessory buildings, and landscaping to buffer new and existing development from noise. Use sound walls only when other methods are not practical or when recommended by an acoustical expert as part of a mitigation program.

Policy NOI-P2.6 Require that the effects of sound walls on noise levels in surrounding areas be considered and taken into account in the design, location, and construction of sound walls.

TABLE 6: Land Use Compatibility Chart (Table NOI-3 of the Vacaville General Plan)

TABLE NOI-3 **LAND USE COMPATIBILITY STANDARDS FOR COMMUNITY NOISE ENVIRONMENTS**



Note: This table provides land use compatibility standards for all noise sources. While the prior General Plan established different standards for different noise sources, it has since become common practice to establish one set of land use compatibility standards for all noise sources because it is often difficult to definitively determine which portion of ambient noise levels are attributable to a particular noise source.
Source: State of California General Plan Guidelines, 2003.

City of Vacaville Land Use and Development Code

Table 14.09.127.03 of the code establishes an outdoor noise level standard of 60 dBA Ldn and an interior standard of 45 dBA Ldn.

Section 14.09.127.090 establishes allowable construction hours as outlined below:

> *A. No construction or grading equipment shall be operated nor any outdoor construction or repair work shall be permitted within 500 feet from any occupied residence between dusk (one-half hour after sunset) and seven a.m. Monday through Saturday, and no such grading or construction activities shall be allowed on Sundays or holidays except as provided for herein:*
>
> *1. Interior work which would not create noise or disturbance noticeable to a reasonable person of normal sensitivity in the surrounding neighborhood shall not be subject to these restrictions;*
>
> *2. Construction or repair work performed by or under the direction of a homeowner at his or her residence is exempt from these restrictions on Sundays and holidays, but such construction or repair work shall be limited to the hours between eight a.m. and dusk.*
>
> *B. A request for an exception to the permitted construction hours and days may be granted by the Director for emergency work, to offset project delays due to inclement weather, for 24-hour construction projects, or other similar occurrences.*
>
> *C. City projects undertaken by or on behalf of the City's Public Works Department shall be exempt from these provisions.*
>
> *(Ord. 1751, Amended, 07/26/2005)*

Criteria for Acceptable Vibration

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception of the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities (p.p.v.) in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. **Table 7**, which was developed by Caltrans, shows the vibration levels which would normally be required to result in damage to structures. The vibration levels are presented in terms of peak particle velocity in inches per second.

Table 7 indicates that the threshold for architectural damage to structures is 0.20 in/sec p.p.v. A threshold of 0.2 in/sec p.p.v. is considered to be a reasonable threshold for short-term construction projects.

TABLE 7: EFFECTS OF VIBRATION ON PEOPLE AND BUILDINGS

Peak Particle Velocity		Human Reaction	Effect on Buildings
mm/second	in/second		
0.15-0.30	0.006-0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10-15	0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage

Source: *Transportation Related Earthborne Vibrations.* Caltrans. TAV-02-01-R9601. February 20, 2002.

THRESHOLDS OF SIGNIFICANCE

Appendix G of the CEQA Guidelines states that a project would normally be considered to result in significant noise impacts if noise levels conflict with adopted environmental standards or plans, or if noise generated by the project would substantially increase existing noise levels at sensitive receivers on a permanent or temporary basis. Significance criteria for noise impacts are drawn from CEQA Guidelines Appendix G (Items XI [a-f]).

Would the project:

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

b. Generate 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?

NOISE LEVEL INCREASE CRITERIA FOR LONG-TERM PROJECT-RELATED NOISE LEVEL INCREASES

The California Environmental Quality Act (CEQA) guidelines define a significant impact of a project if it "increases substantially the ambient noise levels for adjoining areas." Generally, a project may have a significant effect on the environment if it will substantially increase the ambient noise levels for adjoining areas or expose people to severe noise levels. In practice, more specific professional standards have been developed. These standards state that a noise impact may be considered significant if it would generate noise that would conflict with local project criteria or ordinances, or substantially increase noise levels at noise sensitive land uses. The potential increase in traffic noise from the project is a factor in determining significance. Research into the human perception of changes in sound level indicates the following:

- A 3 dB change is barely perceptible,
- A 5 dB change is clearly perceptible, and
- A 10 dB change is perceived as being twice or half as loud.

A limitation of using a single noise level increase value to evaluate noise impacts is that it fails to account for pre-project-noise conditions. **Table 8** is based upon recommendations made by the Federal Interagency Committee on Noise (FICON) to provide guidance in the assessment of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it is widely accepted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the L_{dn}.

TABLE 8: SIGNIFICANCE OF CHANGES IN NOISE EXPOSURE

Ambient Noise Level Without Project, Ldn	Increase Required for Significant Impact
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Source: Federal Interagency Committee on Noise (FICON)

Based on the **Table 8** data, an increase in the traffic noise level of 5 dB or more would be significant where the pre-project noise levels are less than 60 dB Ldn, or 3 dB or more where existing noise levels are between 60 to 65 dB Ldn. Extending this concept to higher noise levels, an increase in the traffic noise level of 1.5 dB or more may be significant where the pre-project traffic noise level exceeds 65 dB Ldn. The rationale for the **Table 8** criteria is that, as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause annoyance.

NOISE LEVEL CRITERIA FOR SHORT-TERM CONSTRUCTION-RELATED NOISE LEVEL INCREASES

The Federal Transit Administration (FTA) suggests a residential noise limit of 90 dBA Leq for construction noise. This limit will be applied to the proposed project.

PROJECT-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT 1: WOULD THE PROJECT GENERATE A SUBSTANTIAL TEMPORARY OR PERMANENT INCREASE IN AMBIENT NOISE LEVELS IN THE VICINITY OF THE PROJECT IN EXCESS OF STANDARDS ESTABLISHED IN THE LOCAL GENERAL PLAN OR NOISE ORDINANCE, OR APPLICABLE STANDARDS OF OTHER AGENCIES?

Traffic Noise Increases

As discussed, the substantial increase criteria range between +1.5 dBA to +5 dBA, depending on the existing noise levels. Under the proposed project, the maximum increase in traffic noise at the nearest sensitive receptor is predicted to be 0.5 dBA as shown in **Table 3**.

Operational Noise Increases

The proposed project would include typical residential noise which would be compatible with the existing adjacent residential uses.

Construction Noise

During the construction phases of the project, noise from construction activities would add to the noise environment in the immediate project vicinity. As indicated in **Table 4**, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dBA L_{max} at a distance of 50 feet. The majority of construction activity would occur at an average distance of 50 feet, or more, from the nearest sensitive receptors. Assuming that the worst-case noise level of 90 dBA L_{max} at 50 feet were to occur for a full hour, the hourly noise level would be 90 dBA L_{eq}. While this level is quite high, it complies with the FTA 90 dBA L_{eq} limit for residential noise exposure from construction activity and would be unlikely to occur at this level and at the same location for a long duration. It should also be noted that construction could occur at distances as close as approximately 25 feet, resulting in maximum (L_{max}) noise levels of up to 96 dBA L_{max}. However, it is not expected that this would be of long duration. Therefore, the predicted maximum average (L_{eq}) noise level is 90 dBA L_{eq}, as noted above.

Construction noise associated with streets would be similar to noise that would be associated with public works projects, such as a roadway widening or paving projects. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours.

Noise would also be generated during the construction phase by increased truck traffic on area roadways. A project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from the construction site. This noise increase would be of short duration and would likely occur primarily during daytime hours.

Transportation Noise on Project Site (Non-CEQA Issue)

Exterior Transportation Noise

Compliance with City standards on new noise-sensitive receptors is not a CEQA consideration. However, this information is provided here so that a determination can be made regarding the ability of the proposed project to meet the requirements of the City of Vacaville for exterior and interior noise levels at new sensitive uses proposed under the project.

As shown on Figure 3, the project site is predicted to be exposed to exterior noise levels up to approximately 58 dBA Ldn at the outdoor activity areas of the proposed uses. This would comply with the City of Vacaville noise level standard of 60 dBA Ldn.

Interior Noise

As illustrated on Figure 3, exterior noise levels at the proposed residential facades are not predicted to exceed 65 dBA Ldn. Modern building construction methods typically yield an exterior-to-interior noise level reduction of 25 dBA. Therefore, where exterior noise levels are 70 dBA Ldn, or less, no additional interior noise control measures are typically required. For this project, exterior noise levels are predicted to be less than 65 dBA Ldn, resulting in an interior noise level of less than 40 dBA Ldn based on typical building

construction. These levels will comply with the City of Vacaville interior noise level standard of 45 dBA. No additional noise control measures would be required.

Regulatory Compliance Measure(s)

1(a) No construction or grading equipment shall be operated nor any outdoor construction or repair work shall be permitted within 500 feet from any occupied residence between dusk (one-half hour after sunset) and seven a.m. Monday through Saturday, and no such grading or construction activities shall be allowed on Sundays or holidays except as provided for herein:

1. Interior work which would not create noise or disturbance noticeable to a reasonable person of normal sensitivity in the surrounding neighborhood shall not be subject to these restrictions;

2. Construction or repair work performed by or under the direction of a homeowner at his or her residence is exempt from these restrictions on Sundays and holidays, but such construction or repair work shall be limited to the hours between eight a.m. and dusk.

1(b) The project contractor shall ensure that the following construction noise BMPs are met on-site during all phases of construction:

- *All equipment driven by internal combustion engines shall be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specifications. Mobile or fixed "package" equipment (e.g., arc welders, air compressors) shall be equipped with shrouds and noise- control features that are readily available for that type of equipment.*
- *All mobile or fixed noise-producing equipment used on the project site that are regulated for noise output by a federal, state, or local agency shall comply with such regulations while in the course of project activity.*
- *The construction contractor shall utilize "quiet" models of air compressors and other stationary noise sources where technology exists.*
- *At all times during project grading and construction, stationary noise-generating equipment shall be located as far as practicable from sensitive receptors and placed so that emitted noise is directed away from residences.*
- *Unnecessary idling of internal combustion engines shall be prohibited.*
- *Construction staging areas shall be established at locations that would create the greatest distance between the construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction activities, to the extent feasible.*

- *Construction site and access road speed limits shall be established and enforced during the construction period.*
- *The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only.*
- *Neighbors located adjacent to the construction site shall be notified of the construction schedule in writing.*
- *The construction contractor shall designate a "noise disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator shall be responsible for determining the cause of the noise complaint (e.g., starting too early, poor muffler, etc.) and instituting reasonable measures as warranted to correct the problem. A telephone number for the disturbance coordinator shall be conspicuously posted at the construction site.*

Construction noise BMPs shall be included in the grading plan submitted by the developer for review and approval by the Community Development Director prior to grading permit issuance.

IMPACT 2: WOULD THE PROJECT GENERATE EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS?

Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural.

With the exception of vibratory compactors, the **Table 5** data indicate that construction vibration levels anticipated for the project are less than the 0.2 in/sec threshold at distance of 15 feet or more. However, the proposed project includes road, detention basin, and building construction which could occur at distances of approximately 10 feet from the adjacent single-family residential uses. Therefore, use of bulldozers, loaded trucks, auger/drill rigs, and vibratory hammers at distances of less than 15 feet of the adjacent residential buildings could cause vibrations in excess of 0.2 in/sec. Use of vibratory compactors at distances of less than 26 feet may also exceed the 0.2 in/sec. standard.

Regulatory Compliance Measure(s)

2(a): Any compaction required less than 26 feet from the adjacent residential structures to the south should be accomplished by using static drum rollers which use weight instead of vibrations to achieve soil compaction. As an alternative to this requirement, pre-construction crack documentation and construction vibration monitoring could be conducted to ensure that construction vibrations do not cause damage to any adjacent structures.

2(b): Use of bulldozers, loaded trucks, auger/drill rigs, and vibratory hammers shall occur at distances of 15 feet or greater from adjacent residential structures.

IMPACT 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?**

There are no airports within two miles of the project site. Therefore, this impact is not applicable to the proposed project.

REFERENCES

American National Standards Institute. (1998). *[Standard] ANSI S1.43-1997 (R2007): Specifications for integrating-averaging sound level meters*. New York: Acoustical Society of America.

American Standard Testing Methods, *Standard Guide for Measurement of Outdoor A-Weighted Sound Levels, American Standard Testing Methods (ASTM) E1014-08*, 2008.

ASTM E1014-12. *Standard Guide for Measurement of Outdoor A-Weighted Sound Levels*. ASTM International. West Conshohocken, PA. 2012.

ASTM E1780-12. *Standard Guide for Measuring Outdoor Sound Received from a Nearby Fixed Source.* ASTM International. West Conshohocken, PA. 2012.

Barry, T M. (1978). *FHWA highway traffic noise prediction model* (FHWA-RD-77-108). Washington, DC: U.S. Department of transportation, Federal highway administration, Office of research, Office of environmental policy.

California Department of Transportation (Caltrans), *Technical Noise Supplement, Traffic Noise Analysis Protocol*, September 2013.

Egan, M. D. (1988). Architectural acoustics. United States of America: McGraw-Hill Book Company.

Federal Highway Administration. *FHWA Roadway Construction Noise Model User's Guide.* FHWA-HEP-05-054 DOT-VNTSC-FHWA-05-01. January 2006.

Federal Transit Administration. *Transit Noise and Vibration Impact Assessment Manual*. September 2018.

Hanson, Carl E. (Carl Elmer). (2006). *Transit noise and vibration impact assessment*. Washington, DC: U.S. Department of Transportation, Federal Transit Administration, Office of Planning and Environment.

International Electrotechnical Commission. Technical committee 29: Electroacoustics. International Organization of Legal Metrology. (2013). *Electroacoustics: Sound level meters*.

International Organization for Standardization. (1996). *Acoustic - ISO 9613-2: Attenuation of sound during propagation outdoors. Part 2: General methods of calculation*. Ginevra: I.S.O.

Miller, L. N., Bolt, Beranek, & and Newman, Inc. (1981). *Noise control for buildings and manufacturing plants*. Cambridge, MA: Bolt, Beranek and Newman, Inc.

Owens, Glen. City of Vacaville Traffic Engineer. Personal email to Luke Saxelby. June 1, 2022.

SoundPLAN. SoundPLAN GmbH. Backnang, Germany. http://www.soundplan.eu/english/

Appendix A: Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
ASTC	Apparent Sound Transmission Class. Similar to STC but includes sound from flanking paths and correct for room reverberation. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by +5 dBA and nighttime hours weighted by +10 dBA.
DNL	See definition of Ldn.
IIC	Impact Insulation Class. An integer-number rating of how well a building floor attenuates impact sounds, such as footsteps. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
L(n)	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one-hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
NIC	Noise Isolation Class. A rating of the noise reduction between two spaces. Similar to STC but includes sound from flanking paths and no correction for room reverberation.
NNIC	Normalized Noise Isolation Class. Similar to NIC but includes a correction for room reverberation.
Noise	Unwanted sound.
NRC	Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.
RT60	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.
SEL	Sound Exposure Level. SEL is a rating, in decibels, of a discrete event, such as an aircraft flyover or train pass by, that compresses the total sound energy into a one-second event.
SPC	Speech Privacy Class. SPC is a method of rating speech privacy in buildings. It is designed to measure the degree of speech privacy provided by a closed room, indicating the degree to which conversations occurring within are kept private from listeners outside the room.
STC	Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations. The STC rating is typically used to rate the sound transmission of a specific building element when tested in laboratory conditions where flanking paths around the assembly don't exist. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

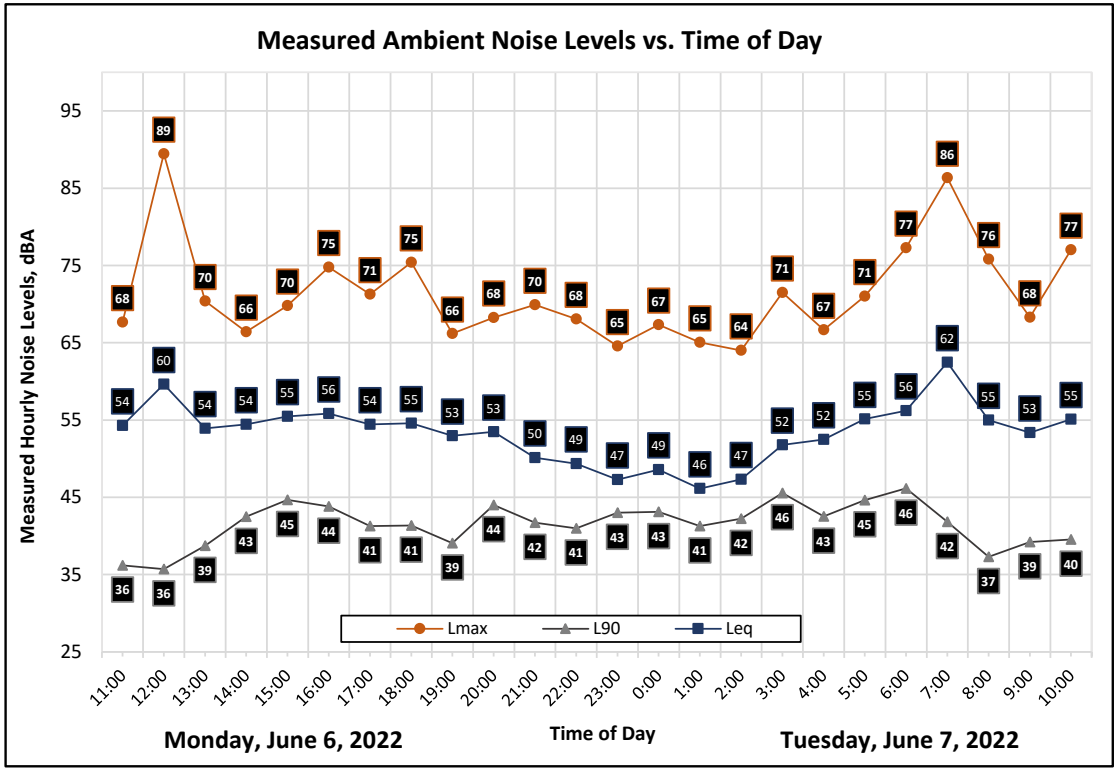
Appendix B: Continuous Ambient Noise Measurement Results

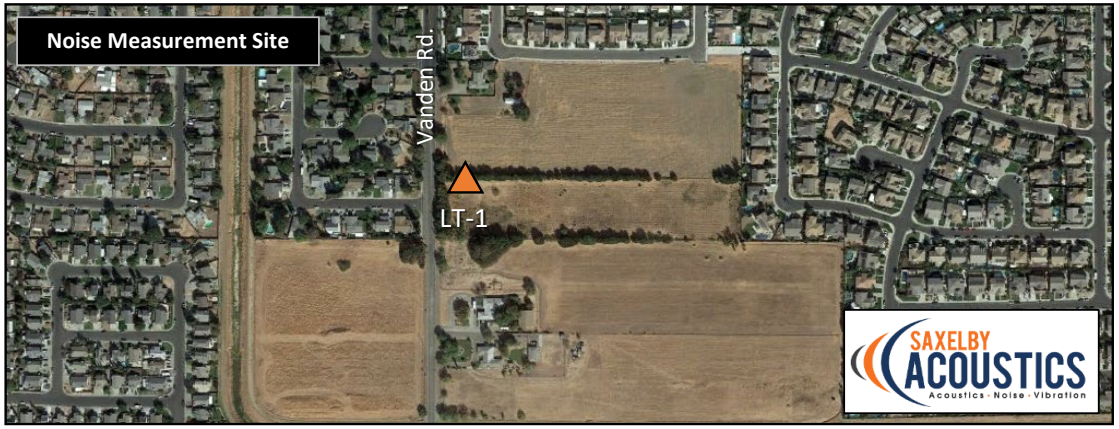
Appendix B1: Continuous Noise Monitoring Results

Site: LT-1
Project: Vanden Estates
Location: Western Project Boundary
Coordinates: 38.3323151°, -121.9427598°
Meter: LDL 820-9
Calibrator: CAL200

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Monday, June 6, 2022	11:00	54	68	47	36
Monday, June 6, 2022	12:00	60	89	47	36
Monday, June 6, 2022	13:00	54	70	48	39
Monday, June 6, 2022	14:00	54	66	51	43
Monday, June 6, 2022	15:00	55	70	52	45
Monday, June 6, 2022	16:00	56	75	52	44
Monday, June 6, 2022	17:00	54	71	49	41
Monday, June 6, 2022	18:00	55	75	49	41
Monday, June 6, 2022	19:00	53	66	47	39
Monday, June 6, 2022	20:00	53	68	48	44
Monday, June 6, 2022	21:00	50	70	45	42
Monday, June 6, 2022	22:00	49	68	46	41
Monday, June 6, 2022	23:00	47	65	45	43
Tuesday, June 7, 2022	0:00	49	67	45	43
Tuesday, June 7, 2022	1:00	46	65	44	41
Tuesday, June 7, 2022	2:00	47	64	46	42
Tuesday, June 7, 2022	3:00	52	71	48	46
Tuesday, June 7, 2022	4:00	52	67	47	43
Tuesday, June 7, 2022	5:00	55	71	50	45
Tuesday, June 7, 2022	6:00	56	77	51	46
Tuesday, June 7, 2022	7:00	62	86	50	42
Tuesday, June 7, 2022	8:00	55	76	47	37
Tuesday, June 7, 2022	9:00	53	68	47	39
Tuesday, June 7, 2022	10:00	55	77	48	40

Statistics	Leq	Lmax	L50	L90
Day Average	56	73	48	40
Night Average	52	68	47	43
Day Low	50	66	45	36
Day High	62	89	52	45
Night Low	46	64	44	41
Night High	56	77	51	46
Ldn	59	Day %		82
CNEL	59	Night %		18



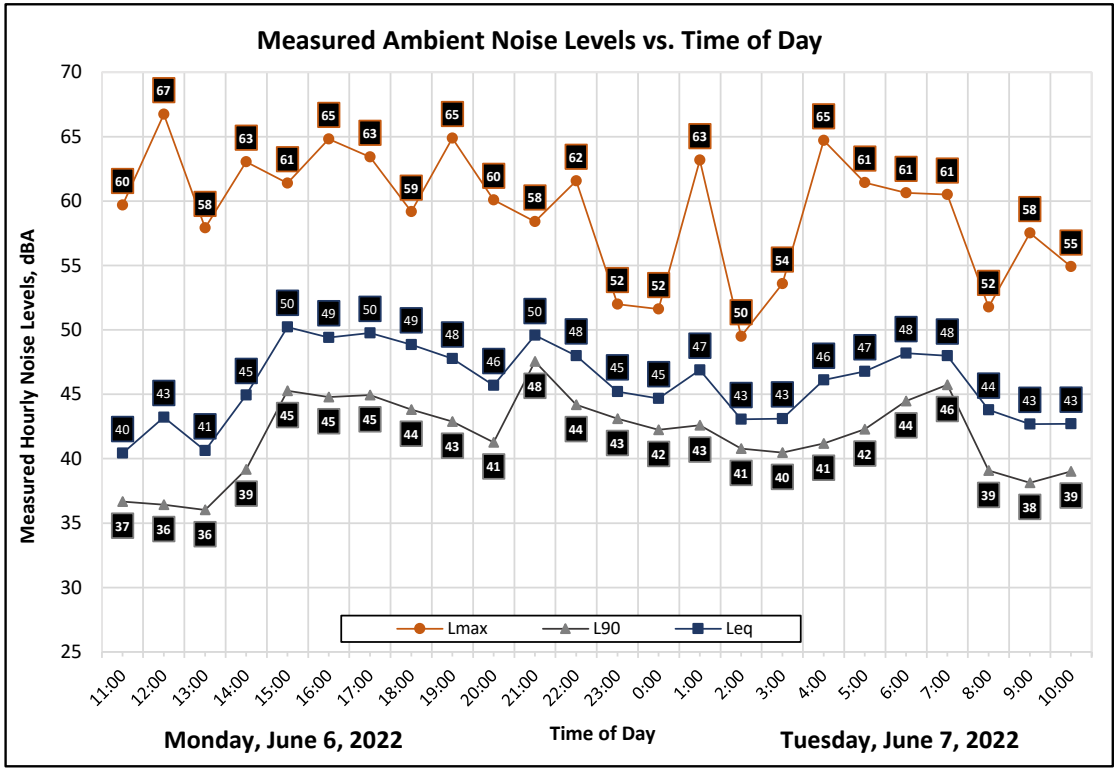


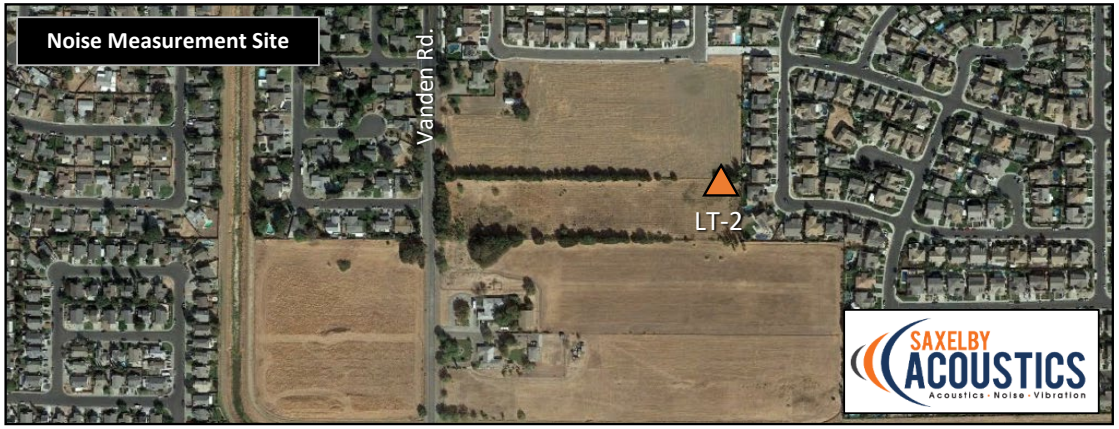
Appendix B2: Continuous Noise Monitoring Results

Site: LT-2
Project: Vanden Estates
Meter: LDL 820-3
Location: Eastern Project Boundary
Calibrator: CAL200
Coordinates: 38.3322619°, -121.9397510°

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Monday, June 6, 2022	11:00	40	60	39	37
Monday, June 6, 2022	12:00	43	67	38	36
Monday, June 6, 2022	13:00	41	58	38	36
Monday, June 6, 2022	14:00	45	63	42	39
Monday, June 6, 2022	15:00	50	61	49	45
Monday, June 6, 2022	16:00	49	65	48	45
Monday, June 6, 2022	17:00	50	63	48	45
Monday, June 6, 2022	18:00	49	59	48	44
Monday, June 6, 2022	19:00	48	65	46	43
Monday, June 6, 2022	20:00	46	60	45	41
Monday, June 6, 2022	21:00	50	58	49	48
Monday, June 6, 2022	22:00	48	62	48	44
Monday, June 6, 2022	23:00	45	52	45	43
Tuesday, June 7, 2022	0:00	45	52	44	42
Tuesday, June 7, 2022	1:00	47	63	45	43
Tuesday, June 7, 2022	2:00	43	50	43	41
Tuesday, June 7, 2022	3:00	43	54	42	40
Tuesday, June 7, 2022	4:00	46	65	43	41
Tuesday, June 7, 2022	5:00	47	61	44	42
Tuesday, June 7, 2022	6:00	48	61	47	44
Tuesday, June 7, 2022	7:00	48	61	47	46
Tuesday, June 7, 2022	8:00	44	52	43	39
Tuesday, June 7, 2022	9:00	43	58	41	38
Tuesday, June 7, 2022	10:00	43	55	42	39

Statistics	Leq	Lmax	L50	L90
Day Average	47	60	44	41
Night Average	46	58	45	42
Day Low	40	52	38	36
Day High	50	67	49	48
Night Low	43	50	42	40
Night High	48	65	48	44
Ldn	53	Day %		67
CNEL	53	Night %		33





Appendix B1 : Short Term Noise Monitoring Results

Site: ST-1
Project: Vanden Cove Estates
Location: South-West of the Project
Coordinates: 38.3296211°, -121.9428432°
Meter: LDL 831-3
Calibrator: CAL200

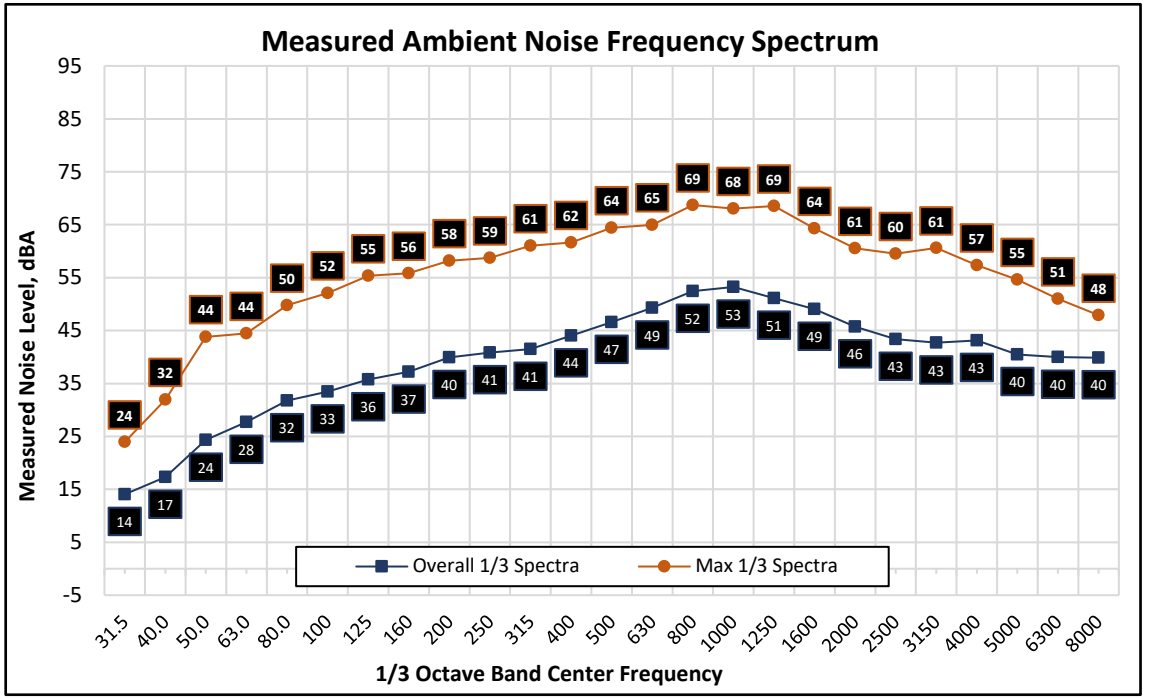
Start: 2022-06-06 11:42:44
Stop: 2022-06-06 11:52:44
SLM: Model 831
Serial: 1329

Measurement Results, dBA

Duration:	0:10
L_{eq}:	59
L_{max}:	74
L_{min}:	34
L_{50}:	50
L_{90}:	41

Notes

Primary Noise Contributors include pedistrian traffic and noise from Vanden Road.



Appendix B2 : Short Term Noise Monitoring Results

Site: ST-2
Project: Vanden Cove Estates
Location: South East of the Project
Coordinates: 38.3295077°, -121.9383106°

Meter: LDL 831-3
Calibrator: CAL200

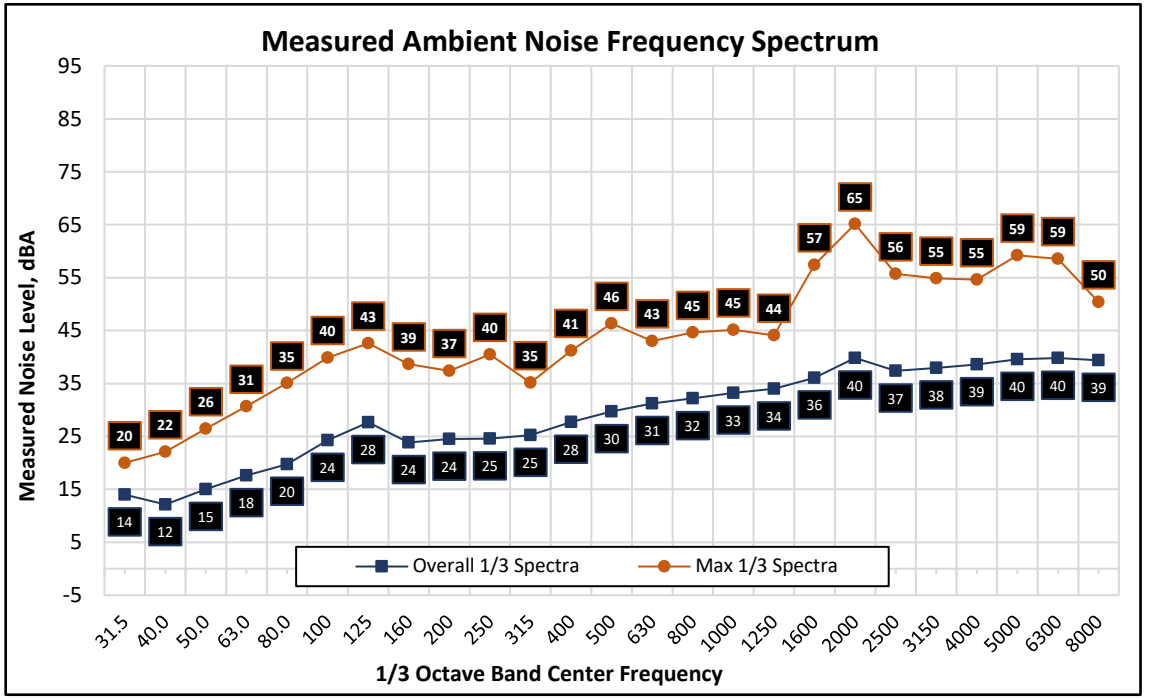
Start: 2022-06-06 11:25:08
Stop: 2022-06-06 11:35:08
SLM: Model 831
Serial: 1329

Measurement Results, dBA

Duration:	0:10
L_{eq}:	43
L_{max}:	68
L_{min}:	34
L_{50}:	37
L_{90}:	36

Notes

Primary Noise Contributors include pedestrian traffic and noise from Vanden Road.



Appendix C: Traffic Noise Calculation Inputs and Results

Appendix C-1

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 210912
Description: Vanden Estates Project - Existing
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Vanden Rd.	South of Alamo Dr.	1,785	67	0	33	1.0%	1.0%	25	40	-5	29	14	6	53.0
2	Vanden Rd.	North of Alamo Dr.	3,019	67	0	33	1.0%	1.0%	45	60	-5	94	44	20	57.9
3	Alamo Dr.	East of Vanden Rd.	8,514	84	0	16	1.0%	1.0%	45	83	-5	136	63	29	58.2
4	Alamo Dr.	West of Vanden Rd.	13,382	84	0	16	1.0%	1.0%	45	55	-5	184	85	40	62.9

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Appendix C-2

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 210912
Description: Vanden Estates Project - Existing + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Vanden Rd.	South of Alamo Dr.	2,011	67	0	33	1.0%	1.0%	25	40	-5	32	15	7	53.5
2	Vanden Rd.	North of Alamo Dr.	3,342	67	0	33	1.0%	1.0%	45	60	-5	101	47	22	58.4
3	Alamo Dr.	East of Vanden Rd.	8,665	84	0	16	1.0%	1.0%	45	83	-5	137	64	30	58.3
4	Alamo Dr.	West of Vanden Rd.	13,758	84	0	16	1.0%	1.0%	45	55	-5	187	87	40	63.0