Appendix 2-1 NOP and NOP Comments

Appendices

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Notice of Preparation / Notice of Public Scoping Meeting for a Draft Environmental Impact Report for the City of Rio Vista General Plan 2045 Update

Date: October 30, 2024

To: State Clearinghouse
State Responsible Agencies
State Trustee Agencies
Other Public Agencies
Interested Organizations

From: Krystine Ball
Public Works Program Manager
City of Rio Vista
Planning Department
One Main Street
Rio Vista, CA 94571

Subject: Notice of Preparation (NOP) for the City of Rio Vista Plan Update Environmental Impact Report (EIR) and Notice of Public Scoping Meeting

Lead Agency: City of Rio Vista
One Main Street
Rio Vista, CA 94571
Contact: Krystine Ball, Public Works Program Manager
Phone: (707) 374-6461, ext. 1122
Email: kball@ci.rio.vista.ca.us

PURPOSE

In discharging its duties under Section 15021 of the California Environmental Quality Act (CEQA) Guidelines, the City of Rio Vista (as lead agency, hereinafter "City" or "Rio Vista") intends to prepare a draft environmental impact report (DEIR), consistent with Section 15162 of the State CEQA Guidelines (Title 14 of the California Code of Regulations, hereinafter the "CEQA Guidelines"), for the Rio Vista General Plan 2045 Update (proposed project).

Under Section 15082 of the California Environmental Quality Act (CEQA) Guidelines, the City of Rio Vista has issued this Notice of Preparation (NOP) to provide responsible agencies, trustee agencies, and other interested parties with information describing the General Plan 2045 Update and its potential environmental effects. The public is encouraged to visit the General Plan 2045 Update's website https://riovista2045.com/ to learn more about the project and view the outreach, reports, and information provided to date. The City is soliciting your comments on the scope of the environmental analysis.

PROJECT LOCATION

The city of Rio Vista is an incorporated city in east Solano County. The city is located 48 miles southwest of Sacramento and 65 miles northeast of San Francisco. The city is bounded on the north, west, and south by unincorporated agricultural lands in Solano County and on the southeast by the Sacramento River. Regional access to the city is provided by State Route (SR-) 12 which

bisects the southwest portion of the city and SR-160 and SR-84 to the east. Figure 1, *Regional Location,* and Figure 2, *Citywide Aerial*, show the City's location and its regional context.

PROJECT DESCRIPTION

The General Plan 2045 Update establishes the community's long-term vision for the future, including where people in Rio Vista will live, work, shop, and recreate. It serves as guidance for all zoning and land use decisions within the city. The General Plan 2045 Update will shape future housing, support job growth, foster healthy and resilient neighborhoods, protect and manage natural resources, ensure community safety, and promote social and economic equity.

The General Plan 2045 Update is a policy document that contains the goals and policies that will guide future decisions within the city and identifies implementation measures to ensure the vision and goals of the General Plan are carried out. The General Plan 2045 Update also contains a land use diagram, which serves as a general guide to the distribution of land uses throughout the city. The following seven elements are required by State law: Land Use, Open Space, Transportation, Housing, Conservation, Safety, and Noise. These elements can be combined or presented in any order that best fits the community. The General Plan 2045 Update will have all the elements required by State law, in addition to optional elements that the City has elected to include, as shown below:

- Land Use and Community Character
- Mobility and Circulation
- Economic Development
- Housing Element (Stand-alone Element)
- Parks and Recreation
- Open Space and Resource Conservation
- Public Facilities and Services
- Safety
- Noise

The 2023 – 2031 Housing Element was adopted by the City Council and approved by the state in September 2023. This element will be integrated into the General Plan 2045; however, it will not be amended or changed as part of the proposed project. The 2045 General Plan Update would amend the General Plan land use diagram, shown on Figure 3, *Existing Land Use Diagram*. The goals, policies, and implementation measures in the Land Use Element provide additional direction on how the various land use designations should be developed to contribute to the overall character of and vision for Rio Vista. The land use diagram changes would occur throughout the city. Figure 4 shows the proposed land use designations in the city. The proposed General Plan also includes changes to the titles of some of the land use designations. Table 1 and Table 2 show the summary of proposed and existing land use designations and acreages, respectively.

Table 1 Proposed General Plan 2045 and Land Use Designation Acres

Land Use	Acres
Downtown	29
South Waterfront	44
North Waterfront	77
Neighborhood Mixed-Use	71
Highway Commercial	50
Industrial/Employment – General	90
Industrial/Employment – Limited	222
Industrial/Employment – Warehouse Service	60
Medium Density Residential	50
Neighborhood Residential	1,943
Residential Estate	156
Multi-Family Residential	35
Parks and Recreation	68
Open Space/Natural Resources	1,611
Public/Quasi-Public	550
Urban Reserve	1,824
Total	**6,880**

Table 2 Existing General Plan 2020 and Land Use Designation Acres

Land Use	Acres
Downtown/Waterfront	50
Marina	15
Neighborhood Service/Mixed-Use	43
Highway Commercial	32
Industrial/Employment – General	312
Industrial/Employment – Limited	113
Industrial/Employment – Warehouse Service	78
Historic Residential	63
Neighborhood Residential	2,093
Residential Estate	154
Parks and Recreation	15
Agriculture/Open Space	1,803
Army Base Reuse Area	27
Airport Transportation	256
Study Area	76
County Land (Not Part of 2001 General Plan) Area	1,750
Total	**6,880**

Table 3, *City of Rio Vista Buildout Projections*, illustrates the buildout projections for the City of Rio Vista as a result of the General Plan Update. Note that these projections are based on the City's existing land use and the General Plan Update 2045 proposed land use changes.

Table 3 City of Rio Vista Buildout Projections

	2020 (Existing)	2045 (General Plan)	Growth (2020-2045)	Percentage Difference (%)
Housing Units	4,351	7,373	3,022	69%
Population	10,553	18,592	8,039	76%
Jobs	2,437	3,213	776	32%
Mixed-use Space (Acres)	108	221	113	105%
Retail Space (Acres)	32	50	18	56%
Industrial Space (Acres)	502	372	-130	-26%

ENVIRONMENTAL IMPACT REPORT

As all of the CEQA topics will be included in the EIR, the City has not prepared an Initial Study for this NOP as permitted in Section 15060(d) of the CEQA Guidelines.

The EIR for the proposed project will address the range of impacts that could result from the adoption and implementation of the General Plan 2045 Update. Below is a list of environmental topics that will be examined in the EIR.

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

REVIEW PERIOD

Section 15082(b) of the CEQA Guidelines requires comments to be provided within 30 days of receipt of an NOP. In compliance with the time limits mandated by CEQA, the comment period for this NOP is from Wednesday, October 30, 2024, through Friday, November 29, 2024. A copy of the NOP can be viewed electronically on the City's web page at: https://riovista2045.com/.

Please email your written comments to Krystine Ball at kball@ci.rio.vista.ca.us, or physically mail them to City Hall, One Main Street, Rio Vista, CA 94571. Please include the name, email, and/or telephone number of a contact person at your agency or organization who can answer questions about the comment.

SCOPING MEETING

The City will hold a Public Scoping Meeting at 2:00 pm on Tuesday, November 19, 2024 for the EIR to describe the proposed project, the environmental review process, and to receive verbal input on the information that should be included in the EIR. The Scoping Meeting will be held in the Rio Vista City Hall City Council Chambers located at 1 Main Street, Rio Vista, California 94571. The meeting will be conducted in a hybrid format, offering both in-person and online participation to accommodate all attendees. Those who prefer to join virtually can access the meeting via Zoom using the following link: https://us06web.zoom.us/j/86207916690

PUBLIC AGENCY APPROVAL: The proposed project will require adoption by the Rio Vista City Council. The Planning Commission and other decision-making bodies will review the proposed project and make recommendations to the City Council. Though other agencies may be consulted during the project process, their approval is not required for the adoption of the General Plan 2045 Update. However, subsequent development under the proposed project may require the approval of responsible or trustee agencies that may rely on the City's General Plan 2045 Update EIR for decisions in their areas of expertise.

Attachments:

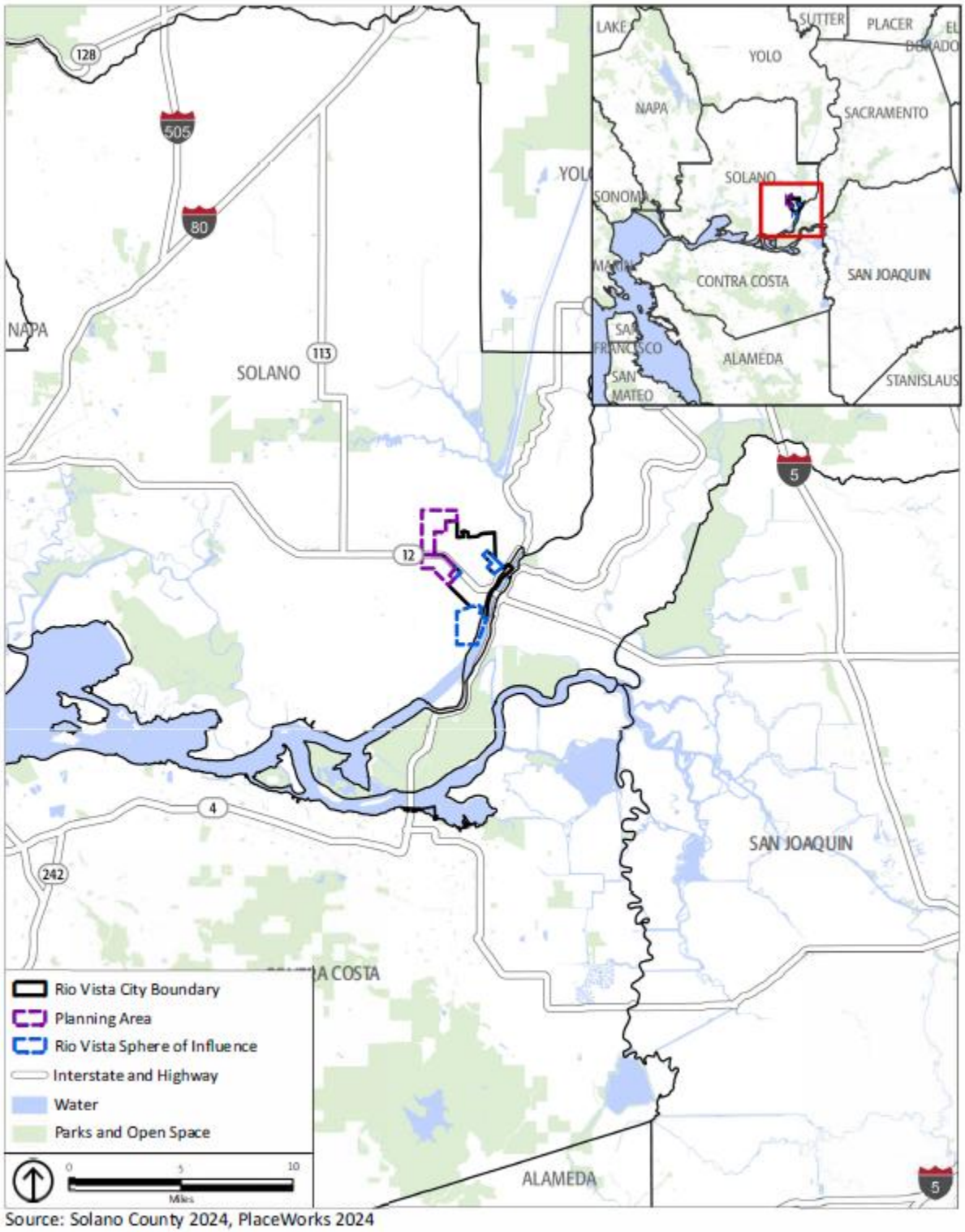
Figure 1: Regional Location

Figure 2: Citywide Aerial

Figure 3: Existing Land Use Diagram

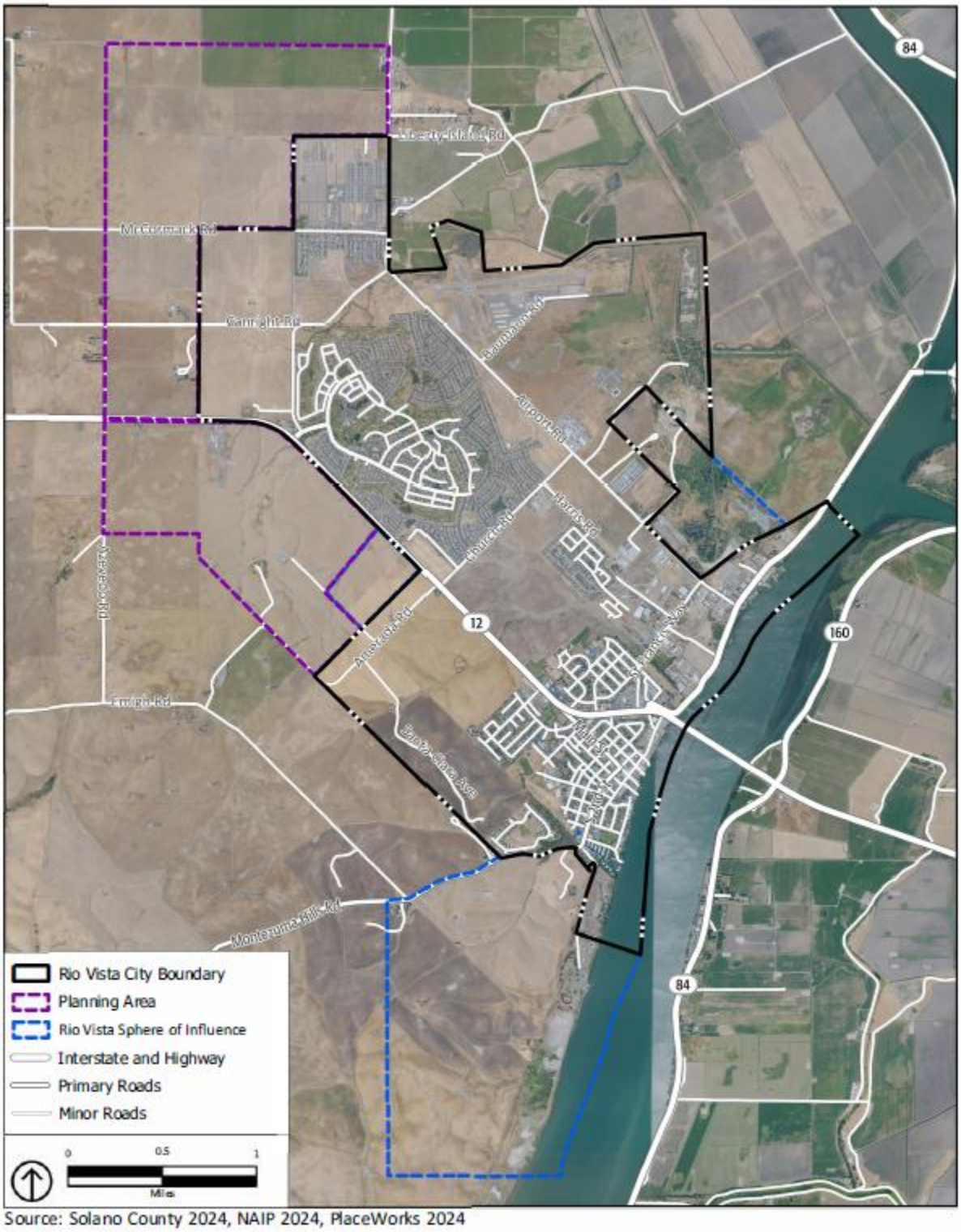
Figure 4: Proposed Land Use Designations

Figure 1 Regional Location



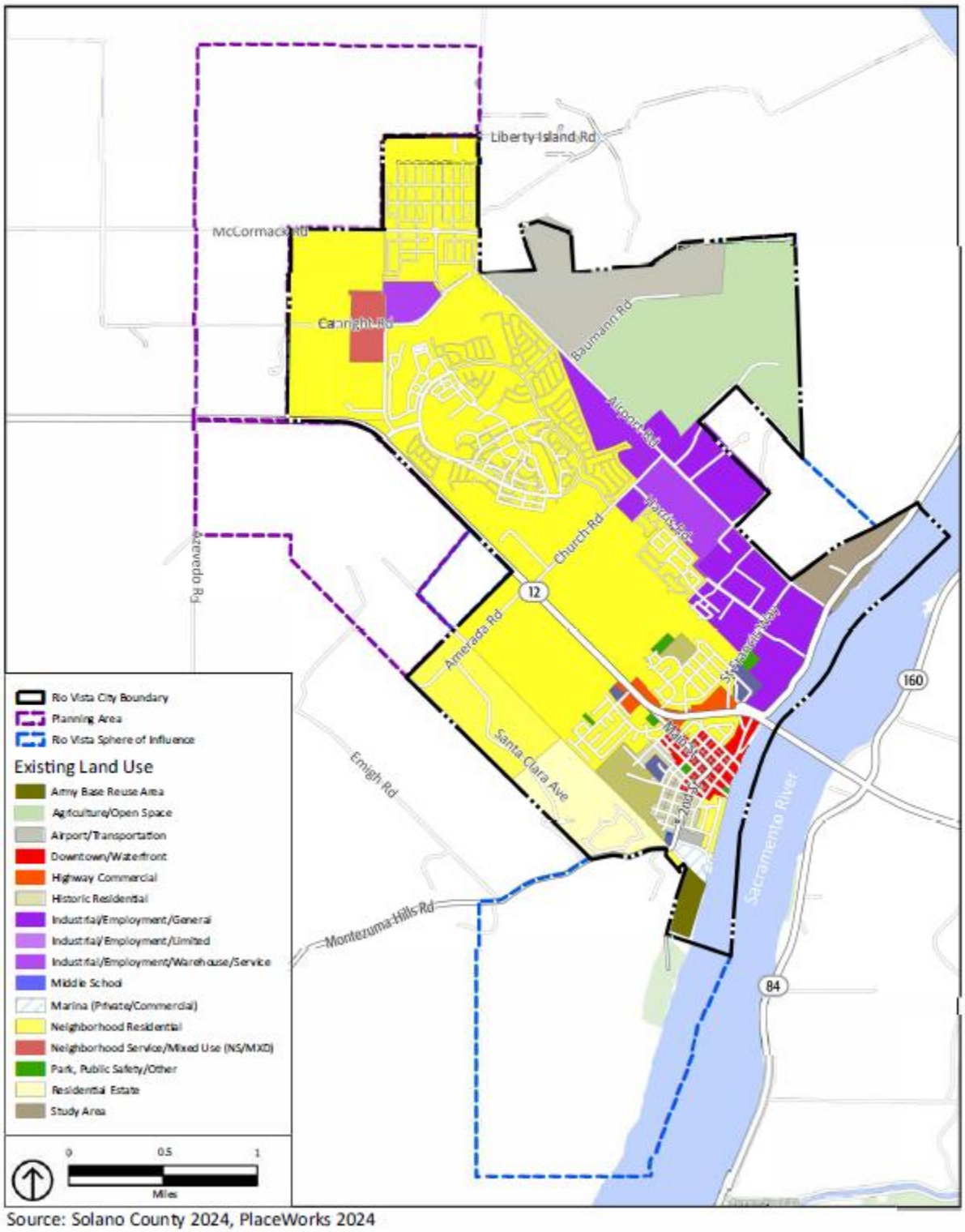
Source: Solano County 2024, PlaceWorks 2024

Figure 2 Citywide Aerial



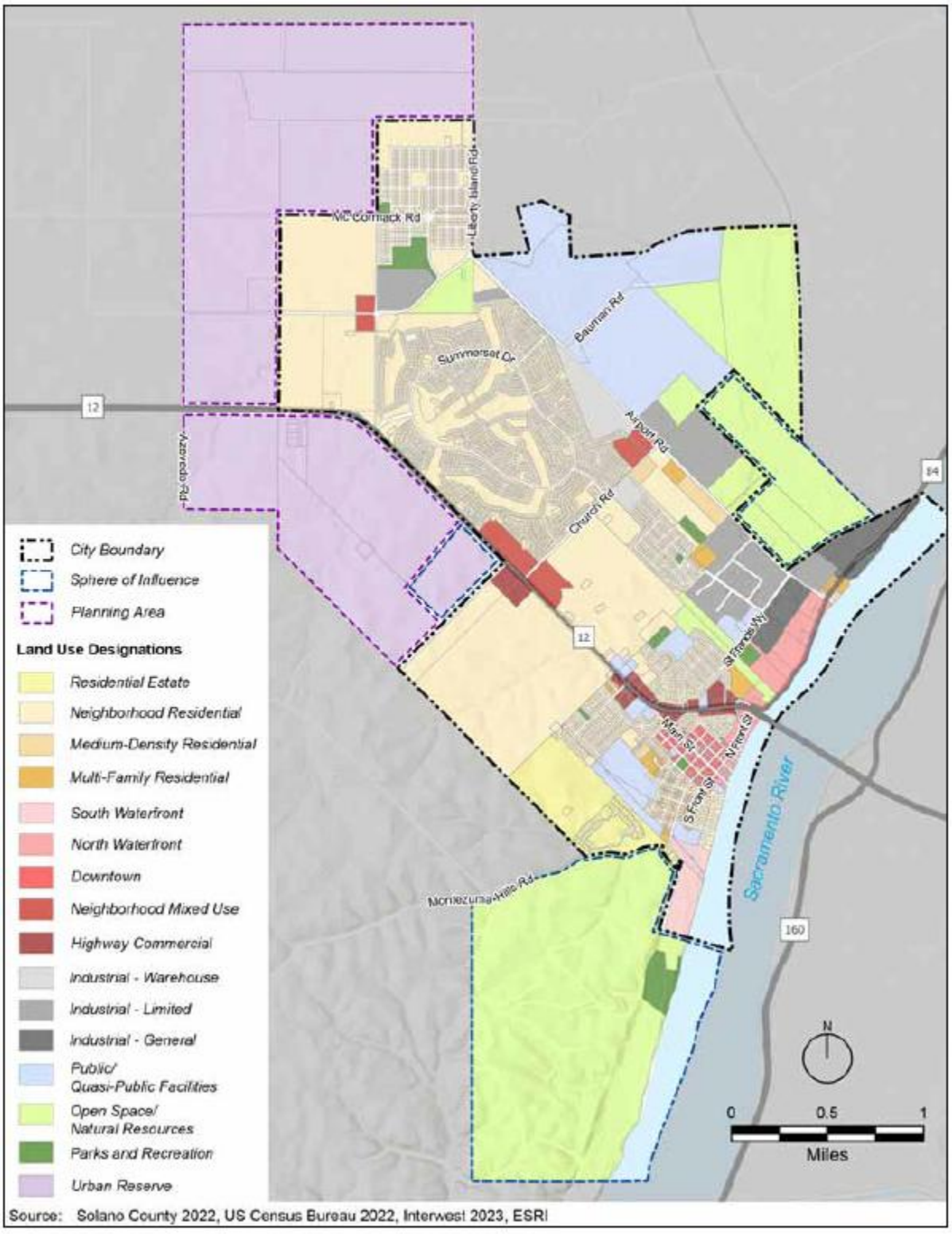
Source: Solano County 2024, NAIP 2024, PlaceWorks 2024

Figure 3 Existing Land Use Diagram



Source: Solano County 2024, PlaceWorks 2024

Figure 4 Proposed Land Use Designations



COMMENT LETTERS RECEIVED

California Department of Transportation

DISTRICT 4
OFFICE OF REGIONAL AND COMMUNITY PLANNING
P.O. BOX 23660, MS–10D | OAKLAND, CA 94623-0660
www.dot.ca.gov

November 26, 2024

SCH #: 2024101291
GTS #: 04-SOL-2024-00393
GTS ID: 34480
Co/Rt/Pm: SOL/VAR/VAR

Krystine Ball, Public Works Program Manager
City of Rio Vista
One Main Street
Rio Vista, CA 94571

Re: City of Rio Vista 2045 General Plan Update – Notice of Preparation (NOP) of Draft Environmental Impact Report (DEIR)

Dear Krystine Ball:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the City of Rio Vista 2045 General Plan Update. The Local Development Review (LDR) Program reviews land use projects and plans to ensure consistency with our mission and state planning priorities. The following comments are based on our review of the October 2024 NOP.

Please note this correspondence does not indicate an official position by Caltrans on this project and is for informational purposes only.

Project Understanding
The City of Rio Vista 2045 General Plan Update includes comprehensive updates to the required elements under the State Planning and Zoning Law, as well as other optional elements that the City has elected to include in its General Plan.

Travel Demand Analysis
With the enactment of Senate Bill (SB) 743, Caltrans is focused on maximizing efficient development patterns, innovative travel demand reduction strategies, and multimodal improvements. For more information on how Caltrans assesses Vehicle Miles Traveled (VMT) analysis for land use projects, please review Caltrans' Transportation Impact Study Guide (*link*). Caltrans looks forward to reviewing the VMT analysis in the DEIR when it is available.

Multimodal Transportation Planning
Please review and include the reference to the *Caltrans District 4 Pedestrian Plan* (2021) and the *Caltrans District 4 Bike Plan* (2018) in the DEIR. These two plans studied existing conditions for walking and biking along and across the State Transportation Network (STN) in the nine-county Bay Area and developed a list of location-based and prioritized needs.

Please note that any Complete Streets reference should be updated to reflect Caltrans Director's Policy 37 (*link*) that highlights the importance of addressing the needs of non-motorists and prioritizing space-efficient forms of mobility, while also facilitating goods movement in a manner with the least environmental and social impacts. This supersedes Deputy Directive 64-R1, and further builds upon its goals of focusing on the movement of people and goods.

Equity and Public Engagement
We will achieve equity when everyone has access to what they need to thrive no matter their race, socioeconomic status, identity, where they live, or how they travel. Caltrans is committed to advancing equity and livability in all communities. We look forward to collaborating with the City to prioritize projects that are equitable and provide meaningful benefits to historically underserved communities.

Caltrans encourages the City to foster meaningful, equitable and ongoing public engagement in the General Plan development process to ensure future transportation decisions and investments reflect community interests and values. The public engagement process should include community-sensitive and equity-focused approaches seeking out the needs of individuals from underserved, Tribal, and low-income communities, the elderly, and individuals with disabilities.

Thank you again for including Caltrans in the environmental review process. Should you have any questions regarding this letter, please contact Llisel Ayon, Associate Transportation Planner, via LDR-D4@dot.ca.gov. For future early coordination opportunities or project referrals, please visit Caltrans LDR website (*link*) or contact LDR-D4@dot.ca.gov.

Sincerely,

YUNSHENG LUO
Branch Chief, Local Development Review
Office of Regional and Community Planning

c: State Clearinghouse

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

November 8, 2024

Krystine Ball
City of Rio Vista
One Main Street
Rio Vista CA 94571

Re: 2024101291 City of Rio Vista 2045 General Plan Update Project, Solano County

Dear Ms. Ball:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

- **a.** A brief description of the project.
- **b.** The lead agency contact information.
- **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
- **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

- **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- **a.** Alternatives to the project.
- **b.** Recommended mitigation measures.
- **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

- **a.** Type of environmental review necessary.
- **b.** Significance of the tribal cultural resources.
- **c.** Significance of the project's impacts on tribal cultural resources.
- **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

- **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
- **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).

2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.

3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).

4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:

- **a.** The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
- **b.** Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (https://ohp.parks.ca.gov/?page_id=30331) for an archaeological records search. The records search will determine:

- **a.** If part or all of the APE has been previously surveyed for cultural resources.
- **b.** If any known cultural resources have already been recorded on or adjacent to the APE.
- **c.** If the probability is low, moderate, or high that cultural resources are located in the APE.
- **d.** If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.

- **a.** The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
- **b.** The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.

b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.

c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Pricilla.Torres-Fuentes@NAHC.ca.gov.

Sincerely,

Pricilla Torres-Fuentes
Cultural Resources Analyst

cc: State Clearinghouse

Appendix 5.3-1 Air Quality & Greenhouse Gas Emissions Assessment

Appendices

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Air Quality & Greenhouse Gas Emissions Assessment

City of Rio Vista 2045 General Plan Update
Rio Vista, California

Prepared For:

PlaceWorks
101 Parkshore Drive, Suite 200
Folsom, California 95630

Prepared By:

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS
55 Hanover Lane
Chico, CA 95926

November 2024

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS

Term	Description
AB	Assembly Bill
ATCM	Airborne toxics control measure
BAAQMD	Bay Area Air Quality Management District
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CAFE	Corporate Average Fuel Economy
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CH_4	Methane
City	City of Rio Vista
CNG	Compressed Natural Gas
CO	Carbon monoxide
County	Solano County
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalents
DPM	Diesel particulate matter
EO	Executive Order
EV	Electric Vehicle
FAR	Floor Area Ratio
GHG	Greenhouse gas emissions
GSP	Gross State Product
GWP	Global Warming Potential
HRA	Health Risk Assessment
HVAC	Heating, Ventilation, and Air Conditioning
IPCC	Intergovernmental Panel on Climate Change
$\mu g/m^3$	Micrograms per cubic meter

LIST OF ACRONYMS AND ABBREVIATIONS

Term	Description
LNG	Liquified Natural Gas
MPO	Metropolitan Planning Organization
MT	Metric Tons
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NHTSA	National Highway Safety Administration
NO_2	Nitrogen dioxide
NO_x	Nitrous oxides
O_3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment
parts per million	ppm
YSAQMD	Solano County Air Quality Management District
PM_{10}	Coarse particulate matter
$PM_{2.5}$	Fine particulate matter
ppm	Parts per million
Project	City of Rio Vista 2045 General Plan Project
ROG	Reactive organic gases
SAFE	Safer Affordable Fuel Efficient
SB	Senate Bill
SCS	Sustainable Communities Strategy
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SR-12	State Route 12
SVAB	Sacramento Valley Air Basin
SOx	Sulfur oxides
SO_2	Sulfur dioxide
TACs	Toxic air contaminants
USEPA	U.S. Environment Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile organic compounds
YSAQMD	Yolo-Solano Air Quality Management District
ZEV	Zero Emission Vehicle

1.0 INTRODUCTION

This report describes the potential impacts to air quality and greenhouse gas (GHG) emissions due to the implementation of the proposed City of Rio Vista 2045 General Plan Update. This section describes the regulatory framework and existing conditions, identifies criteria used to determine impact significance, provides an analysis of the potential air quality and/or GHG-related impacts, and identifies General Plan policies and feasible mitigation measures that could minimize any potentially significant impacts. This report was prepared using methodologies and assumptions recommended in the rules and regulations of the Yolo-Solano Air Quality Management District (YSAQMD). Regional and local existing conditions are presented, along with pertinent emissions standards and regulations.

1.1 Project Location and Description

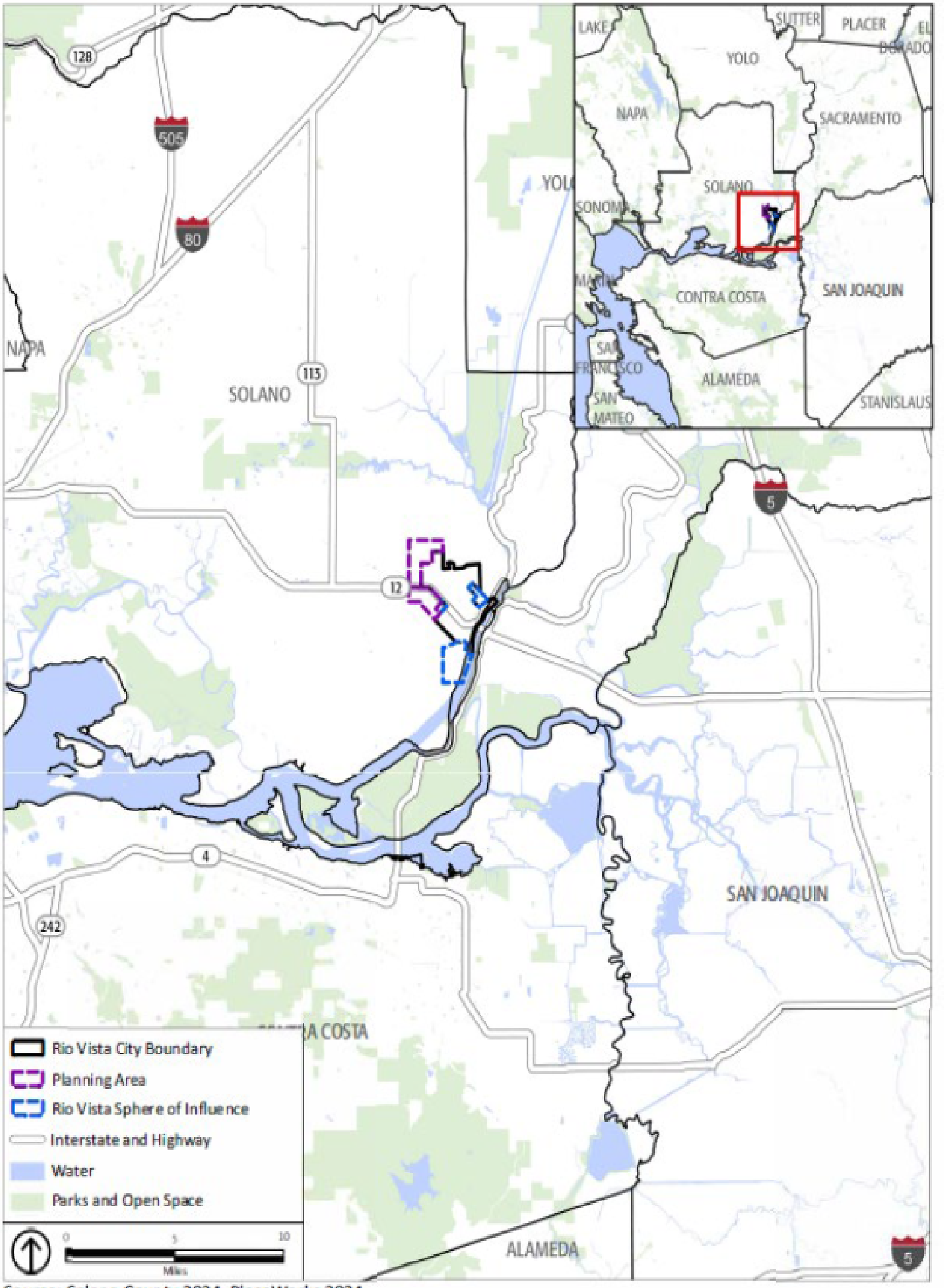
The City of Rio Vista (City) is the eastern-most incorporated city in Solano County, located on the banks of the Sacramento River. Rio Vista is bordered by unincorporated Solano County lands. The City covers an area of 7.5 square miles and is bisected by State Route 12 (SR-12). Rio Vista is a small community located in the heart of the Sacramento River Delta. The main highway, SR-12, provides a corridor from Lodi and Stockton in the Central Valley to Suisun City, Fairfield and the counties of the northern Bay Area. Figure 1-1, Regional Location, shows the General Plan area in its regional context.

The General Plan establishes the community's long-term vision for the future, including where people in Rio Vista will live, work, shop, and recreate. It serves as guidance for all zoning and land use decisions within the City. It will shape future housing, support job growth, foster healthy and resilient neighborhoods, protect and manage natural resources, ensure community safety, and promote social and economic equity. The proposed General Plan Update does not make major changes in land use, but is focused on shortening the existing document, consolidating goals and policies into a more user-friendly document, and recognizing the need for different styles of development than were prevalent with the existing "General Plan 2001", adopted in 1998. The proposed General Plan Update policy document contains the goals and policies that will guide future decisions within the City and identifies implementation measures to ensure the vision and goals of the General Plan are carried out. The General Plan Update also contains a land use diagram, which serves as a general guide to the distribution of land uses throughout the City. The General Plan Update addresses all the elements required by State law, in addition to optional elements that the City has elected to include, as listed here:

- Land Use Element and Community Character
- Mobility and Circulation Element
- Economic Development (Optional Element)
- Housing Element (Stand-alone Element)
- Parks and Recreation Element
- Open Space and Resource Conservation Element
- Public Facilities and Services Element

- Safety Element
- Noise Element

The Existing General Plan 2001 land area consists of 5,130 acres (8.0 square miles) within the City limits, and 1,750 acres (2.7 square miles) within the Sphere of Influence. The total land area covered by this proposed 2045 General Plan Update is 6,880 acres (10.8 square miles). Figure 1-2, Proposed Land Use Plan Diagram, illustrates the proposed 2045 General Plan Update land use diagram.



Source: Solano County 2024, PlaceWorks 2024

Figure 1-1. Regional Location

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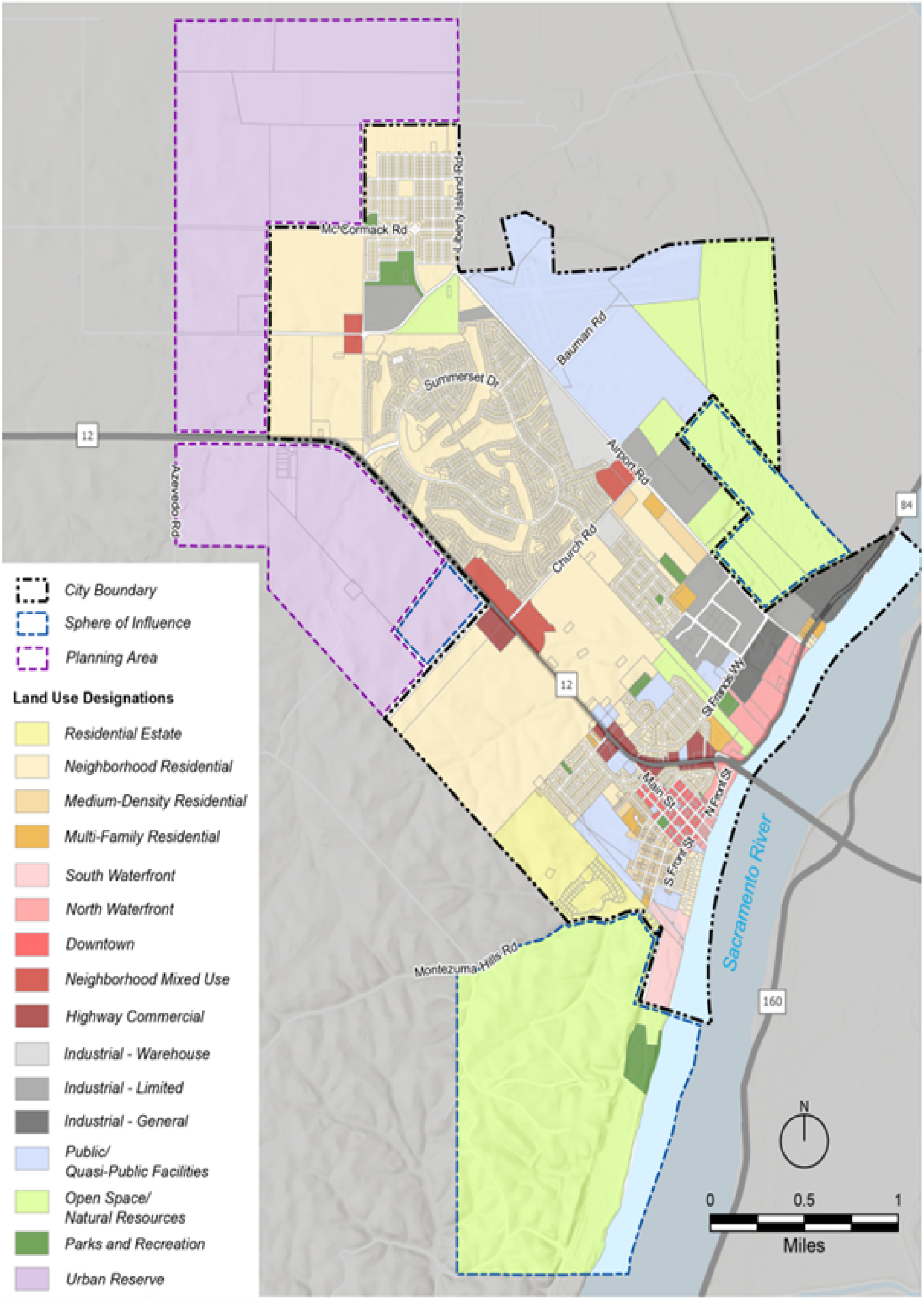

Source: Solano County 2022, US Census Bureau 2022, Interwest 2023, ESRI

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 1-2 Proposed Land Use Designations

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2.0 AIR QUALITY

This section includes a discussion of existing air quality conditions, a summary of applicable regulations, and an analysis of potential construction and operational air quality impacts caused by future development allowed under the proposed 2045 General Plan Update.

2.1 Environmental Setting

Air quality in a region is determined by its topography, meteorology, and existing air pollutant sources. These factors are discussed below, together with the current regulatory structure that applies to the Sacramento Valley Air Basin (SVAB), in which Rio Vista is located, pursuant to the regulatory authority of the YSAQMD. The YSAQMD is responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws.

Ambient air quality is commonly characterized by climate conditions, the meteorological influences on air quality, and the quantity and type of pollutants released. The air basin is subject to a combination of topographical and climatic factors that reduce the potential for high levels of regional and local air pollutants. The following section describes the pertinent characteristics of the air basin and provides an overview of the physical conditions affecting pollutant dispersion in the City of Rio Vista.

2.1.1 Sacramento Valley Air Basin

The California Air Resources Board (CARB) divides the state into air basins that share similar meteorological and topographical features. The Project Site is located in the SVAB, in a portion of area that is under the jurisdiction of the YSAQMD. The air basin is relatively flat, bordered by mountains to the east, west, and north and by the San Joaquin Valley to the south. Air flows into the SVAB through the Carquinez Strait, moving across the Sacramento Delta, and bringing pollutants from the heavily populated San Francisco Bay Area. The climate is characterized by hot, dry summers and cool, rainy winters. Characteristic of SVAB winter weather are periods of dense and persistent low-level fog, which are most prevalent between storm systems. From May to October, the region's intense heat and sunlight lead to high ozone pollutant concentrations. Summer inversions are strong and frequent but are less troublesome than those that occur in the fall. Autumn inversions, formed by warm air subsiding in a region of high pressure, have accompanying light winds that do not provide adequate dispersion of air pollutants.

2.1.2 Criteria Air Pollutants

Criteria air pollutants are defined as those pollutants for which the federal and state governments have established air quality standards for outdoor or ambient concentrations to protect public health with a determined margin of safety. Ozone (O_3), coarse particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$) are generally considered to be regional pollutants because they or their precursors affect air quality on a regional scale. Pollutants such as carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) are considered to be local pollutants because they tend to accumulate in the air locally. PM is also considered a local pollutant. Health effects commonly associated with criteria pollutants are summarized in Table 2-1.

Table 2-1. Summary of Criteria Air Pollutants Sources and Effects

Pollutant	Major Manmade Sources	Human Health and Welfare Effects
CO	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, effecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
NO_2	A reddish-brown gas formed during fuel combustion for motor vehicles, energy utilities and industrial sources.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Causes brown discoloration of the atmosphere.
O_3	Formed by a chemical reaction between reactive organic gases (ROGs) and nitrogen oxides (NOx) in the presence of sunlight. Common sources of these precursor pollutants include motor vehicle exhaust, industrial emissions, solvents, paints and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield.
$PM_{2.5}$ & PM_{10}	Power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles and others.	Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze).
SO_2	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, effecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.

Source: California Air Pollution Control Offices Association (CAPCOA 2013)

2.1.2.1 Carbon Monoxide

CO in the urban environment is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. CO combines with hemoglobin in the bloodstream and reduces the amount of oxygen that can be circulated through the body. High CO concentrations can cause headaches, aggravate cardiovascular disease and impair central nervous system functions. CO concentrations can vary greatly over comparatively short distances. Relatively high concentrations of CO are typically found near crowded intersections and along heavy roadways with slow moving traffic. Even under the most sever meteorological and traffic conditions, high concentrations of CO are limited to locations within relatively short distances (i.e., up to 600 feet or 185 meters) of the source. Overall CO emissions are decreasing as a result of the Federal Motor Vehicle Control Program, which has mandated increasingly lower emission levels for vehicles manufactured since 1973.

2.1.2.2 Nitrogen Oxides

Nitrogen gas comprises about 80 percent of the air and is naturally occurring. At high temperatures and under certain conditions, nitrogen can combine with oxygen to form several different gaseous compounds collectively called nitric oxides (NO_x). Motor vehicle emissions are the main source of NO_x in urban areas. NO_x is very toxic to animals and humans because of its ability to form nitric acid with water in the eyes,

lungs, mucus membrane, and skin. In animals, long-term exposure to NO_x increases susceptibility to respiratory infections, and lowering resistance to such diseases as pneumonia and influenza. Laboratory studies show that susceptible humans, such as asthmatics, who are exposed to high concentrations can suffer from lung irritation or possible lung damage. Precursors of NO_x, such as NO and NO_2, attribute to the formation of O_3 and $PM_{2.5}$. Epidemiological studies have also shown associations between NO_2 concentrations and daily mortality from respiratory and cardiovascular causes and with hospital admissions for respiratory conditions.

2.1.2.3 Ozone

Ozone (O_3) is a secondary pollutant, meaning it is not directly emitted. It is formed when volatile organic compounds (VOCs) also known as reactive organic gases (ROG) and NO_x undergo photochemical reactions that occur only in the presence of sunlight. The primary source of ROG emissions is unburned hydrocarbons in motor vehicle and other internal combustion engine exhaust. Sunlight and hot weather cause ground-level O_3 to form. Ground-level O_3 is the primary constituent of smog. Because O_3 formation occurs over extended periods of time, both O_3 and its precursors are transported by wind and high O_3 concentrations can occur in areas well away from sources of its constituent pollutants.

People with lung disease, children, older adults, and people who are active can be affected when O_3 levels exceed ambient air quality standards. Numerous scientific studies have linked ground-level O_3 exposure to a variety of problems including lung irritation, difficult breathing, permanent lung damage to those with repeated exposure, and respiratory illnesses.

2.1.2.4 Sulfur Dioxide

SO_2 is a colorless gas with a pungent odor, however sulfur dioxide can react with other particulates in the atmosphere to for particulates which contribute to the haze effect. SO_2 standards have been developed by the EPA to regulate all sulfur oxides, however SO_2 is by far the most abundant sulfur oxide in the atmosphere. Currently, SO_2 is primarily a result of the burning of fossil fuels for power generation and other industrial sources. Modern regulations on diesel fuel have greatly reduced the amount of SO_2 in the atmosphere and there are currently no areas in California that have nonacceptable levels of SO_2, by state or federal standards.

2.1.2.5 Particulate Matter

Particulate matter includes both aerosols and solid particulates of a wide range of sizes and composition. Of concern are those particles smaller than or equal to 10 microns in diameter size (PM_{10}) and small than or equal to 2.5 microns in diameter ($PM_{2.5}$). Smaller particulates are of greater concern because they can penetrate deeper into the lungs than larger particles. PM_{10} is generally emitted directly as a result of mechanical processes that crush or grind larger particles or form the resuspension of dust, typically through construction activities and vehicular travel. PM_{10} generally settles out of the atmosphere rapidly and is not readily transported over large distances. $PM_{2.5}$ is directly emitted in combustion exhaust and is formed in atmospheric reactions between various gaseous pollutants, including NO_x, sulfur oxides (SO_x) and VOCs. $PM_{2.5}$ can remain suspended in the atmosphere for days and/or weeks and can be transported long distances.

The principal health effects of airborne PM are on the respiratory system. Short-term exposure of high $PM_{2.5}$ and PM_{10} levels are associated with premature mortality and increased hospital admissions and emergency room visits. Long-term exposure is associated with premature mortality and chronic respiratory disease. According to the U.S. Environmental Protection Agency (USEPA), some people are much more sensitive than others to breathing PM_{10} and $PM_{2.5}$. People with influenza, chronic respiratory and cardiovascular diseases, and the elderly may suffer worse illnesses; people with bronchitis can expect aggravated symptoms; and children may experience decline in lung function due to breathing in PM_{10} and $PM_{2.5}$. Other groups considered sensitive include smokers and people who cannot breathe well through their noses. Exercising athletes are also considered sensitive because many breathe through their mouths.

2.1.3 Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. TACs are considered either carcinogenic or noncarcinogenic based on the nature of the health effects associated with exposure to the pollutant. For regulatory purposes, carcinogenic TACs are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per one million exposed individuals. Noncarcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis. Carcinogenic TACs can also have noncarcinogenic health hazard levels.

There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Additionally, diesel engines emit a complex mixture of air pollutants composed of gaseous and solid material. The solid emissions in diesel exhaust are known as diesel particulate matter (DPM). In 1998, California identified DPM as a TAC based on its potential to cause cancer, premature death, and other health problems (e.g., asthma attacks and other respiratory symptoms). Those most vulnerable are children (whose lungs are still developing) and the elderly (who may have other serious health problems). Overall, diesel engine emissions are responsible for the majority of California's known cancer risk from outdoor air pollutants. Diesel engines also contribute to California's $PM_{2.5}$ air quality problems. Public exposure to TACs can result from emissions from normal operations, as well as from accidental releases of hazardous materials during upset conditions. The health effects of TACs include cancer, birth defects, neurological damage, and death.

2.1.3.1 Diesel Exhaust

CARB has identified DPM as a TAC. DPM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. Diesel exhaust is a complex mixture of particles and gases produced when an engine burns diesel fuel. DPM is a concern because it causes lung cancer; many compounds found in diesel exhaust are carcinogenic. DPM includes the particle-phase constituents in diesel exhaust. The chemical composition and particle sizes of DPM vary between different engine types (heavy-duty, light-duty), engine operating conditions (idle, accelerate, decelerate), fuel formulations (high/low sulfur fuel), and the year of the engine (USEPA 2002). Some short-term (acute) effects of diesel exhaust include eye, nose, throat, and lung irritation, and diesel exhaust can cause coughs, headaches, light-

headedness, and nausea. DPM poses the greatest health risk among the TACs; due to their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung.

2.1.4 Ambient Air Quality

Ambient air quality in Rio Vista can be inferred from ambient air quality measurements conducted at nearby air quality monitoring stations. CARB maintains more than 60 monitoring stations throughout California. O_3, PM_{10} and $PM_{2.5}$ are the pollutant species most potently affecting the Rio Vista region. As described in detail below, the region is designated nonattainment for the federal standards of O_3 and $PM_{2.5}$ and is nonattainment for the State standards of O_3 and PM_{10}. Solano County contains several air quality monitors throughout the area, which capture the ambient concentrations of O_3, $PM_{2.5}$ and PM_{10}. The Vacaville-Ulatis Drive and Vacaville-Merchant Street air quality monitoring stations monitor O_3 and PM_{10}, respectively. The Davis-UCD Campus air quality monitoring station is the closest $PM_{2.5}$ monitoring station to Rio Vista, approximately 8 miles to the north. Table 2-2 summarizes the air quality data from the most recent years that is relevant to Rio Vista. Ambient emission concentrations will vary due to localized variations in emission sources and climate, yet these measurements should be considered "generally" representative of ambient concentrations in the City.

Table 2-2. Summary of Ambient Air Quality Data in Rio Vista

Pollutant Scenario	2021	2022	2023
O_3			
Max 1-hour concentration (ppm)	0.095	0.086	0.075
Max 8-hour concentration (ppm) (state/federal)	0.078 / 0.078	0.068 / 0.069	0.069 / 0.069
Number of days above 1-hour standard (state/federal)	1 / 0	0 / 0	0 / 0
Number of days above 8-hour standard (state/federal)	0 / 0	0 / 0	0 / 0
PM_{10}			
Max 24-hour concentration (µg/m^3) (state/federal)	49.6 / 50.0	35.4 / 33.4	38.1 / 37.6
Number of days above 24-hour standard (state/federal)	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
$PM_{2.5}$**			
Max 24-hour concentration (µg/m^3) (state/federal)	66.2 / *	31.3 / *	38.3 / *
Number of days above federal 24-hour standard	*	*	*

Source: CARB 2024a

Note: ** = $PM_{2.5}$ measurements were taken from the Davis-UCD Campus air quality monitoring station. This is the closest monitor to Rio Vista that provides data for PM_{10}, and the only air quality monitoring station in Solano County that monitors $PM_{2.5}$.

* = Insufficient data available

µg/m^3 = micrograms per cubic meter; ppm = parts per million

The USEPA and CARB designate air basins or portions of air basins and counties as being in "attainment" or "nonattainment" for each of the criteria pollutants. Areas that do not meet the standards are classified as nonattainment areas. The National Ambient Air Quality Standards (NAAQS) for O_3, PM_{10}, and $PM_{2.5}$ are

based on statistical calculations over one- to three-year periods, depending on the pollutant. The California Ambient Air Quality Standards (CAAQS) are not to be exceeded during a three-year period. The attainment status for Rio Vista portion of Solano County is presented in Table 2-3.

Table 2-3. Attainment Status of Criteria Pollutants in the Rio Vista Portion of Solano County

Pollutant	State Designation	Federal Designation
O_3	Nonattainment - Transitional	Nonattainment
PM_{10}	Nonattainment	Unclassified
$PM_{2.5}$	Unclassified	Nonattainment
CO	Attainment	Unclassified/Attainment
NO_2	Attainment	Unclassified/Attainment
SO_2	Attainment	Unclassified/Attainment

Source: CARB 2023

The determination of whether an area meets the state and federal standards is based on air quality monitoring data. As shown above, sometimes areas are unclassified, which means there is insufficient monitoring data for determining attainment or nonattainment. Unclassified areas are typically treated as being in attainment. Because the attainment/nonattainment designation is pollutant-specific, an area may be classified as nonattainment for one pollutant and attainment for another. Similarly, because the state and federal standards differ, an area could be classified as attainment for the federal standards of a pollutant and as nonattainment for the state standards of the same pollutant. The Solano County region is designated as a nonattainment area for the federal O_3 and $PM_{2.5}$ standards and is also a nonattainment area for the state standards for O_3 and PM_{10} (CARB 2023).

2.1.5 Sensitive Receptors

Sensitive receptors are defined as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. CARB has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over 65, children under 14, athletes, and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis.

Because placement of sensitive land uses falls outside CARB's jurisdiction, CARB developed and approved the Air Quality and Land Use Handbook: A Community Health Perspective (2005) to address the siting of sensitive land uses in the vicinity of freeways, distribution centers, rail yards, ports, refineries, chrome plating facilities, dry cleaners, and gasoline-dispensing facilities. This guidance document was developed to assess compatibility and associated health risks when placing sensitive receptors near existing pollution sources. CARB's recommendations on the siting of new sensitive land uses identified in Table 2-4 were based on a compilation of recent studies that evaluated data on the adverse health effects from proximity to air pollution sources.

Table 2-4. CARB Recommendations on Siting New Sensitive Land Uses Near Air Pollutant Sources

Source/Category	Advisory Recommendations
Freeways and High-Traffic Roads	Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day
Distribution Centers	Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units per day, or where transport refrigeration units unit operations exceed 300 hours per week). Take into account the configuration of existing distribution centers and avoid locating residences and other sensitive land uses near entry and exit points.
Rail Yards	Avoid siting new sensitive land uses within 1,000 feet of a major service and maintenance rail yard. Within one mile of a rail yard, consider possible siting limitations and mitigation approaches.
Ports	Avoid siting of new sensitive land uses immediately downwind of ports in the most heavily impacted zones. Consult local air districts or CARB on the status of pending analyses of health risks
Refineries	Avoid siting new sensitive land uses immediately downwind of petroleum refineries. Consult with local air districts and other local agencies to determine an appropriate separation.
Chrome Platers	Avoid siting new sensitive land uses within 1,000 feet of a chrome plater.
Dry Cleaners Using Perchloroethylene	Avoid siting new sensitive land uses within 300 feet of any dry cleaning operation. For operations with two or more machines, provide 500 feet. For operations with three or more machines, consult with the local air district. Do not site new sensitive land uses in the same building with perchloroethylene dry cleaning operations
Gasoline Dispensing Facilities	Avoid siting new sensitive land uses within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50-foot separation is recommended for typical gas dispensing facilities

Source: CARB 2005

The key observation in these studies is that proximity to air pollution sources substantially increases both exposure and the potential for adverse health effects. There are three carcinogenic TACs that constitute the majority of the known health risks from motor vehicle traffic: DPM from trucks and benzene and 1,3-butadiene from passenger vehicles. In 2017, CARB provided a supplemental technical advisory to the handbook for near-roadway air pollution exposure, titled Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways. Strategies include practices and technologies that reduce traffic emissions, increase dispersion of traffic pollution (or the dilution of pollution in the air), or remove pollution from the air (CARB 2017).

2.1.6 Odors

Typically, odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another.

It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air.

When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

2.2 Regulatory Framework

2.2.1 Federal

2.2.1.1 Clean Air Act

The Clean Air Act (CAA) of 1970 and the CAA Amendments of 1971 required the USEPA to establish the NAAQS, with states retaining the option to adopt more stringent standards or to include other specific pollutants.

These standards are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and welfare. They are designed to protect those "sensitive receptors" most susceptible to further respiratory distress such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed.

The USEPA has classified air basins (or portions thereof) as being in attainment, nonattainment, or unclassified for each criteria air pollutant, based on whether or not the NAAQS have been achieved. If an area is designated unclassified, it is because inadequate air quality data were available as a basis for a nonattainment or attainment designation. Table 2-3 lists the federal attainment status of the Rio Vista region for the criteria pollutants.

2.2.2 State

2.2.2.1 California Clean Air Act

The California Clean Air Act (CCAA) allows the state to adopt ambient air quality standards and other regulations provided that they are at least as stringent as federal standards. CARB, a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both federal and state air pollution control programs within California, including setting the CAAQS. CARB also conducts research, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions. CARB also has primary responsibility for the development of California's State Implementation Plan (SIP), for which it works closely with the federal government and the local air districts.

2.2.2.2 California State Implementation Plan

The federal CAA (and its subsequent amendments) requires each state to prepare an air quality control plan referred to as the SIP. The SIP is a living document that is periodically modified to reflect the latest emissions inventories, plans, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The CAA Amendments dictate that states containing areas violating the NAAQS revise their SIPs to include extra control measures to reduce air pollution. The SIP includes strategies and control measures to attain the NAAQS by deadlines established by the CAA. The USEPA has the responsibility to review all SIPs to determine if they conform to the requirements of the CAA.

State law makes CARB the lead agency for all purposes related to the SIP. Local air districts and other agencies prepare SIP elements and submit them to CARB for review and approval. CARB then forwards SIP revisions to the USEPA for approval and publication in the Federal Register. The YSAQMD is the agency responsible for ensuring that NAAQS and CAAQS are not exceeded. The 2017 Sacramento Regional 2008 8-Hour Ozone Attainment and Reasonable Further Progress Plan (including 2018 updates), the PM_{10} Implementation/Maintenance Plan and Re-Designation Request (2010), and $PM_{2.5}$ Implementation/Maintenance Plan and Re-designation Request for Sacramento $PM_{2.5}$ Nonattainment Area (2013) constitute the current SIP for Solano County. These air quality planning documents present comprehensive strategies to reduce the O_3 precursor pollutants (ROG and NOx) as well as PM emissions from stationary, area, mobile, and indirect sources.

2.2.2.3 Pavley Fuel Efficiency Standards

Pavley I is a clean-car standard that reduces emissions from new passenger vehicles (light-duty auto to medium-duty vehicles) from 2009 through 2016. In January 2012, CARB approved the Advanced Clean Cars program (formerly known as Pavley II) for model years 2017 through 2025.

2.2.2.4 CARB's Mobile Source Strategy

In September 2021, CARB developed the 2020 Mobile Source Strategy that, similar to the 2016 Mobile Source Strategy, is a framework to identify the technology trajectories and programmatic concepts to meet criteria pollutant, GHG, and TAC emission reduction goals from mobile sources. The 2020 Mobile Source Strategy will deliver broad environmental and public health benefits, as well as support much needed efforts to modernize and upgrade transportation infrastructure, enhance system-wide efficiency and mobility options, and promote clean economic growth in the mobile sector.

2.2.2.5 Governor's Executive Order B-48-18: Zero-Emission Vehicles

On January 26, 2018, Governor Brown signed Executive Order (EO) B-48-18 requiring all state entities to work with the private sector to have at least 5 million zero emission vehicles (ZEVs) on the road by 2030, as well as install 200 hydrogen fueling stations and 250,000 electric vehicle (EV) charging stations by 2025. It specifies that 10,000 of the EV charging stations should be direct current fast chargers. The order requires all state entities to continue to partner with local and regional governments to streamline the installation of ZEV infrastructure. The Governor's Office of Business and Economic Development is required to publish a Plug-in Charging Station Design Guidebook and update the 2015 Hydrogen Station Permitting Guidebook to assist in these efforts. All state entities are required to participate in updating the 2016 Zero-Emissions Vehicle Action Plan, along with the 2018 ZEV Action Plan Priorities Update, which includes and extends the 2016 ZEV Action Plan (Caltrans 2016; 2018), to help expand private investment in ZEV infrastructure with a focus on serving low-income and disadvantaged communities.

2.2.2.6 Governor's Executive Order N-79-20

Governor Newsom signed EO N-79-20 in September 2020, which sets a statewide goal that 100 percent of all new passenger car and truck sales in the state will be zero-emissions by 2035. It also sets a goal that 100 percent of statewide new sales of medium- and heavy-duty vehicles will be zero emissions by 2045, where feasible, and for all new sales of diesel-fuel heavy duty trucks to be zero emissions by 2035. Additionally, the EO targets 100 percent of new off-road vehicle sales in the state to be zero emission by 2035. CARB is responsible for implementing the new vehicle sales regulations.

2.2.2.7 California Code of Regulations (CCR) Title 20: Appliance Energy Efficiency Standards

The 2006 Appliance Efficiency Regulations (20 CCR secs. 1601–1608) were adopted by the California Energy Commission on October 11, 2006, and approved by the California Office of Administrative Law on December

14, 2006. The regulations include standards for both federally regulated appliances and non– federally regulated appliances. This code reduces natural gas use from appliances.

2.2.2.8 24 CCR, Part 6: Building and Energy Efficiency Standards and Part 11: Green Building Standards Code

Part 6: Building and Energy Efficiency Standards establishes energy conservation standards for new residential and nonresidential buildings adopted by the California Energy Resources Conservation and Development Commission (now the California Energy Commission) in June 1977. This code reduces natural gas use from buildings. Part 11: Green Building Standards Code establishes planning and design standards for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants. This code reduces natural gas use from buildings. Effective January 1, 2024, the latest (2022) version of the Title 24, Part 6 Energy Code updates took effect. The 2022 Building Energy Efficiency Standards focus on regulations for energy efficiency, water efficiency and conservation, material conservation and resource efficiency, environmental quality, as well as mandatory provisions for commercial, residential, and school buildings.

2.2.2.9 Tanner Air Toxics Act & Air Toxics "Hot Spot" Information and Assessment Act

CARB's Statewide comprehensive air toxics program was established in 1983 with Assembly Bill (AB) 1807, the Toxic Air Contaminant Identification and Control Act (Tanner Air Toxics Act of 1983). AB 1807 created California's program to reduce exposure to air toxics and sets forth a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB adopts an airborne toxics control measure (ATCM) for sources that emit designated TACs. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate toxics best available control technology to minimize emissions.

CARB also administers the state's mobile source emissions control program and oversees air quality programs established by state statute, such as AB 2588, the Air Toxics "Hot Spots" Information and Assessment Act of 1987. Under AB 2588, TAC emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High priority facilities are required to perform a health risk assessment (HRA) and, if specific thresholds are exceeded, required to communicate the results to the public in the form of notices and public meetings. In September 1992, the "Hot Spots" Act was amended by Senate Bill (SB) 1731, which required facilities that pose a significant health risk to the community to reduce their risk through a risk management plan.

2.2.2.10 CalEnviroScreen and Disadvantaged Communities (Senate Bill 535)

CalEnviroScreen is a mapping tool that helps identify California communities that are most affected by many sources of pollution, and where people are often especially vulnerable to pollution's effects. This tool is used by the California Environmental Protection Agency to determine which communities are considered disadvantaged based on factors like pollution levels, demographics, and human risks. While CalEnviroScreen was originally developed as part of SB 535 and used to identify disadvantaged communities for the purposes of allocating funding from the State's Cap-and-Trade regulation, its application and scope have

expanded over the years. The tool uses environmental, health, and socioeconomic information to produce scores for every census tract in the state. The CalEnviroScreen model is made up of four components – two pollution burden components (exposures and environmental effects) and two population characteristics components (sensitive populations and socioeconomic factors). The four components are further divided into 20 indicators. An indicator is a measure of either environmental conditions, in the case of pollution burden indicators, or health and vulnerability factors, in the case of population characteristic indicators.

Exposure indicators are based on the measurements of diverse types of pollution that people may come into contact with. Exposure indicators include:

- o Air Quality: Ozone
- o Air Quality: $PM_{2.5}$
- o Children's Lead Risk from Housing
- o Diesel Particular Matter
- o Drinking Water Contaminants
- o Pesticide Use
- o Toxic Releases from Facilities
- o Traffic Density

Environmental effects indicators are based on the locations of toxic chemicals in or near communities. Environmental effects indicators include:

- o Cleanup Sites
- o Groundwater Threats
- o Hazardous Waste Generators and Facilities
- o Impaired Water Bodies
- o Solid Waste Sites and Facilities

Sensitive population indicators measure the number of people in a community who may be more severely affected by pollution because of their age or health. Sensitive population indicators include:

- o Asthma
- o Cardiovascular Disease
- o Low Birth Weight Infants

Socioeconomic factor indicators are conditions that may increase people's stress or make healthy living difficult and cause them to be more sensitive to pollution's effects. Socioeconomic factors include:

- o Educational Attainment

- o Housing Burden
- o Linguistic Isolation
- o Poverty
- o Unemployment

Each census tract receives scores for as many of the 20 indicators as possible, and the scores are then mapped so that different communities can be compared. Percentiles are assigned to each census tract based on the census tract's score in relation to the rest of the state. An area with a high percentile is one that experiences a much higher pollution burden than areas with low scores. For example, if a census tract has an indicator in the 40th percentile, it means that indicator's percentile is higher than 40 percent of the census tracts in the state. CalEnviroScreen also provides a total (or cumulative) score, which is the product of multiplying the 10 pollution burden components by the 10 population characteristics. This total / cumulative score helps contextualize how multiple contaminants from multiple sources affect people, while considering their living conditions (e.g., nonchemical factors such as socioeconomic and health status). Communities that are within the top 25th percentile for total CalEnviroScreen scores are considered disadvantaged communities pursuant to Senate Bill (SB) 535.

According to the Office of Environmental Health Hazard Assessment (OEHHA) CalEnviroScreen 4.0 Map, the City of Rio Vista is in Census Tract 6095253500. This area shows an average pollution indicator percentile of 77.76 percent based on the CalEnviroScreen indicators (e.g., exposure, environmental effects, population characteristics, socioeconomic factors) and has a population of 10,676 people (OEHHA 2021). The CalEnviroScreen data indicates approximately 86 in 10,000 people in the City area's census tract visited an emergency facility for asthma-related health issues. This rate places the City area's census tract in the 23rd percentile, meaning the asthma rate in this census tract is higher than 23 percent of the census tracts in the State.

Census Tract 6095253500 is within the top 25 percent of total CalEnviroScreen percentiles throughout the State. It is burdened by exposure to O_3 but overall is subject to relatively low levels of pollution and underlying conditions. Census tract 6095253500 is in the 35th percentile for O_3, meaning this census tract has higher exposure to O_3 than 35 percent of census tracts in the State. However, the census tract is not heavily burdened by socioeconomic factors, with a Population Characteristics Percentile of 71. The total CalEnviroScreen Percentile is 77.76, which falls within the top 25 percent, meaning the most burdened by pollution and socioeconomic factors, of all CalEnviroScreen scores statewide. Since this census tract is within the top 25 percent in scoring, according to the CalEnviroScreen methodology, it is considered a disadvantaged community pursuant to SB 535.

2.2.3 Local

2.2.3.1 Yolo-Solano County Air Pollution Control District

The YSAQMD is designated by law to adopt and enforce regulations to achieve and maintain ambient air quality standards. The YSAQMD responsibilities include preparing plans for the attainment of ambient air quality standards, adopting and enforcing air pollution rules, issuing permits for and inspecting stationary

air pollution sources, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, and implementing state and federal programs and regulations. The YSAQMD has also adopted various rules and regulations that are designed to reduce and control pollutant emissions from project's construction and operational activities. The following provisions applicable to the Proposed Project are summarized as follows:

- **Rule 2.1: Control of Emissions:** The emission of material which may be the cause of air pollution shall be controlled.
- **Rule 2.3 Ringlemann Chart Visible Emissions:** A person shall not discharge into the atmosphere from any single source of emissions whatsoever any air contaminant for a period or periods aggregating more than three (3) in any one (1) hour which is: a.) As dark or darker in shade as that designated as No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines, or b.) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in section (A) above.
- **Rule 2.5 Nuisance:** A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause to have a natural tendency to cause injury or damage to businesses or property.
- **Rule 2.14 Architectural Coating:** To limit the quantity of volatile organic compounds in architectural coating supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within the District.
- **Rule 2.19 Particulate Matter Process Emission Rate:** To reduce the amount of particulate matter entrained in the ambient air, or discharge into the ambient air, as a result of anthropogenic (manmade) fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions.
- **Rule 3.4 New Source Review:** The purpose of this rule is to provide for the review of new and modified stationary air pollution sources and to provide mechanisms, including emission offsets, by which authorities to construct for such sources may be granted without interfering with the attainment or maintenance of ambient air quality standards.

To assist local jurisdictions in the evaluation of air quality impacts under CEQA, the YSAQMD has published a guidance document for the preparation of the air quality portions of environmental documents that include thresholds of significance to be used in evaluating land use proposals. Thresholds of significance are based on a source's projected impacts and are a basis from which to apply mitigation measures. YSAQMD's CEQA thresholds have also been used to determine air quality impacts in this analysis. According to the YSAQMD, an air quality impact is considered significant if the Proposed Project would violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations.

The YSAQMD's established thresholds of significance for air quality for construction and operational activities of land use development projects are shown in Table 2-5.

Table 2-5. YSAQMD Significance Thresholds

Air Pollutant	Thresholds of Significance
ROG	10 tons/year
NO_x	10 tons/year
CO	Violation of a state ambient air quality standard for CO
SO_2	--
PM_{10}	80 pounds/day
$PM_{2.5}$	--

Source: YSAQMD 2007

By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size, by itself, to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's individual emissions exceed its identified significance thresholds, the project would be cumulatively considerable. Projects that do not exceed significance thresholds would not be considered cumulatively considerable.

2.3 Air Quality Emissions Impact Assessment

2.3.1 Threshold of Significance

The impact analysis provided below is based on the following California Environmental Quality Act (CEQA) Guidelines Appendix G thresholds of significance. The Project would result in a significant impact to air quality if it would do any of the following:

1) Conflict with or obstruct implementation of any applicable air quality plan.

2) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

3) Expose sensitive receptors to substantial pollutant concentrations.

4) Result in other emissions (such as those leading to odors adversely affecting a substantial number of people).

2.3.2 Methodology

Impacts related to air quality resulting from implementation (future construction and operation) of the proposed General Plan Update are discussed below. Air quality impacts were assessed in accordance with methodologies recommended by the YSAQMD. The analysis focuses on the extent to which the 2045

General Plan Update would conflict with regional and local air quality planning and regulatory compliance efforts. O_3 precursors and PM emitted anywhere in the SVAB can affect air quality throughout the region; thus, any increases in O_3 precursors and PM associated with the 2045 General Plan Update are inherently cumulative in nature. In contrast, the effects of diesel PM, TAC or odor emissions are localized to the vicinity of their specific sources, and the cumulative context for these emissions sources would include existing and proposed future development within the Planning Area. The impact analysis is based on calculations of the criteria air pollutant and O_3 precursor emissions that would result from projected future growth at buildout of the 2045 General Plan Update.

Compared with buildout of the City of Rio Vista under the existing "General Plan 2001", buildout of the proposed 2045 General Plan Update would redesignate a total of 773 acres, which would allow for an additional 3,022 residential units, and an additional 113 acres of mixed-use space and 18 acres of retail spaces. Conversely, compared with buildout of the City of Rio Vista under the existing General Plan 2001, buildout of the proposed General Plan Update would reduce the amount of allowable industrial building space by 130 acres. Where criteria air pollutant quantification was required, emissions were modeled using the California Emissions Estimator Model (CalEEMod), version 2022.1.28. CalEEMod is a statewide land use emissions computer model designed to quantify potential criteria pollutant emissions associated with operations from a variety of land use projects. The net increase in criteria air pollutant emissions for which the region is in nonattainment of ambient air quality standards (respirable and fine particulate matter, PM_{10} and $PM_{2.5}$, respectively) and O_3 precursors (ROG and NO_x) generated by the 2045 General Plan Update were estimated based on CalEEMod default vehicle miles traveled (VMT) and General Plan land use buildout assumptions. Operational generated air pollutant emissions calculations employed land uses and acreage provided by the City coupled with the median density/intensity standards contained in the City Municipal Code. (Density/intensity standards indicate how much development is allowed on a single plot of land. A maximum permitted Floor Area Ratio (FAR) is specified for nonresidential uses. FAR refers to the ratio of building floor space compared to the square footage of the site.)

The estimated daily PM_{10} emissions and annual average NO_x and ROG operational emissions from the CalEEMod modeling results are compared to the YSAQMD thresholds of significance.

The analysis also evaluates the potential for exposure of sensitive receptors to substantial pollutant concentrations and to excessive odors according to guidance from YSAQMD (YSAQMD 2007).

2.3.3 Impact Analysis

2.3.3.1 Project Construction-Generated Criteria Air Quality Emissions

The General Plan Update would accommodate future development for residential, commercial, recreational, and industrial uses. The future development and other physical changes that could result from the implementation of the General Plan Update would generate construction-related emissions of criteria air pollutants and O_3 precursors, including ROG, NO_X, PM_{10}, and $PM_{2.5}$ from site preparation (e.g., excavation, clearing), off-road equipment, material delivery, worker commute trips, and other activities (e.g., building construction, asphalt paving, application of architectural coatings). Typical construction activities that could occur with land use development include use of all-terrain forklifts, cranes, pick-up and fuel trucks,

compressors, loaders, backhoes, excavators, dozers, scrapers, pavement compactors, welders, concrete pumps, concrete trucks, and off-road haul trucks as well as other diesel-powered equipment as necessary. Fugitive dust emissions of PM_{10} and $PM_{2.5}$ would be associated primarily with site preparation and grading and would vary as a function of the soil silt content, soil moisture, wind speed, acreage of disturbance, and mobile sources. Emissions of O_3 precursors would occur from the exhaust of construction equipment and on-road vehicles. Paving and the application of architectural coatings would also result in off-gas emissions of ROG. PM_{10} and $PM_{2.5}$ would also be emitted from off-road equipment and vehicle exhaust.

Construction activities associated with the proposed General Plan Update would occur over the buildout horizon of the plan, causing short-term emissions of criteria air pollutants. For the proposed General Plan Update, which is a broad policy plan, it is not possible to determine whether the scale and phasing of individual projects would exceed the YSAQMD's thresholds of criteria pollutants of concern, as identified in Table 2-5 above, due to project-level variability and uncertainties related to future individual projects in terms of detailed site plans, construction schedules, equipment requirements, etc., which are not currently determined or even proposed. Nonetheless, depending on how development proceeds, construction-generated emissions associated with the proposed General Plan Update could potentially exceed YSAQMD thresholds of significance. Overall, air quality emissions related to construction must be addressed on a project-by-project basis, and information regarding specific development projects, soil types, and the locations of receptors would be needed to quantify the level of impact associated with construction activity.

As typically required for new discretionary development projects, the City requires that development applications be reviewed against YSAQMD quantification methodologies and significant protocols and incorporate, as conditions of approval or mitigation measures, YSAQMD-recommended pollutant-reduction measures if necessary to reduce project pollutants to levels below significance thresholds. Specifically, proposed General Plan Update Policy OSC-13 would require application of the analysis methods and significance thresholds recommended by the YSAQMD to determine a future project's air quality impacts. The YSAQMD has promulgated methodology protocols for the preparation of air quality analyses. For instance, the YSAQMD has adopted thresholds of significance depicting the approximate level of construction-generated emissions that would result in a potentially significant impact (i.e., violation of an ambient air quality standard) for each pollutant of concern. The significance criteria established by the YSAQMD may be relied upon to make a determination of impact significance level. In addition, the YSAQMD recommends appropriate emissions modeling input parameters for the Solano County region in addition to other recommended procedures for evaluating potential air quality impacts during the environmental review process consistent with CEQA requirements.

Projects estimated to exceed YSAQMD significance thresholds are required to implement mitigation measures in order to reduce air pollutant emissions as much as feasible. Such measures would be required to be implemented and could include, but is not limited to, the requirement that all construction equipment employ the use of the most efficient diesel engines available, which are able to reduce NO_X, PM_{10}, and $PM_{2.5}$ emissions by 60–90 percent (e.g., EPA-classified Tier 3 and/or Tier 4 engines[1]), and/or that construction

[1] NOx emissions are primarily associated with use of diesel-powered construction equipment (e.g., graders, excavators, rubber-tired dozers, tractor/loader/backhoes). The Clean Air Act of 1990 directed the EPA to study, and regulate if warranted, the contribution of off-road internal combustion engines to urban air pollution. The first federal standards (Tier 1) for new off-road diesel engines were

equipment be equipped with diesel particulate filters. Other YSAQMD recommended air pollutant reduction measures include, but are not limited to, the following:

- The fueling of all off-road and portable diesel powered equipment with CARB certified motor vehicle diesel fuel (non-taxed version suitable for use off-road).
- The prohibition of all on and off-road diesel equipment from idling for more than 5 minutes and the posting of signs in the designated queuing areas and/or job sites to remind drivers and operators of the 5 minute idling limit.
- The prohibition of diesel idling within 1,000 feet of sensitive receptors.
- The prohibition of locating staging and queuing areas within 1,000 feet of sensitive receptors.
- The use of electrified equipment when feasible.
- The substitution of gasoline-powered in place of diesel-powered equipment, where feasible.
- The use of alternatively fueled construction equipment on-site where feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane or biodiesel.
- The requirement that contractors repower equipment with the cleanest engines available.
- The requirement that construction equipment use installed California Verified Diesel Emission Control Strategies. These strategies are listed at: http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm
- The requirement that the contractor prepare a dust control plan when the disturbed area is more than one (1) acre.
- The reduction of the amount of disturbed areas where possible.
- The use of water trucks or sprinkler systems in sufficient quantities to prevent airborne dust from leaving the site, and the requirement to increase watering frequency whenever wind speeds exceed 15 mph, using reclaimed (non-potable) water whenever possible.
- The spraying of all dirt stock-pile areas daily as needed.
- The requirement that all roadways, driveways, sidewalks, etc. be paved as soon as possible, with building pads laid as soon as possible after grading unless seeding or soil binders are used.
- The requirement to show all fugitive dust mitigation measures on grading and building plans.
- The requirement that the contractor or builder designate a person or persons to monitor the fugitive dust emissions and enhance the implementation of the measures as necessary to minimize dust complaints, reduce visible emissions below 20 percent opacity, and prevent transport of dust offsite.

Furthermore, all development projects in Rio Vista are subject to YSAQMD rules and regulations adopted to reduce air pollutant emissions. As just described, proposed General Plan Update Policy OSC-13 would require application of the analysis methods and significance thresholds recommended by the YSAQMD to

adopted in 1994 for engines over 50 horsepower and were phased in from 1996 to 2000. In 1996, a Statement of Principles pertaining to off-road diesel engines was signed between the EPA, CARB, and engine makers (including Caterpillar, Cummins, Deere, Detroit Diesel, Deutz, Isuzu, Komatsu, Kubota, Mitsubishi, Navistar, New Holland, Wis-Con, and Yanmar). On August 27, 1998, the EPA signed the final rule reflecting the provisions of the Statement of Principles. The 1998 regulation introduced Tier 1 standards for equipment under 50 horsepower and increasingly more stringent Tier 2 and Tier 3 standards for all equipment with phase-in schedules from 2000 to 2008. As a result, all off-road, diesel-fueled construction equipment manufactured in 2006 or later has been manufactured to Tier 3 standards. On May 11, 2004, the EPA signed the final rule introducing Tier 4 emission standards, which are currently phased-in over the period of 2008-2015. The Tier 4 standards require that emissions of PM and NOx be further reduced by about 90 percent. All off-road, diesel-fueled construction equipment manufactured in 2015 or later will be manufactured to Tier 4 standards.

determine a future project's air quality impacts. YSAQMD Rule 2.3, *Visible Emissions*, states that no person shall discharge into the atmosphere from any single source of emissions whatsoever any air contaminant for a period or periods aggregating more than three (3) in any one (1) hour which is: a.) As dark or darker in shade as that designated as No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines, or b.) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described above. Rule 2.5, *Nuisance*, states that no person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause to have a natural tendency to cause injury or damage to businesses or property. Rule 2.14, *Architectural Coating*, requires a limit on the quantity of volatile organic compounds in architectural coating supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within the county. Rule 2.19, Fugitive Dust, requires the reduction of the amount of particulate matter entrained in the ambient air, or discharge into the ambient air, as a result of anthropogenic (manmade) fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions.

While the YSAQMD has promulgated methodology protocols for the preparation of air quality analyses, and future development projects allowed under the proposed General Plan Update that are projected to exceed YSAQMD significance thresholds are required to implement mitigation measures in order to reduce air pollutant emissions as much as feasible, YSAQMD significance thresholds may still be exceeded as a result of construction activities allowed under the proposed General Plan Update. Since it cannot be guaranteed that construction of future projects allowed under the proposed General Plan Update would generate air pollutant emissions below YSAQMD significance thresholds due to the programmatic and conceptual nature of the proposed General Plan Update and uncertainties related to future individual projects, this is considered a significant impact. As such, due to nonattainment status for O_3, PM_{10}, and $PM_{2.5}$, construction activities associated with implementation of the General Plan Update may result in adverse air quality impacts to surrounding land uses and may contribute to the existing air quality condition in the City. The General Plan Update has been prepared to include policies and actions to address and mitigate impacts at the plan level. Policies included in the General Plan Update would reduce emissions from construction. For instance, implementation of Policy OSC-13 could reduce emissions of ROG, NOx, and PM_{10} associated by most future construction activities to a less-than-significant level through compliance with YSAQMD's recommended thresholds and application of applicable mitigation measures. Proposed General Plan Update Policy OSC-13 would additionally reduce future construction emissions under the proposed General Plan by requiring construction contractors to utilize Tier 4 engines and exhaust filters, which significantly reduce NOx, ROG, PM_{10} and $PM_{2.5}$ emissions, when necessary to reduce projected construction emissions to levels below significance thresholds. However, at this programmatic stage, the City cannot guarantee that implementing these measures would be sufficient to fully mitigate construction emissions for all projects in all scenarios. There are no additional plan-level measures available that would address this impact. For the vast majority of development projects implemented under the General Plan Update, compliance with existing state and federal regulations, as well as compliance with proposed General Plan Update policies and actions would minimize potential adverse air emissions; however, due to the level of uncertainty regarding the specific project types and the lack of detailed development plans at this

programmatic level of analysis, it cannot be concluded that all impacts would be minimized in a manner consistent with YSAQMD's guidance. Individual projects under the General Plan Update may involve unusual use types, locations, or design features that cannot be anticipated at this city-wide planning stage. Additional measures to minimize unique, project-specific impacts may be able to be identified at the time of environmental review for these individual projects; however, the measures cannot be identified at this time, nor can the City guarantee that such measures will, in fact, be available and feasible for all project scenarios.

Impacts due to construction emissions would be significant.

2.3.3.2 Project Operations Criteria Air Quality Emissions

The proposed General Plan Update would accommodate new development that would operate through the planning horizon year. New residential, commercial, industrial, and recreational development facilitated by the proposed General Plan Update would result in long-term area-, energy-, and mobile-source emissions. Area source emissions are the combination of many small emission sources that include use of outdoor landscape maintenance equipment, use of consumer products such as cleaning products, use of fireplaces and hearths, and periodic reapplication of architectural coatings. Criteria pollutants generated from energy sources are principally from the onsite use of natural gas and other heating fuels; electricity consumption is not included in energy source emissions as those potential emissions would be generated as the result of the operation of an electricity generation facility which may or may not be within the same air basin and under the same attainment status as the end-use. Mobile source emissions result from the vehicle activity associated with the operation of a given land use development project. It should be noted that the proposed General Plan Update would not itself authorize specific development to occur within the City. Future development projects would be subject to the City's standard CEQA review process and would be required to assess project-specific emissions in relation to the YSAQMD significance thresholds. Although specific project-level information for potential future development is not available at this time and the estimation of emissions resulting from future development would be speculative, anticipated average daily emissions were quantified and presented in Table 2-6 in order to provide an estimate of the potential overall area, energy, and mobile source emissions resulting from the proposed General Plan Update based on the calculation methodology provided in Section 2.3.2, Methodology.

Table 2-6. Operational Criteria Air Pollutant Emissions						
Emission Source	**Pollutant**					
	ROG	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Proposed General Plan Update Buildout Daily Emissions (Pounds per Day)						
Mobile	979.00	1,143.00	7,109.00	22.40	142,855.00	14,562.00
Area	1,318.00	15.50	1,808.00	0.10	2.68	2.02
Energy	18.10	326.00	253.00	1.97	25.00	25.00
Total	**2,315.10**	**1,484.50**	**9,170.00**	**24.47**	**142,882.68**	**14,589.02**
YSAQMD Significance Threshold	-	-	-	-	*80 pounds/day*	-
Exceed YSAQMD Daily Threshold?	**No**	**No**	**No**	**No**	**Yes**	**No**
Proposed General Plan Update Buildout Total Annual Emissions (Tons per Year)						
Mobile	134.00	152.00	886.00	2.86	18,496.00	1,887.00
Area	216.00	1.40	163.00	0.01	0.24	0.18
Energy	3.30	59.40	46.20	0.36	4.56	4.56
Total	**353.30**	**212.80**	**1,095.20**	**3.23**	**18,500.80**	**1,891.74**
YSAQMD Significance Threshold	*10 tons/year*	*10 tons/year*	-	**-**	**-**	**-**
Exceed YSAQMD Daily Threshold?	**Yes**	**Yes**	**No**	**No**	**No**	**No**
Existing General Plan 2001 Buildout Daily Emissions (Pounds per Day)						
Mobile	969.00	1,587.00	6,963.00	18.80	85,349.00	8,712.00
Area	853.00	10.10	1,156.00	0.07	1.75	1.32
Energy	12.70	230.00	180.00	1.39	17.60	17.60
Total	**1,834.70**	**1,827.10**	**8,299.00**	**20.26**	**85,368.35**	**8,730.92**
YSAQMD Significance Threshold	-	-	-	-	*80 pounds/day*	-
Exceed YSAQMD Daily Threshold?	**No**	**No**	**No**	**No**	**Yes**	**No**
Existing General Plan 2001 Buildout Total Annual Emissions (Tons per Year)						
Mobile	129.00	206.00	882.00	2.43	10,962.00	1,120.00
Area	140.00	0.91	104.00	0.01	0.16	0.12
Energy	3.32	41.90	32.80	0.25	3.21	3.21
Total	**272.32**	**248.81**	**1,018.80**	**2.69**	**10,965.37**	**1,123.33**
YSAQMD Significance Threshold	*10 tons/year*	*10 tons/year*	-	**-**	**-**	**-**
Exceed YSAQMD Daily Threshold?	**Yes**	**Yes**	**No**	**No**	**No**	**No**

Table 2-6. Operational Criteria Air Pollutant Emissions						
Emission Source	**Pollutant**					
	ROG	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Daily Emissions (Pounds per Day) Difference						
Mobile	+10.00	-444.00	+146.00	+3.60	+57,506.00	+5,850.00
Area	+465.00	+5.40	+652.00	+0.03	+0.93	+0.70
Energy	+5.40	+96.00	+73.00	+0.58	+7.40	+7.40
Total	**+480.40**	**-342.60**	**+871.00**	**+4.21**	**+57,514.33**	**+5,858.10**
YSAQMD Significance Threshold	-	-	-	-	*80 pounds/day*	-
Exceed YSAQMD Daily Threshold?	**No**	**No**	**No**	**No**	**Yes**	**No**
Total Annual Emissions (Tons per Year) Difference						
Mobile	+5.00	-54.00	+4.00	+0.43	+7,534.00	+767.00
Area	+76.00	+0.49	+59.00	0.00	+0.08	+0.06
Energy	-0.02	+17.50	+13.40	+0.11	+1.35	+1.35
Total	**+80.98**	**-36.01**	**+76.40**	**+0.54**	**+7,535.43**	**+768.41**
YSAQMD Significance Threshold	*10 tons/year*	*10 tons/year*	-	**-**	**-**	**-**
Exceed YSAQMD Daily Threshold?	**Yes**	**Yes**	**No**	**No**	**No**	**No**

Source: CalEEMod version 2022.1.1.28 Refer to Attachment A and Attachment B for Model Data Outputs.
Notes: Emission projections predominately based on CalEEMod model defaults for Solano County, site acreage provided by the City, and median building square footage and dwelling units allowed per information the City's General Plan Land Use Element.

As shown by Table 2-6, all criteria air pollutant emissions projected to be generated at buildout of the proposed 2045 General Plan Update would be higher than projected emissions at existing General Plan 2001 buildout, with the exception of NOx emissions. NOx emissions would be higher under the existing General Plan 2001 buildout. This is because buildout of the existing General Plan 2001 would accommodate a greater amount of industrial land use acreage, a source of heavy-duty trucks. Heavy-duty trucks are a potent source of NOx compared with other vehicles and the reduction of industrial land use acreage under the proposed General Plan would instigate fewer heavy-duty truck trips in the city and therefore less NOx emissions. Buildout of the proposed 2045 General Plan Update would allow for an additional 3,022 residential units, an additional 113 acres of mixed-use space and an additional 18 acres of retail spaces compared with the existing General Plan 2001 buildout and the more typical fleet mix associated with these land uses would result in increases of the other pollutants.

The General Plan Update does propose several policy provisions that would assist to reduce the generation of criteria air pollutants from mobile sources, the highest emitter of criteria air pollutants. For instance, proposed Land Use and Community Character Element Policy LU-1 seeks the development of compact, complete residential neighborhoods by encouraging the location of services and amenities within walking

and biking distance of residences. Policy LU-3 would encourage new residential development to incorporate design features that promote walking and connectivity between blocks and adjacent neighborhoods and in a similar context, Policy LU-6 would encourage development in the North Waterfront District to be a mix of uses including residential, commercial, and public park space along the waterfront. Proposed Policy LU-9 would promote pedestrian-oriented retail and mixed-use development in Neighborhood Mixed Use, Downtown, and the Waterfront areas. The promotion of mixed-use development contributes to less dependency on automobiles, a source of criteria air pollutants. Mobility and Circulation Element Policies MC-2, MC-4, and MC-14 proposes to promote the development of bikeways, sidewalks, pedestrian pathways, and multi-use paths that connect residential neighborhoods with other neighborhoods, schools, employment centers, commercial centers and public open space, and that separate bicyclists, skateboarders, and pedestrians from vehicular traffic whenever possible. Proposed Policy MC-15 seeks to ensure that bicycle and pedestrian facilities follow logical routes providing connections between transportation nodes and land uses, including bicycle and pedestrian connections to transit stops, buses that can accommodate bicycles, and park-and-ride lots, so that the pedestrian facilities serve the transportation needs of residents, and are not constructed as "sidewalks to nowhere." Further, Policy MC-16 seeks to ensure that the City's circulation network will accommodate all anticipated and potential modes of transportation, including small personal electric vehicles ranging in size up to golf carts. Additionally, Parks & Recreation Policy PR-9 proposes to create an integrated trail, bikeway, and open space network within the City that links parks and recreation areas, schools, downtown, the waterfront, and residential neighborhoods.

Development projects accommodated by the proposed General Plan would be analyzed on a case-by-case basis when detailed information regarding operational activities is known and, where applicable, projects will be required to implement mitigation to reduce operational emissions. Future projects would be subject to the proposed General Plan Update policies identified above, as well as YSAQMD and State rules and regulations, including, but not limited to those identified in Section 2.2, Regulatory Framework. Nonetheless, due to the uncertainties discussed above, the reductions that may be achieved through implementation of General Plan Update policies cannot be assumed to be sufficient to reduce operational emissions to meet the YSAQMD's thresholds for all projects and in instances where concurrent projects may combine to exceed thresholds. Therefore, emissions associated with the Project could exceed the YSAQMD significance thresholds. The Project has been designed to include policies and actions to address and mitigate impacts. Policies included in the General Plan Update would reduce emissions of criteria air pollutants in Rio Vista but cannot be assumed to be sufficient to reduce operational emissions to meet the YSAQMD thresholds. There are no additional plan-level measures available that would reduce impacts from long-term operational-related emissions. All feasible operational emissions reduction measures have been incorporated into the General Plan Update through the inclusion of the policies discussed above. There could be additional project-specific mitigation measures applied to specific future development allowed under the General Plan Update to reduce long-term operational-generated emissions of air pollutants to levels below the YSAQMD's thresholds of significance. However, the nature, feasibility, and effectiveness of such project-specific mitigation cannot be determined at this time. As such, the City cannot assume that mitigation would be available and implemented such that all future operational-related emissions of air pollutants would be reduced to less-than-significant levels. Furthermore, as shown by Table 2-6 all criteria air pollutant emissions at buildout of the proposed 2045 General Plan Update, with the exception of NOx,

would be higher than projected emissions at existing General Plan 2001 buildout. As such, this impact is significant.

2.3.3.3 Project Consistency with Air Quality Planning

As part of its enforcement responsibilities, the USEPA requires each state with nonattainment areas to prepare and submit a SIP that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs. Similarly, under state law, the CCAA requires an air quality attainment plan to be prepared for areas designated as nonattainment regarding the federal and state ambient air quality standards. Air quality attainment plans outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date.

As previously described, the YSAQMD is the agency responsible for enforcing many federal and State air quality requirements and for establishing air quality rules and regulations. The YSAQMD attains and maintains air quality conditions in Solano County. They achieve this through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. As part of this effort, the YSAQMD has developed input to the SIP. The 2017 Sacramento Regional 2008 8-Hour Ozone Attainment and Reasonable Further Progress Plan (including 2018 updates), the PM_{10} Implementation/Maintenance Plan and Re-Designation Request (2010), and $PM_{2.5}$ Implementation/ Maintenance Plan and Re-designation Request for Sacramento $PM_{2.5}$ Nonattainment Area (2013) constitute the current SIP for Solano County and include the YSAQMD's plans and control measures for attaining air quality standards. These air quality attainment plans are a compilation of new and previously submitted plans, programs (e.g., monitoring, modeling, permitting), district rules, state regulations, and federal controls describing how the state will attain ambient air quality standards.

The proposed 2045 General Plan Update and associated policy provisions support the air quality planning efforts of the YSAQMD, as they include applicable pollutant control mechanisms. For instance, the General Plan Update promotes compact, mixed-use development patterns that reduce the need for automobile travel, and thus reduce criteria air pollutants. It is noted that an additional 113 acres of mixed-use space is proposed in the 2045 General Plan Update. Further, Land Use and Community Character Element Implementation Program LU-4 incentivizes development on underutilized land, which minimizes sprawl and shortens commuting distances, indirectly reducing VMT and thereby reducing criteria air pollutants. The proposed General Plan Update seeks to reduce the environmental impact (including air quality) of land use development by increasing the viability of walking, biking, and transit. The proposed General Plan Update supports the development of projects that facilitate and enhance the use of alternative modes of transportation, including pedestrian-oriented retail and activity centers and dedicated bicycle lanes and paths. For example, proposed Land Use and Community Character Element Policy LU-1 seeks the development of compact, complete residential neighborhoods by encouraging the location of services and amenities within walking and biking distance of residences. Policy LU-3 would encourage new residential development to incorporate design features that promote walking and connectivity between blocks and adjacent neighborhoods and in a similar context, Policy LU-6 would encourage development in the North

Waterfront District to be a mix of uses including residential, commercial, and public park space along the waterfront. Proposed Policy LU-9 would promote pedestrian-oriented retail and mixed-use development in Neighborhood Mixed Use, Downtown, and the Waterfront areas. The Mobility and Circulation Element focuses on enhancing active transportation infrastructure, such as bicycle lanes and pedestrian pathways, and supports alternatives to single-occupancy vehicle trips. Additionally, this Element of the proposed General Plan Update seeks to collaborate with regional entities like the Solano Transportation Authority with the intent of improving public transit access and reducing vehicular reliance, thus reducing criteria air pollutants. By improving public transit options, the proposed General Plan aims to shift commuters from private vehicles to mass transit, reducing congestion and emissions. The Open Space and Resource Conservation Element integrates air quality considerations in the conservation of natural resources. The policy provisions in this element emphasize reducing emissions through energy efficiency in new developments and preserving open spaces, which serve as carbon sinks. Additionally, this Element encourages urban greening, such as tree planting, which directly contributes to mitigating urban heat islands and improving air quality. Most importantly, Open Space and Resource Conservation Element Policy OSC-13 requires coordination with the YSAQMD, ensuring that the majority of development projects adhere to emissions reduction targets and other air quality regulations.

These proposed policy provisions demonstrate the General Plan's alignment with the YSAQMD's goals to improve air quality by reducing vehicular emissions, supporting sustainable development, and enhancing green infrastructure. The policies and programs of the proposed General Plan Update collectively create a framework for Rio Vista to grow in a manner that actively supports air quality improvements by reducing emissions from transportation, encouraging sustainable land use, and integrating green infrastructure. The proposed General Plan Update is consistent with YSAQMD's air quality planning efforts and the Project would not conflict with or obstruct implementation of YSAQMD's air quality plans.

2.3.3.4 Exposure of Sensitive Receptors to Toxic Air Contaminants

As previously described, sensitive receptors are defined as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. CARB has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over age 65, children under age 14, athletes, and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis.

According to California's SB 535, the City of Rio Vista is considered a disadvantage community due to it designation as such based on the CalEnviroScreen tool, described in detail in Section 2.2.2.10, *CalEnviroScreen and Disadvantaged Communities (Senate Bill 535)*, which identifies areas disproportionately burdened by environmental pollution and other factors impacting public health, meaning that residents of Rio Vista are likely to experience higher levels of environmental hazards compared to other communities in California.

Construction-Generated Air Contaminants

Construction of the Project would result in temporary emissions of ROG, NO_x, CO, PM_{10}, $PM_{2.5}$, and the TAC, DPM. As previously described, TACs are a defined set of airborne pollutants that may pose a present or potential hazard to human health. Sources of the TAC, DPM, during construction activities include off-road construction vehicle and equipment use and on-road vehicle use for material and soil hauling. For construction activity, DPM is the primary TAC of concern. Identification of potential impacts to sensitive receptors resulting from individual project-generated TACs would require project-specific information for future individual land use development projects that is not currently known. Therefore, assessment of future development projects facilitated by the proposed General Plan Update that would be subject to CEQA would undergo their own review of potential construction-related localized impacts and identify appropriate and feasible mitigation to implement to reduce potentially significant impacts. The amount to which the receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Health-related risks associated with diesel-exhaust emissions are primarily linked to long-term exposure and the associated risk of contracting cancer. Concentrations of mobile-source diesel PM emissions are typically reduced by 70 percent at a distance of approximately 500 feet (CARB 2005). In the case of most construction projects allowed under the proposed 2045 General Plan Update, duration would be short term, lasting less than one year. Construction-generated DPM emissions contribute to negative health impacts when construction is extended over lengthy periods of time. The use of diesel-powered construction equipment during construction would be temporary and episodic and would occur over several locations isolated from one another. Furthermore, future development allowed under the proposed 2045 General Plan Update would be subject to and would comply with California regulations limiting idling to no more than 5 minutes, which would further reduce nearby sensitive receptors exposure to temporary and variable diesel PM emissions. Many of the individual construction projects would span small areas. Construction projects contained in a site of less than 5 acres are generally considered to represent less than significant health risk impacts due to (1) limitations on the off-road diesel equipment able to operate and thus a reduced amount of generated diesel PM, (2) the reduced amount of dust-generating ground disturbance possible compared to larger construction sites, and (3) the reduced duration of construction activities compared to the development of larger sites. For these reasons and because diesel fumes disperse rapidly over relatively short distances, DPM generated by most construction activities, in and of itself, would not be expected to create conditions where the probability of contracting cancer is greater than 10 in one million for nearby receptors.

Implementation of Policy OSC-13 could reduce emissions of DPM associated by most future construction activities to a less-than-significant level through compliance with YSAQMD's recommended thresholds and application of applicable mitigation measures, such as the requirement to utilize Tier 4 engines and exhaust filters, which significantly reduce DPM emissions, when necessary to reduce projected construction emissions to levels below significance thresholds. Implementation of appropriate YSAQMD-recommended pollutant reduction measures would reduce construction emissions for future individual development projects; however, because individual project-specific information is not available, it is not possible to determine whether implementation of the YSAQMD reduction measures would reduce health risk-related impacts to sensitive receptors or identify additional quantifiable mitigation measures that would reduce project-specific construction emissions to ensure that localized emissions generated during construction of

future development projects under the General Plan Update do not expose sensitive receptors to substantial pollutant concentrations. As such, the following mitigation is recommended.

Mitigation Measure

MM AQ-1 The following will be added as policies to the Open Space and Resource Conservation Element of the 2045 General Plan:

NEW POLICY: In the case when a subsequent project's construction span is greater than 5 acres and/or is scheduled to last more than two years, the subsequent project applicant shall be required to prepare a site-specific construction pollutant mitigation plan in consultation with City of Rio Vista Planning staff prior to the issuance of grading permits. A project-specific construction-related dispersion modeling acceptable to the Yolo Solano Air Quality Management District (YSAQMD) shall be used to identify potential toxic air contaminant impacts, including diesel particulate matter. If YSAQMD risk thresholds (i.e., probability of contracting cancer is greater than 10 in one million) would be exceeded, mitigation measures shall be identified in the construction pollutant mitigation plan to address potential impacts and shall be based on site-specific information such as the distance to the nearest sensitive receptors, project site plan details, and construction schedule. The City shall ensure construction contracts include all identified measures and that the measures reduce the health risk below YSAQMD risk thresholds. Construction pollutant mitigation plan measures shall include but not be limited to:

1. Limiting the amount of acreage to be graded in a single day.
2. Restricting intensive equipment usage and intensive ground disturbance to hours outside of normal school hours.
3. Notifying affected sensitive receptors one week prior to commencing on-site construction so that any necessary precautions (such as rescheduling or relocation of outdoor activities) can be implemented. The written notification shall include the name and telephone number of the individual empowered to manage construction of the project. In the event that complaints are received, the individual empowered to manage construction shall respond to the complaint within 24 hours. The response shall include identification of measures being taken by the project construction contractor to reduce construction-related air pollutants. Such a measure may include the relocation of equipment.

Mitigation measure AQ-1 requires a site-specific analysis of large-scale construction projects (greater than 5 acres lasting longer than two years) for the potential for construction-generated air pollutant impacts based on specific project details of future development, and the development of adequate mitigation, consistent with YSAQMD methodologies and protocols, to address any such impacts. As a result, implementation of these mitigation measures would reduce the impact.

Operational Air Contaminants

Common sources of operational TAC emissions are stationary sources (e.g., diesel backup generators and gasoline stations), which are subject to YSAQMD permit requirements. Another common and often more significant source type is on-road motor vehicles on high-volume roads, such as SR-12. As previously described, CARB developed and approved the Air Quality and Land Use Handbook: A Community Health Perspective (2005) to address the siting of sensitive land uses in the vicinity of freeways, distribution centers, rail yards, ports, refineries, chrome plating facilities, dry cleaners, and gasoline-dispensing facilities. This guidance document was developed to assess compatibility and associated health risks when placing sensitive receptors near existing pollution sources. CARB's recommendations on the siting of new sensitive land uses identified in Table 2-4 above were based on a compilation of recent studies that evaluated data on the adverse health effects from proximity to air pollution sources.

As a planning document, the proposed General Plan Update identifies land use designations within the City Boundary, Sphere of Influence, and Planning Area that specify the type of allowed uses associated with each designation. While the proposed General Plan Updated does not propose site-specific development, its policies establish a framework to minimize TAC exposure risks through careful land use planning. Key characteristics include the fact that Rio Vista already hosts sensitive land uses such as residential neighborhoods, schools, and healthcare facilities, and the proposed General Plan Update anticipates the addition of new sensitive land uses (primarily residential) during implementation but incorporates safeguards to minimize exposure risks. Compared to the existing 2001 General Plan, the proposed General Plan Update reduces allowable industrial development by 130 acres. This shift demonstrates a deliberate effort to mitigate potential conflicts between industrial TAC sources and sensitive receptors.

The General Plan requires industrial uses to be located away from sensitive land uses like residences. By prohibiting heavy industrial activities near residential areas, schools, and healthcare facilities, the proposed General Plan Update minimizes potential exposure to high concentrations of TACs. For example, proposed Land Use and Community Character Element Policy LU-7 explicitly emphasizes that new developments must be compatible with surrounding uses. This ensures that sensitive receptors like schools, homes, or healthcare facilities are not situated near significant TAC sources, such as heavy manufacturing facilities or distribution centers. The proposed General Plan Update also contains policy provisions that are generally consistent with the CARB Air Quality and Land Use Handbook. For example, The General Plan Land Use Element would require the location of industrial and commercial land uses away from noise-sensitive land uses, which also includes TAC-sensitive land uses such as residences, thereby prohibiting the development of any substantial commercial or industrial source of TAC emissions in the vicinity of residential land uses. Additionally, the Land Use Element states that to protect existing industry and commercial businesses, new sensitive land uses shall not be placed near existing noise generating uses, which often consist of sources of TAC emissions such as industrial facilities, thereby prohibiting the development of TAC-sensitive land uses in the vicinity of most sources of stationary TAC sources.

These proposed policies of the General Plan Update effectively assist to reduce human health impacts and exposure of sensitive receptors to substantial pollutant concentrations including, the requirement new developments to be compatible with existing uses, preventing land use conflicts. The proposed General Plan Update generally aligns with CARB guidelines to maintain safe distances between sensitive land uses

and major TAC sources, and further reduces industrial land use acreage, decreasing the overall potential for stationary TAC sources. Given these proactive measures, the General Plan Update demonstrates a strong framework for managing TAC-related health risks.

2.3.3.5 Odors

Typically, odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Construction activities that have the potential to emit odors from the operation of diesel equipment, generation of fugitive dust, and paving (asphalt). Odors and similar emissions from construction would be intermittent and temporary, and generally would not extend beyond the construction area. While odors could be generated during construction activities, the proposed General Plan Update would not directly result in construction of any development project. Identification of potential impacts to odor receptors resulting from construction-generated odors, such as equipment exhaust, would require project-specific information for future individual land use development projects that is not currently known. Nonetheless, odors generated from the operation of diesel equipment are short-term in nature and rapidly dissipate and be diluted by the atmosphere downwind of the odor sources. Additionally, odors would be localized and generally confined to the construction area. Therefore, construction odors generated under the General Plan Update would not adversely affect a substantial number of people to odor emissions.

According to the YSAQMD CEQA Handbook (2007), facilities/land uses that have the potential to produce odors during standard operations and may require special attention in the environmental review process include the following:

- Wastewater Treatment Plants
- Sanitary Landfills
- Composting/Green Waste Facilities
- Recycling Facilities
- Chemical Manufacturing Plants
- Painting/Coating Operations
- Agricultural Operations
- Slaughterhouse/Food Packaging Plants

Per the YSAQMD (2007), if a land use project proposes any of the above type of land uses, which have the potential to cause significant odor impacts, the odor impacts should be identified and discussed in the environmental document so mitigation measures may be identified. These guidelines further state that the most effective mitigation strategy is to provide a sufficient distance, or buffer zone, between the source and the receptor(s). The greater the distance between an odor source and receptor, the less odor impact when it reaches the receptor. The YSAQMD CEQA Handbook (2007) recommends a buffer distance of one mile between odor sources like those listed above and sensitive receptors. Consideration of YSAQMD's recommended buffer distances would be required for all future development under the proposed General Plan Update, which requires incorporation, as conditions of approval, of YSAQMD-recommended mitigation measures (see General Plan Update Policy OSC-13). Additionally, the City Municipal Code also addresses potential odor impacts by requiring that no emission of odorous gases or other odorous matter be permitted in excess of the most recent standards adopted by the YSAQMD and Solano County Department of Environmental Health. Any process which may involve the creation or emission of any odor shall be provided with a secondary safeguard system so that control will be maintained if the primary safeguard system should fail. Lastly, YSAQMD Rule 2.5, *Nuisance*, states that no person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause to have a natural tendency to cause injury or damage to businesses or property. These existing requirements would minimize odor emissions from adversely affecting a substantial number of people within the City, and impacts would be less than significant.

2.3.3.6 Cumulative Air Quality Impacts

The cumulative area of analysis is the SVAB, which includes Rio Vista. By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size, by itself, to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively

significant adverse air quality impacts. Furthermore, per YSAQMD guidance, projects that would individually have a significant air quality impact would also be considered to have a significant cumulative impact. Thus, the impacts previously discussed are evaluated in the cumulative context and no additional cumulative analysis is needed.

In summary, the proposed General Plan Update is expected to generate construction and operational emissions that would exceed YSAQMD thresholds. Additionally, buildout of the proposed General Plan would result in an increase of emissions compared with buildout of the existing General Plan, with the exception of NOx emissions. Implementation of proposed General Plan Polices and YSAQMD-recommended mitigation measures would reduce construction and operational emissions for future projects under the proposed General Plan Update; however, due to the programmatic nature of this Draft EIR, it cannot be determined whether this would reduce emissions below the specified thresholds during construction or operation. Thus, Project impacts are cumulatively considerable.

Health Effects

The City of Rio Vista, within the SVAB, is designated as nonattainment with respect to the NAAQS and CAAQS for ROG and NOx, which are precursors to ozone. The health effects associated with O_3 are generally associated with reduced lung function. The contribution of reactive organic gases and NOx to regional ambient O_3 concentrations is the result of complex photochemistry. The increases in O_3 concentrations in the SVAB due to O_3 precursor emissions tend to be found downwind from the source location to allow time for the photochemical reactions to occur. Further, the potential for exacerbating excessive O_3 concentrations would also depend on the time of year that the ROG emissions would occur, because exceedances of the O_3 NAAQS and CAAQS tend to occur between April and October when solar radiation is highest. Due to the lack of quantitative methods to assess this complex photochemistry and the difficulty in connecting small amounts of pollution to generalized health outcomes, the holistic effect of a single project's emissions of O_3 precursors on health impacts is hard to predict. The effect of a single project's emissions of O_3 precursors is speculative due to the lack of quantitative methods to assess this impact.

The Rio Vista region is also designated as nonattainment with respect to the NAAQS for $PM_{2.5}$ and nonattainment with respect to the CAAQS for PM_{10}. Particulate matter (PM_{10} and $PM_{2.5}$) contains microscopic solids or liquid droplets that are so small that they can get deep into the lungs and cause serious health problems. Particulate matter exposure has been linked to a variety of problems, including premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms such as irritation of the airways, coughing, or difficulty breathing. While PM_{10} and $PM_{2.5}$ contribute to overall air quality concerns, these pollutants are highly localized. PM concentrations decrease rapidly with distance from the source due to dispersion and gravitational settling, and thus regional air quality averages do not capture the localized nature of PM emissions. For these reasons, the effect of a single project's PM emissions, in combination with other projects and sources spanning the SVAB and Rio Vista region, is speculative.

While it is not possible to determine whether implementation of the YSAQMD reduction measures would reduce health risk-related impacts to sensitive receptors or identify additional quantifiable mitigation measures that would reduce project-specific construction emissions to ensure that localized emissions

generated during construction of future development projects under the General Plan Update do not expose sensitive receptors to substantial pollutant concentrations, proposed policies of the General Plan Update would effectively reduce human health impacts and exposure of sensitive receptors to substantial pollutant concentrations during the operations of these future development projects.

There are numerous scientific and technological complexities associated with correlating criteria air pollutant emissions from an individual project to specific health effects or potential additional nonattainment days, and there are currently no modeling tools that can provide reliable and meaningful additional information regarding health effects from criteria air pollutants generated by individual projects within YSAQMD's jurisdiction. Currently, YSAQMD, CARB, and the USEPA have not approved a quantitative method to reliably, meaningfully, and consistently translate the mass emission estimates for the criteria air pollutants resulting from the 2045 General Plan Update to specific health effects.

In summary, compliance with the required 2045 General Plan policies along with the implementing action aimed at reduction of construction and operational criteria air pollutant emissions would help reduce impacts associated with buildout of the 2045 General Plan. Future projects under the 2045 General Plan would comply with applicable YSAQMD rules and regulations in order to meet YSAQMD significance thresholds, as required under Policy OSC-13, which are based on levels that the SVAB can accommodate without affecting the attainment date for both the federal and State AAQS, that has been established to protect public health and welfare. Therefore, the 2045 General Plan would result in less-than-significant health effects associated with criteria air pollutants.

Overall however, cumulative impacts to air quality are considered significant.

3.0 GREEENHOUSE GAS EMISSIONS

This section presents a summary of regulations applicable to greenhouse gas (GHG) emissions; a summary of climate change science and GHG sources in California; quantification of project-generated GHGs and discussion about their contribution to global climate change; and analysis of the project's resiliency to climate change-related risks. In addition, mitigation measures are recommended to reduce the project's contribution to climate change.

3.1 Greenhouse Gas Setting

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. Because the earth has a much lower temperature than the sun, it emits lower-frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead trapped, resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth. Without the greenhouse effect, the earth would not be able to support life as we know it.

A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the atmosphere. As defined in California Health and Safety Code Section 38505(g) for purposes of administering many of the state's primary GHG emissions reduction programs. Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of increased warming of the earth's climate, known as global climate change or global warming.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Fluorinated gases also make up a small fraction of the GHGs that contribute to climate change. Fluorinated gases include chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride; however, it is noted that these gases are not associated with typical land use development. Human-caused emissions of these GHGs in excess of natural ambient concentrations are believed to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is "extremely likely" that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic factors together (Intergovernmental Panel on Climate Change [IPCC] 2023).

Table 3-1 describes the primary GHGs attributed to global climate change, including their physical properties, primary sources, and contributions to the greenhouse effect.

The Intergovernmental Panel on Climate Change (IPCC) developed the global warming potential (GWP) concept to compare each GHG's ability to trap heat in the atmosphere relative to another gas. The reference gas used is CO_2; therefore, GWP-weighted emissions are measured in metric tons (MT) of CO_2 equivalent

(CO_2e). Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. CH_4 traps over 27 times more heat per molecule than CO_2, and N_2O absorbs 273 times more heat per molecule than CO_2 (IPCC 2023). Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO_2e), which weight each gas by its global warming potential. Expressing GHG emissions in CO_2e takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

Table 3-1. Summary of Greenhouse Gases

Greenhouse Gas	Description
CO_2	Carbon dioxide is a colorless, odorless gas. CO_2 is emitted in a number of ways, both naturally and through human activities. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can also lead to CO_2 emissions. The atmospheric lifetime of CO_2 is variable because it is so readily exchanged in the atmosphere.[1]
CH_4	Methane is a colorless, odorless gas and is the major component of natural gas, about 87 percent by volume. It is also formed and released to the atmosphere by biological processes occurring in anaerobic environments. Methane is emitted from a variety of both human-related and natural sources. Human-related sources include fossil fuel production, animal husbandry (intestinal fermentation in livestock and manure management), rice cultivation, biomass burning, and waste management. These activities release significant quantities of CH_4 to the atmosphere. Natural sources of CH4 include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. The atmospheric lifetime of CH_4 is about 12 years.[2]
N_2O	Nitrous oxide is a clear, colorless gas with a slightly sweet odor. Nitrous oxide is produced by both natural and human-related sources. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production. N_2O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N_2O is approximately 120 years.[3]

Sources: (1) USEPA 2023a; (2) USEPA 2023b; (3) USEPA 2023c

Climate change refers to any significant change in measures of climate (e.g., temperature, precipitation, or wind patterns) lasting for an extended period of time (i.e., decades or longer). The Earth's temperature depends on the balance between energy entering and leaving the planet's system, and many factors (natural and human) can cause changes in Earth's energy balance. The greenhouse effect is the trapping and buildup of heat in the atmosphere near the Earth's surface (the troposphere). The greenhouse effect is a natural process that contributes to regulating the Earth's temperature, and it creates a livable environment on Earth.

Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that is absorbed before escaping into space, thus enhancing the greenhouse effect and causing the Earth's surface temperature to rise. Global climate change is a cumulative impact; a project contributes to this impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. GHG impacts are recognized exclusively as cumulative impacts (CAPCOA 2008).

3.1.1 Sources of Greenhouse Gas Emissions

In 2024, CARB released the 2024 edition of the California GHG Emissions from 2000 to 2022: trends of Emissions and Other Indicators report. In 2022, California emitted 371.1 million metric tons of CO2e. This inventory is 2.4 percent lower than in 2021. The 2022 emissions data shows that the State of California is continuing its established long-term trend of GHG emission declines, despite the anomalous emissions trends from 2019 through 2021, due in large part to the impacts of the COVID-19 pandemic. Overall trends in the Inventory continue to demonstrate that the carbon intensity of California's economy (the amount of carbon pollution per million dollars of gross state product (GSP) is declining. California's GSP increased by 0.7 percent in 2022, and emissions per GSP declined by 3.1 percent from 2021 to 2022. Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2022, accounting for approximately 37.7 percent of total GHG emissions in the state. Transportation emissions have decreased 3.6 percent from 2021 levels due to reductions from on-road, rail and, to a lesser extent, intrastate aviation transportation. Emissions from the electricity sector account for 16.1 percent of the Inventory, which is a decrease of 4.1 percent since 2021, despite the growth of in-state solar, wind, and hydropower energy generation. California's industrial sector accounts for the second largest source of the state's GHG emissions in 2022, accounting for 19.6 percent, which saw a decrease of 2 percent since 2021 (CARB 2024b).

3.2 Regulatory Framework

3.2.1 Federal

3.2.1.1 Update to Corporate Average Fuel Economy Standard (2017 to 2026)

The federal government issued new Corporate Average Fuel Economy (CAFE) standards in 2012 for model years 2017 to 2025, which required a fleet average of 54.5 miles per gallon in 2025. However, on March 30, 2020, the USEPA finalized an updated CAFE and GHG emissions standards for passenger cars and light trucks and established new standards covering model years 2021 through 2026, known as the Safer Affordable Fuel Efficient (SAFE) Vehicles Final Rule for Model Years 2021 to 2026. Under SAFE, the fuel economy standards will increase 1.5 percent per year compared to the 5.0 percent per year under the CAFE standards established in 2012. Overall, SAFE requires a fleet average of 40.4 miles per gallon for model year 2026 vehicles (85 Federal Register 24174 (April 30, 2020)). On December 21, 2021, under the direction of Executive Order (EO) 13990 issued by President Biden, the National Highway Traffic Safety Administration (NHTSA) repealed SAFE Vehicles Rule Part One, which had preempted state and local laws related to fuel economy standards. In addition, the NHTSA announced new proposed fuel standards on March 31, 2022. Fuel efficiency under the new standards proposed will increase 8.0 percent annually for model years 2024 to 2025 and 10 percent annually for model year 2026. Overall, the new CAFE standards require a fleet average of 49 miles per gallon for passenger vehicles and light trucks for model year 2026, which would be a 10 miles per gallon increase relative to model year 2021 (NHTSA 2022).

3.2.2 State

3.2.2.1 Executive Order S-3-05

Executive Order (EO) S-3-05, signed by Governor Arnold Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the EO established total GHG emission targets for the state. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

3.2.2.2 Executive Order B-55-18

EO B-55-18 (September 2018) establishes a statewide policy for the state to achieve carbon neutrality as soon as possible (no later than 2045) and achieve and maintain net negative emissions thereafter. The goal is an addition to the existing statewide targets of reducing the state's GHG emissions. CARB will work with relevant state agencies to ensure that future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal.

3.2.2.3 Assembly Bill 32 Climate Change Scoping Plan and Updates

In 2006, the California legislature passed Assembly Bill (AB) 32 (Health and Safety Code § 38500 et seq., or AB 32), also known as the Global Warming Solutions Act. AB 32 required CARB to design and implement feasible and cost-effective emission limits, regulations, and other measures, such that statewide GHG emissions are reduced to 1990 levels by 2020 (representing a 25 percent reduction in emissions). Pursuant to AB 32, CARB adopted a Scoping Plan in December 2008, which outlined measures to meet the 2020 GHG reduction goals. California exceeded the target of reducing GHG emissions to 1990 levels by the year 2017.

The Scoping Plan is required by AB 32 to be updated at least every five years. The latest update, the 2022 Scoping Plan Update, outlines strategies and actions to reduce greenhouse gas emissions in California. The plan focuses on achieving the state's goal of reaching carbon neutrality by 2045 and reducing greenhouse gas emissions to 40 percent below 1990 levels by 2030. The plan includes a range of strategies across various sectors, including transportation, industry, energy, and agriculture. Some of the key strategies include transitioning to zero-emission vehicles, expanding renewable energy sources, promoting sustainable land use practices, implementing a low-carbon fuel standard, and reducing emissions from buildings. Additionally, the plan addresses equity and environmental justice by prioritizing investments in communities most impacted by pollution and climate change. The plan also aims to promote economic growth and job creation through the transition to a low-carbon economy.

3.2.2.4 Senate Bill 32 of 2016

In August 2016, Governor Brown signed SB 32 and AB 197, which serve to extend California's GHG reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include § 38566, which contains language to authorize CARB to achieve a statewide GHG emission reduction of at least 40 percent below

1990 levels by no later than December 31, 2030 (the other provisions of AB 32 remained unchanged). On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provided a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, as well as implementation of recently adopted policies. The 2017 Scoping Plan also placed an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally appropriate quantitative thresholds consistent with Statewide per capita goals of no more than 6 metric tons of CO_2e by 2030 and 2 metric tons of CO_2e by 2050.

3.2.2.5 Assembly Bill 1279 of 2022

In September 2022, Governor Brown signed AB 1279, the California Climate Crisis Act, which requires California to achieve carbon neutrality as soon as possible, but no later than 2045, and to achieve and maintain net negative GHG emissions thereafter. AB 1279 also requires that by 2045 statewide anthropogenic GHG emissions be reduced to at least 85 percent below 1990 levels and directs CARB to ensure that its scoping plan identifies and recommends measures to achieve these goals. AB 1279 also directs CARB to identify policies and strategies to enable carbon capture, utilization, and storage and CO_2 removal technologies to meet emission reduction goals. In addition, CARB is required to submit an annual report on progress in achieving the 2022 Scoping Plan's goals.

In response to the passage of AB 1279 and the identification of the 2045 GHG emissions reduction target, CARB published the Final 2022 Climate Change Scoping Plan in November 2022 (2022 Update). The 2022 Update builds upon the framework established by the 2008 Climate Change Scoping Plan and previous updates while identifying a new, technologically feasible, cost-effective, and equity-focused path to achieve California's climate target. The 2022 Update includes policies to achieve a significant reduction in fossil fuel combustion, further reductions in short-lived climate pollutants, support for sustainable development, increased action on natural and working lands to reduce emissions and sequester carbon, and the capture and storage of carbon.

The 2022 Update assesses the progress California is making toward reducing its GHG emissions by at least 40 percent below 1990 levels by 2030, as called for in SB 32 and laid out in the 2017 Scoping Plan; addresses recent legislation and direction from Governor Newsom; extends and expands upon these earlier plans; and implements a target of reducing anthropogenic emissions to 85 percent below 1990 levels by 2045, as well as taking an additional step of adding carbon neutrality as a science-based guide for California's climate work. As stated in the 2022 Update, "the plan outlines how carbon neutrality can be achieved by taking bold steps to reduce GHGs to meet the anthropogenic emissions target and by expanding actions to capture and store carbon through the State's natural and working lands and using a variety of mechanical approaches." Specifically, the 2022 Update achieves the following:

- Identifies a path to keep California on track to meet its SB 32 GHG reduction target of at least 40 percent below 1990 emissions by 2030.

- Identifies a technologically feasible, cost-effective path to achieve carbon neutrality by 2045 and a reduction in anthropogenic emissions by 85 percent below 1990 levels.
- Focuses on strategies for reducing California's dependency on petroleum to provide consumers with clean energy options that address climate change, improve air quality, and support economic growth and clean sector jobs.
- Integrates equity and protecting California's most impacted communities as driving principles throughout the document.
- Incorporates the contribution of natural and working lands to the State's GHG emissions, as well as their role in achieving carbon neutrality.
- Relies on the most up-to-date science, including the need to deploy all viable tools to address the existential threat that climate change presents, including carbon capture and sequestration, as well as direct air capture.
- Evaluates the substantial health and economic benefits of taking action.
- Identifies key implementation actions to ensure success.

In addition to reducing emissions from transportation, energy, and industrial sectors, the 2022 Update includes emissions and carbon sequestration in natural and working lands and explores how they contribute to long-term climate goals. Under the Scoping Plan Scenario, California's 2030 emissions are anticipated to be 48 percent below 1990 levels, representing an acceleration of the current SB 32 target. Cap-and-trade regulation continues to play a large factor in the reduction of near-term emissions for meeting the accelerated 2030 reduction target. Every sector of the economy will need to begin to transition in this decade to meet these GHG emissions reduction goals and achieve carbon neutrality no later than 2045. The 2022 Update approaches decarbonization from two perspectives, managing a phasedown of existing energy sources and technologies, as well as increasing, developing, and deploying alternative clean energy sources and technology.

3.2.2.6 Executive Order N-79-20

Governor Gavin Newsom signed an executive order on September 23, 2020, that would phase out sales of new gas-powered passenger cars by 2035 with an additional 10-year transition period for heavy vehicles. The State would not restrict used car sales, nor forbid residents from owning gas-powered vehicles, meaning that the overall reduction in GHG emissions would likely not substantially reduce GHG emissions from vehicles for many years after the ban goes into effect.

3.2.2.7 Senate Bill 100 of 2018

In 2018, SB 100 was signed codifying a goal of 60 percent renewable procurement by 2030 and 100 percent by 2045 Renewables Portfolio Standard.

3.2.2.8 Senate Bill 1020 of 2022

SB 1020, the Clean Energy, Jobs, and Affordability Act of 2022, adds interim targets to the policy framework originally established in SB 100 to require renewable energy and zero-carbon resources to supply 90 percent of all retail electricity sales by 2035 and 95 percent of all retail electricity sales by 2040. Additionally, the bill requires all state agencies to rely on 100 percent renewable energy and zero-carbon resources to serve their own facilities by 2035. This bill also requires that CARB's Scoping Plan workshops be held in non-attainment areas and requires the California Public Utilities Commission, the California Energy Commission, and CARB to create a joint report on electricity reliability.

3.2.2.9 Senate Bill 375 of 2008

The Sustainable Communities and Climate Protection Act of 2008, which became effective in January 2009, helps facilitate AB 32's GHG reduction goals by addressing the emissions from passenger vehicles. The main objectives of the bill aim to reduce GHG emissions through extensive transportation, housing, and land use planning. SB 375 directs CARB to establish regional targets to reduce GHG emissions from passenger vehicle use. CARB administers 2020 and 2035 targets for each of the regions throughout the State. The corresponding metropolitan planning organizations (MPOs) in each region are required to prepare and adopt a Sustainable Communities Strategy (SCS) which help adhere to the CARB administered targets. Sustainable Community Strategies play a vital role in regional transportation plans by allowing transportation, land use, and housing strategies to align with the State's GHG emission goals. Project Plans that are consistent with their region's SCS may be subject to a more streamlined CEQA process.

3.2.2.10 Assembly Bill 197 of 2016

AB 197 is a bill linked to SB 32 and was signed on September 8, 2016. AB 197 prioritizes efforts to cut GHG emissions in low-income or minority communities. AB 197 requires CARB to make available, and update at least annually, the emissions of GHGs, criteria pollutants, and toxic air contaminants for each facility that reports to CARB and air districts. In addition, AB 197 adds two Members of the Legislature to the CARB board as ex officio, non-voting members and creates the Joint Legislative Committee on Climate Change Policies to ascertain facts and make recommendations to the Legislature and the houses of the Legislature concerning the State's programs, policies, and investments related to climate change.

3.2.2.11 2022 Building Energy Efficiency Standards for Residential and Nonresidential Buildings

The Building and Efficiency Standards (Energy Standards) were first adopted and put into effect in 1978 and have been updated periodically in the intervening years. These standards are a unique California asset that have placed the State on the forefront of energy efficiency, sustainability, energy independence and climate change issues. The 2022 California Building Codes include provisions related to energy efficiency to reduce energy consumption and greenhouse gas emissions from buildings. Some of the key energy efficiency components of the codes are:

1. Energy Performance Requirements: The codes specify minimum energy performance standards for the building envelope, lighting, heating and cooling systems, and other components.
2. Lighting Efficiency: The codes require that lighting systems meet minimum efficiency standards, such as the use of energy-efficient light bulbs and fixtures.
3. HVAC Systems: The codes establish requirements for heating, ventilation, and air conditioning (HVAC) systems, including the use of high-efficiency equipment, duct sealing, and controls.
4. Building Envelope: The codes include provisions for insulation, air sealing, glazing, and other building envelope components to reduce energy loss and improve indoor comfort.
5. Renewable Energy: The codes encourage the use of renewable energy systems, such as photovoltaic panels and wind turbines, to reduce dependence on non-renewable energy sources.
6. Commissioning: The codes require the commissioning of building energy systems to ensure that they are installed and operate correctly and efficiently.

Overall, the energy efficiency provisions of the 2022 California Building Codes aim to reduce the energy consumption of buildings, lower energy costs for building owners and occupants, and reduce the environmental impact of the built environment. The 2022 Building Energy Efficiency Standards improve upon the 2019 Energy Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The exact amount by which the 2022 Building Codes are more efficient compared to the 2019 Building Codes would depend on the specific provisions that have been updated and the specific building being considered. However, in general, the 2022 Building Codes have been updated to include increased requirements for energy efficiency, such as higher insulation and air sealing standards, which are intended to result in more efficient buildings. The 2022 standards are a major step toward meeting Zero Net Energy.

3.2.3 Local

3.2.3.1 Yolo-Solano County Air Pollution Control District

Addressing GHG generation impacts requires an agency to make a determination as to what constitutes a significant impact. The CEQA Guidelines specifically allow lead agencies to determine thresholds of significance that illustrate the extent of an impact and are a basis from which to apply mitigation measures. This means that each agency is left to determine if a project's GHG emissions would have a significant impact on the environment. The guidelines direct that agencies are to use "careful judgment" and "make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate" the development's GHG emissions (14 CCR Section 15064.4[a]). Determining a threshold of significance for climate change impacts poses a special difficulty for lead agencies. Much of the science in this area is new and is evolving constantly. At the same time, neither the State nor local agencies are specialized in this area, and there are currently no local, regional, or state thresholds for determining whether a residential development has a significant impact on climate change. The CEQA Amendments do not prescribe specific significance thresholds but instead leave considerable discretion to lead agencies to develop appropriate thresholds to apply to projects within their jurisdiction.

The YSAQMD has not adopted thresholds of significance for GHG emissions. In absence of thresholds of significance, this analysis employs the use of the methods and protocols for preparing a plan-level analysis of the Bay Area Air Quality Management District (BAAQMD). The BAAQMD is the air quality officer for the San Francisco Bay Area Air Basin, which directly borders the City of Rio Vista. The BAAQMD does not promulgate a plan-level or project-level construction GHG threshold. Thus, this analysis also cites the project-level construction significance threshold established by the Sacramento Metropolitan Air Quality Management District (SMAQMD), the air quality officer for the metropolitan Sacramento region. Both the SMAQMD and BAAQMD have adopted GHG emission thresholds to assist the district in attaining the GHG reduction goals established by AB 32 and SB 32.

The 2017 Scoping Plan also addressed how CEQA can be used to further statewide GHG reduction goals. The Plan recommends GHG reduction goals that can apply to plan- or project-level analyses to be incorporated into environmental documentation in support of CEQA. The Plan states that a per capita GHG target is "appropriate for the plan level (city, county, subregional, or regional level), but not for specific individual projects, because CARB's metric includes all emissions sectors in the State. The BAAQMD states that regional plans, such as the proposed General Plan Update, would have a less than significant impact related to GHG emissions if can be demonstrated that there is no net increase in GHG emissions. To demonstrate no net increase, two comparative analyses should be completed for the projected future emissions:

- Compare the existing (base year) emissions with projected future year emissions plus the regional plan's emissions (base year/regional plan comparison).
- Compare projected future year emissions with projected future year emissions plus the regional plan's emissions (no regional plan/regional plan comparison).

If both comparative analyses demonstrate no net increase in emissions, the GHG impacts of the General Plan Update would be less than significant.

3.3 Greenhouse Gas Emissions Impact Assessment

3.3.1 Thresholds of Significance

The impact analysis provided below is based on the following CEQA Guidelines Appendix G thresholds of significance. The Project would result in a significant impact to GHG emissions if it would:

1) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment or

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

The Appendix G thresholds for GHG's do not prescribe specific methodologies for performing an assessment, do not establish specific thresholds of significance, and do not mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize 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. With respect to GHG emissions, the CEQA Guidelines § 15064.4(a) states that lead agencies "shall make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions resulting from a project. The CEQA Guidelines note that an agency has the discretion to either quantify a project's GHG emissions or rely on a "qualitative analysis or other performance-based standards." (14 California Code of Regulations [CCR] 15064.4(b)). A lead agency may use a "model or methodology" to estimate GHG emissions and has the discretion to select the model or methodology it considers "most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change." (14 CCR 15064.4(c)). Section 15064.4(b) provides that the lead agency should consider the following when determining the significance of impacts from GHG emissions on the environment:

1. The extent a project may increase or reduce GHG emissions as compared to the existing environmental setting.
2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
3. 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 (14 CCR 15064.4(b)).

As previously described, the GHG emission thresholds assist the City in attaining the GHG reduction goals established by AB 32 and SB 32. For the purpose of this evaluation, the proposed General Plan Update is evaluated consistent with BAAQMD guidance for analyzing regional plans. As previously described, the BAAQMD states that regional plans, such as the proposed General Plan Update, would have a less than significant impact related to GHG emissions if can be demonstrated that there is no net increase in GHG emissions. To demonstrate no net increase, two comparative analyses are completed for the projected future emissions:

- A comparison of the existing (base year) emissions with projected future year emissions plus the regional plan's emissions (base year/regional plan comparison).
- A comparison of the projected future year emissions with projected future year emissions plus the regional plan's emissions (no regional plan/regional plan comparison).

If both comparative analyses demonstrate no net increase in emissions, the GHG impacts of the General Plan Update would be less than significant. Due to a limitation of data, a comparison of the emissions that would be generated under the proposed General Plan Update cannot be compared to existing conditions, but only to the emissions that would be generated at buildout of the existing General Plan 2001.

3.3.2 Methodology

Impacts related to GHG emissions resulting from implementation (construction and operation) of the proposed General Plan Update are discussed below. The impact analysis is based on calculations of the GHG emissions that would result from projected future growth at buildout of the 2045 General Plan Update.

Compared with buildout of the City of Rio Vista under the existing "General Plan 2001", buildout of the proposed 2045 General Plan Update would redesignate a total of 773 acres, which would allow for an additional 3,022 residential units, and an additional 113 acres of mixed-use space and 18 acres of retail spaces. Conversely, compared with buildout of the City of Rio Vista under the existing General Plan 2001, buildout of the proposed General Plan Update would reduce the amount of allowable industrial building space by 130 acres. Where criteria air pollutant quantification was required, emissions were modeled using CalEEMod, version 2022.1.28. CalEEMod is a statewide land use emissions computer model designed to quantify potential GHG emissions associated with operations from a variety of land use projects. The net increase in GHG emissions generated by the 2045 General Plan Update are estimated based on CalEEMod default VMT and General Plan land use buildout assumptions. Operational generated GHG emissions calculations employed land uses and acreage provided by the City coupled with the median density/intensity standards contained in the City Municipal Code. (Density/intensity standards indicate how much development is allowed on a single plot of land. A maximum permitted FAR is specified for nonresidential uses. FAR refers to the ratio of building floor space compared to the square footage of the site.) Operational generated GHG emissions calculations employed land uses and acreage provided by the Project proponent as well as median building square footage and dwelling units allowed per information the City's General Plan Land Use Element.

3.3.3 Impact Analysis

3.3.3.1 Project Construction-Generated Greenhouse Gas Emissions Resulting in Conflicts with any Applicable Plan, Policy, or Regulation of an Agency Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases

The General Plan Update would accommodate future development for residential, commercial, recreational, and industrial uses. The future development and other physical changes that could result from the implementation of the General Plan Update would generate construction related GHG emissions from worker commute trips, haul trucks carrying supplies and materials to and from the construction site, and off-road construction equipment (e.g., dozers, loaders, excavators).

Construction activities associated with the proposed General Plan Update would occur over the buildout horizon of the plan, causing short-term GHG emissions. For the proposed General Plan Update, which is a broad policy plan, it is not possible to determine whether the scale and phasing of individual construction projects would exceed recommended GHG construction thresholds due to project-level variability and uncertainties related to future individual projects in terms of detailed site plans, construction schedules, equipment requirements, etc., which are not currently determined or even proposed[2]. Nonetheless, depending on how development proceeds, construction-generated GHG emissions associated with the proposed General Plan Update could potentially exceed the recommended threshold of significance for

[2] As previously stated, the YSAQMD has no established GHG emissions thresholds. In absence of thresholds of significance, this analysis employs the use of the methods and protocols for preparing a plan-level analysis of the BAAQMD. The BAAQMD does not promulgate a plan-level or project-level construction GHG threshold. Thus, this analysis also cites the project-level construction significance threshold established by the SMAQMD. The SMAQMD has adopted a numeric threshold of 1,100 metric tons of CO_2e annually from construction activities.

construction activities. Overall, GHG emissions related to construction must be addressed on a project-by-project basis, and information regarding specific development projects, soil types, and the locations of receptors would be needed to quantify the level of impact associated with construction activity.

As previously described, proposed General Plan Update Policy OSC-13 would require application of the analysis methods and significance thresholds recommended by the YSAQMD to determine a future project's GHG-related impacts. The YSAQMD has not adopted thresholds of significance for GHG emissions. In absence of thresholds of significance, this analysis employs the use of the methods and protocols for preparing a plan-level analysis of the BAAQMD. The BAAQMD is the air quality officer for the San Francisco Bay Area Air Basin, which directly borders the City of Rio Vista. The BAAQMD does not promulgate a plan-level or project-level construction GHG threshold. Thus, this analysis cites the project-level construction significance threshold established by the SMAQMD, the air quality officer for the metropolitan Sacramento region. The SMAQMD has adopted a numeric threshold of 1,100 metric tons of CO_2e annually from construction activities. The significance criteria established by the SMAQMD for future construction projects instigated by the proposed General Plan Update may be relied upon to make a determination of impact significance level.

Future development projects allowed under the proposed General Plan Update that are projected to exceed the significance threshold are required to implement mitigation measures in order to reduce GHG emissions as much as feasible; however, the significance threshold may still be exceeded as a result of construction activities allowed under the proposed General Plan Update. Since it cannot be guaranteed that construction of future projects allowed under the proposed General Plan Update would generate GHG emissions below the significance threshold due to the programmatic and conceptual nature of the proposed General Plan Update and uncertainties related to future individual projects, this is considered a significant impact.

3.3.3.2 Project Operational Greenhouse Gas Emissions Resulting in Conflicts with any Applicable Plan, Policy, or Regulation of an Agency Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases

Development under the proposed General Plan Update would contribute to global climate change through direct and indirect emissions of GHG from land uses within the City. A General Plan does not directly result in development without additional approvals. However, the General Plan Update would guide and facilitate development throughout the City. Before any development can occur in the City, it must be analyzed for consistency with the General Plan, zoning requirements, and other applicable local and State requirements; comply with the requirements of CEQA; and obtain all necessary clearances and permits. Future development projects would be subject to the City's standard CEQA review process and would be required to assess project-specific emissions in relation to the YSAQMD significance thresholds. Although specific project-level information for potential future development is not available at this time and the estimation of emissions resulting from future development would be speculative, anticipated maximum annual GHG emissions were quantified and presented in Table 3-2 in order to provide an estimate of the potential overall GHG emissions resulting from the proposed General Plan Update based on the calculation methodology provided in Section 3.3.2, Methodology.

The proposed General Plan Update would have a less than significant impact related to GHG emissions if can be demonstrated that there is no net increase in GHG emissions. To demonstrate no net increase, two comparative analyses are completed for the projected future emissions as follows:

- A comparison of the existing (base year) emissions with projected future year emissions plus the regional plan's emissions (base year/regional plan comparison).
- A comparison of the projected future year emissions with projected future year emissions plus the regional plan's emissions (no regional plan/regional plan comparison).

In the case that both comparative analyses demonstrate no net increase in emissions, the GHG impacts of the General Plan Update would be less than significant.

Table 3-2. Operational-Related Greenhouse Gas Emissions

Emission Source	CO_2e Emissions (Metric Tons/Year)
Proposed 2045 General Plan Update Buildout Emissions	
Mobile	269,456
Area	561
Energy	133,147
Water	10,805
Waste	14,112
Refrigerants	493
Total	**428,574**
Existing General Plan 2001 Buildout Emissions	
Mobile	232,660
Area	361
Energy	84,439
Water	7,493
Waste	9,612
Refrigerants	559
Total	**335,124**
Difference in Proposed 2045 General Plan and Existing General Plan	
Mobile	**+36,796**
Area	**155**
Energy	**+48,708**
Water	**+3,312**
Waste	**+4,500**
Refrigerants	**-66**
Total	**+93,450**

Sources: CalEEMod 2022.1.28 Refer to Attachment A and B for Model Data Outputs.
Notes: Emission projections predominately based on CalEEMod model defaults for Solano County, site acreage provided by the City, and median building square footage and dwelling units allowed per information the City's General Plan Land Use Element.

As shown by Table 3-2, the GHG emissions from buildout of the proposed General Plan Update would be greater than the GHG emissions from buildout of the existing General Plan 2001 buildout by approximately 93,450 metric tons of CO_2e annually. This net increase of GHG emissions associated with the proposed General Plan Update compared with the existing General Plan 2001 is largely due to mobile-source and energy-source emissions. Since a net increase of GHG emissions would occur as a result of the proposed General Plan Update, the plan-level GHG threshold previously identified would be surpassed.

The General Plan Update does propose several policy provisions that would assist to reduce the generation of GHG emissions from mobile sources. For instance, proposed Land Use and Community Character Element Policy LU-1 seeks the development of compact, complete residential neighborhoods by encouraging the location of services and amenities within walking and biking distance of residences. Policy LU-3 would encourage new residential development to incorporate design features that promote walking and connectivity between blocks and adjacent neighborhoods and in a similar context, Policy LU-6 would encourage development in the North Waterfront District to be a mix of uses including residential, commercial, and public park space along the waterfront. Proposed Policy LU-9 would promote pedestrian-oriented retail and mixed-use development in Neighborhood Mixed Use, Downtown, and the Waterfront areas. The promotion of mixed-use development contributes to less dependency on automobiles, a source of GHG emissions. Mobility and Circulation Policies MC-2, MC-4, and MC-14 proposes to promote the development of bikeways, sidewalks, pedestrian pathways, and multi-use paths that connect residential neighborhoods with other neighborhoods, schools, employment centers, commercial centers and public open space, and that separate bicyclists, skateboarders, and pedestrians from vehicular traffic whenever possible. Proposed Policy MC-15 seeks to ensure that bicycle and pedestrian facilities follow logical routes providing connections between transportation nodes and land uses, including bicycle and pedestrian connections to transit stops, buses that can accommodate bicycles, and park-and-ride lots, so that the pedestrian facilities serve the transportation needs of residents, and are not constructed as "sidewalks to nowhere." Further, Policy MC-16 seeks to ensure that the City's circulation network will accommodate all anticipated and potential modes of transportation, including small personal electric vehicles ranging in size up to golf carts. Additionally, Parks & Recreation Policy PR-9 proposes to create an integrated trail, bikeway, and open space network within the City that links parks and recreation areas, schools, downtown, the waterfront, and residential neighborhoods. Lastly, proposed Open Space and Resource Conservation Policy OSC-14 seeks to promote energy conservation programs for all utility users and encourage active and passive solar energy design in building and site development; and promote more tree planting and landscaping in the City to reduce the heat island effect and address climate change.

Development projects accommodated by the proposed General Plan Update would be analyzed on a case-by-case basis when detailed information regarding operational activities is known. Future projects would be subject to the proposed General Plan Update policies identified above, as well as YSAQMD and State rules and regulations. Nonetheless, as shown in Table 3-2, a net increase of GHG emissions from buildout of the existing General Plan 2001 would occur as a result of the proposed General Plan Update. Thus, the identified plan-level GHG threshold would be surpassed. There are no additional plan-level measures available that would reduce impacts from long-term operational-related emissions. All feasible operational emissions reduction measures have been incorporated into the General Plan Update through the inclusion of the policies discussed above. There could be additional project-specific mitigation measures applied to specific future development allowed under the General Plan Update to reduce long-term operational-generated GHG emissions to levels below the applicable thresholds of significance. For instance, as previously described AB 1279, the California Climate Crisis Act, requires California to achieve carbon neutrality as soon as possible, but no later than 2045, and to achieve and maintain net negative GHG emissions thereafter. The 2022 Scoping Plan Update outlines the mechanisms for how this will be achieved. As stated in the 2022 Update, "the plan outlines how carbon neutrality can be achieved by taking bold steps

to reduce GHGs to meet the anthropogenic emissions target and by expanding actions to capture and store carbon through the State's natural and working lands and using a variety of mechanical approaches." Specifically, the 2022 Update identifies a path to keep California on track to meet its SB 32 GHG reduction target of at least 40 percent below 1990 emissions by 2030, identifies a technologically feasible, cost-effective path to achieve carbon neutrality by 2045 and a reduction in anthropogenic emissions by 85 percent below 1990 levels, relies on the most up-to-date science, including the need to deploy all viable tools to address the existential threat that climate change presents, including carbon capture and sequestration, as well as direct air capture, and identifies key implementation actions to ensure success. However, the nature, feasibility, and effectiveness of such strategies implemented within Rio Vista cannot be determined at this time. As such, the City cannot assume that mitigation would be available and implemented such that all future operational-related emissions of air pollutants would be reduced to less-than-significant levels. As such, this impact is significant.

3.3.3.3 Cumulative Greenhouse Gas Emissions Impacts

General Plan Update-related GHG emissions are not confined to a particular air basin but are dispersed worldwide. Therefore, impacts under Impact 3.3.3.2 are not project-specific impacts to global warming, but the proposed General Plan Update's contribution to this cumulative impact. As discussed, a net increase of GHG emissions from buildout of the existing General Plan 2001 would occur as a result of the proposed General Plan Update, resulting in an exceedance of the applicable plan-level significance threshold. Therefore, the proposed General Plan Update-related GHG emissions and their contribution to global climate change would be cumulatively considerable, and GHG emissions impacts would be significant.

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LIST OF ATTACHMENTS

Attachment A – CalEEMod Output File for Air Quality and Greenhouse Gas Emissions – Proposed 2045 General Plan Update

Attachment B – CalEEMod Output File for Air Quality Greenhouse Gas Emissions – Existing General Plan 2001

ATTACHMENT A

CalEEMod Output File for Air Quality and Greenhouse Gas Emissions – Proposed 2045 General Plan Update

2045 Proposed General Plan Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	2045 Proposed General Plan
Operational Year	2045
Lead Agency	—
Land Use Scale	Plan/community
Analysis Level for Defaults	County
Windspeed (m/s)	5.70
Precipitation (days)	20.6
Location	Rio Vista, CA 94571, USA
County	Solano-Sacramento
City	Rio Vista
Air District	Yolo/Solano AQMD
Air Basin	Sacramento Valley
TAZ	783
EDFZ	4
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.29

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Office Park	1,642	1000sqft	29.0	1,642,212	0.00	—	—	—
Office Park	2,492	1000sqft	44.0	2,491,632	0.00	—	—	—

Office Park	4,358	1000sqft	77.0	4,358,056	0.00	—	—	—
General Office Building	1,237	1000sqft	71.0	1,237,104	0.00	—	—	—
High Turnover (Sit Down Restaurant)	762	1000sqft	50.0	762,300	0.00	—	—	—
Manufacturing	1,960	1000sqft	90.0	1,960,200	0.00	—	—	—
Industrial Park	3,385	1000sqft	222	3,384,912	0.00	—	—	—
Industrial Park	915	1000sqft	60.0	914,760	0.00	—	—	—
Single Family Housing	6,275	Dwelling Unit	1,943	12,236,250	73,498,178	—	17,695	—
Single Family Housing	86.0	Dwelling Unit	156	167,700	1,007,306	—	243	—
Apartments Low Rise	700	Dwelling Unit	35.0	742,000	0.00	—	1,974	—
City Park	68.0	Acre	68.0	0.00	0.00	0.00	—	—
General Office Building	15,573	1000sqft	357	15,572,700	550	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2,316	1,337	9,170	24.1	41.2	142,842	142,883	39.8	14,549	14,589	36,678	3,063,427	3,100,105	3,863	153	3,543	3,245,705

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1,995	1,468	6,807	22.4	38.6	142,842	142,880	37.8	14,549	14,587	36,678	2,900,699	2,937,376	3,872	161	2,992	3,085,267
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1,935	1,169	6,001	17.7	36.6	101,339	101,376	35.8	10,332	10,368	36,678	2,413,762	2,450,440	3,853	130	3,161	2,588,612
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	353	213	1,095	3.22	6.69	18,494	18,501	6.53	1,886	1,892	6,072	399,626	405,698	638	21.5	523	428,574

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	979	995	7,109	22.0	13.5	142,842	142,855	12.8	14,549	14,562	—	2,245,153	2,245,153	62.3	114	566	2,281,136
Area	1,318	15.5	1,808	0.10	2.68	—	2.68	2.02	—	2.02	0.00	6,852	6,852	0.29	0.06	—	6,877
Energy	18.1	326	253	1.97	25.0	—	25.0	25.0	—	25.0	—	799,104	799,104	101	8.71	—	804,214
Water	—	—	—	—	—	—	—	—	—	—	12,315	12,318	24,633	1,265	30.2	—	65,265
Waste	—	—	—	—	—	—	—	—	—	—	24,363	0.00	24,363	2,435	0.00	—	85,237
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2,977	2,977
Total	2,316	1,337	9,170	24.1	41.2	142,842	142,883	39.8	14,549	14,589	36,678	3,063,427	3,100,105	3,863	153	3,543	3,245,705
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Mobile	924	1,143	6,554	20.4	13.6	142,842	142,855	12.8	14,549	14,562	—	2,089,277	2,089,277	72.0	122	14.7	2,127,575
Area	1,053	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Energy	18.1	326	253	1.97	25.0	—	25.0	25.0	—	25.0	—	799,104	799,104	101	8.71	—	804,214
Water	—	—	—	—	—	—	—	—	—	—	12,315	12,318	24,633	1,265	30.2	—	65,265
Waste	—	—	—	—	—	—	—	—	—	—	24,363	0.00	24,363	2,435	0.00	—	85,237
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2,977	2,977
Total	1,995	1,468	6,807	22.4	38.6	142,842	142,880	37.8	14,549	14,587	36,678	2,900,699	2,937,376	3,872	161	2,992	3,085,267
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	733	836	4,856	15.6	10.3	101,339	101,350	9.76	10,332	10,342	—	1,598,961	1,598,961	52.1	90.9	184	1,627,528
Area	1,184	7.66	892	0.05	1.32	—	1.32	1.00	—	1.00	0.00	3,379	3,379	0.14	0.03	—	3,391
Energy	18.1	326	253	1.97	25.0	—	25.0	25.0	—	25.0	—	799,104	799,104	101	8.71	—	804,214
Water	—	—	—	—	—	—	—	—	—	—	12,315	12,318	24,633	1,265	30.2	—	65,265
Waste	—	—	—	—	—	—	—	—	—	—	24,363	0.00	24,363	2,435	0.00	—	85,237
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2,977	2,977
Total	1,935	1,169	6,001	17.7	36.6	101,339	101,376	35.8	10,332	10,368	36,678	2,413,762	2,450,440	3,853	130	3,161	2,588,612
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	134	152	886	2.86	1.88	18,494	18,496	1.78	1,886	1,887	—	264,726	264,726	8.63	15.0	30.4	269,456
Area	216	1.40	163	0.01	0.24	—	0.24	0.18	—	0.18	0.00	559	559	0.02	< 0.005	—	561
Energy	3.30	59.4	46.2	0.36	4.56	—	4.56	4.56	—	4.56	—	132,301	132,301	16.6	1.44	—	133,147
Water	—	—	—	—	—	—	—	—	—	—	2,039	2,039	4,078	209	5.01	—	10,805
Waste	—	—	—	—	—	—	—	—	—	—	4,034	0.00	4,034	403	0.00	—	14,112
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	493	493
Total	353	213	1,095	3.22	6.69	18,494	18,501	6.53	1,886	1,892	6,072	399,626	405,698	638	21.5	523	428,574

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	203	153	1,356	3.91	2.07	26,214	26,216	1.95	2,670	2,672	—	398,634	398,634	12.2	18.1	102	404,440
General Office Building	353	266	2,361	6.82	3.60	45,657	45,661	3.40	4,650	4,653	—	694,295	694,295	21.3	31.5	178	704,407
High Turnover (Sit Down Restaurant)	235	177	1,568	4.53	2.39	30,322	30,324	2.26	3,088	3,090	—	461,094	461,094	14.2	21.0	118	467,810
Manufacturing	13.0	115	139	0.87	1.37	3,513	3,515	1.31	359	360	—	91,522	91,522	1.30	10.8	18.5	94,781
Industrial Park	15.0	132	161	1.01	1.58	4,045	4,047	1.51	413	415	—	105,380	105,380	1.49	12.4	21.3	109,132
Single Family Housing	146	140	1,391	4.43	2.29	30,211	30,214	2.17	3,077	3,079	—	451,228	451,228	10.8	18.1	117	457,013
Apartments Low Rise	13.7	13.1	131	0.42	0.22	2,837	2,837	0.20	289	289	—	42,369	42,369	1.01	1.70	11.0	42,912
City Park	0.32	0.24	2.15	0.01	< 0.005	41.5	41.5	< 0.005	4.23	4.23	—	632	632	0.02	0.03	0.16	641
Total	979	995	7,109	22.0	13.5	142,842	142,855	12.8	14,549	14,562	—	2,245,153	2,245,153	62.3	114	566	2,281,136

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	191	178	1,269	3.63	2.07	26,214	26,216	1.96	2,670	2,672	—	369,619	369,619	14.3	19.8	2.64	375,888
General Office Building	333	310	2,211	6.32	3.61	45,657	45,661	3.41	4,650	4,653	—	643,759	643,759	24.9	34.5	4.60	654,677
High Turnover (Sit Down Restaurant)	221	206	1,468	4.19	2.40	30,322	30,324	2.26	3,088	3,090	—	427,532	427,532	16.5	22.9	3.06	434,783
Manufacturing	12.3	125	132	0.85	1.38	3,513	3,515	1.32	359	360	—	88,784	88,784	1.45	10.9	0.48	92,079
Industrial Park	14.2	144	151	0.98	1.59	4,045	4,047	1.52	413	415	—	102,227	102,227	1.67	12.6	0.55	106,020
Single Family Housing	138	164	1,207	4.10	2.29	30,211	30,214	2.17	3,077	3,079	—	417,563	417,563	11.9	19.7	3.05	423,744
Apartments Low Rise	13.0	15.4	113	0.38	0.22	2,837	2,837	0.20	289	289	—	39,208	39,208	1.12	1.85	0.29	39,788
City Park	0.30	0.28	2.01	0.01	< 0.005	41.5	41.5	< 0.005	4.23	4.23	—	586	586	0.02	0.03	< 0.005	595
Total	924	1,143	6,554	20.4	13.6	142,842	142,855	12.8	14,549	14,562	—	2,089,277	2,089,277	72.0	122	14.7	2,127,575
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	26.0	22.6	166	0.50	0.28	3,366	3,367	0.27	343	343	—	46,269	46,269	1.63	2.34	5.43	47,013
General Office Building	45.9	40.0	293	0.89	0.50	5,955	5,956	0.47	607	608	—	81,852	81,852	2.88	4.14	9.61	83,168
High Turnover (Sit Down Restaurant)	31.3	22.8	157	0.40	0.23	2,612	2,612	0.22	266	266	—	36,923	36,923	1.75	2.18	4.21	37,619
Manufacturing	1.57	15.2	16.1	0.11	0.17	420	420	0.17	42.9	43.1	—	10,242	10,242	0.16	1.24	0.92	10,618

Industrial Park	2.29	22.1	23.3	0.16	0.25	610	610	0.24	62.3	62.6	—	14,874	14,874	0.23	1.81	1.33	15,420
Single Family Housing	24.7	27.3	213	0.74	0.41	5,090	5,090	0.39	519	519	—	68,613	68,613	1.83	3.07	8.21	69,582
Apartments Low Rise	2.12	2.35	18.3	0.06	0.04	438	438	0.03	44.6	44.7	—	5,900	5,900	0.16	0.26	0.71	5,984
City Park	0.03	0.03	0.18	< 0.005	< 0.005	3.76	3.76	< 0.005	0.38	0.38	—	51.6	51.6	< 0.005	< 0.005	0.01	52.5
Total	134	152	886	2.86	1.88	18,494	18,496	1.78	1,886	1,887	—	264,726	264,726	8.63	15.0	30.4	269,456

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	99,326	99,326	16.1	1.95	—	100,308
General Office Building	—	—	—	—	—	—	—	—	—	—	—	196,616	196,616	31.8	3.86	—	198,560
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	17,106	17,106	2.77	0.34	—	17,275
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	11,316	11,316	1.83	0.22	—	11,428
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	50,291	50,291	8.14	0.99	—	50,788

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	30,308	30,308	4.90	0.59	—	30,608
Apartments Low Rise	—	—	—	—	—	—	—	—	—	—	—	1,739	1,739	0.28	0.03	—	1,756
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	406,702	406,702	65.8	7.98	—	410,724
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	99,326	99,326	16.1	1.95	—	100,308
General Office Building	—	—	—	—	—	—	—	—	—	—	—	196,616	196,616	31.8	3.86	—	198,560
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	17,106	17,106	2.77	0.34	—	17,275
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	11,316	11,316	1.83	0.22	—	11,428
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	50,291	50,291	8.14	0.99	—	50,788
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	30,308	30,308	4.90	0.59	—	30,608
Apartments Low Rise	—	—	—	—	—	—	—	—	—	—	—	1,739	1,739	0.28	0.03	—	1,756
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	406,702	406,702	65.8	7.98	—	410,724
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	16,444	16,444	2.66	0.32	—	16,607

General Office Building	—	—	—	—	—	—	—	—	—	—	—	32,552	32,552	5.27	0.64	—	32,874
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	2,832	2,832	0.46	0.06	—	2,860
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	1,874	1,874	0.30	0.04	—	1,892
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	8,326	8,326	1.35	0.16	—	8,409
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	5,018	5,018	0.81	0.10	—	5,067
Apartments Low Rise	—	—	—	—	—	—	—	—	—	—	—	288	288	0.05	0.01	—	291
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	67,334	67,334	10.9	1.32	—	68,000

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	3.62	65.8	55.3	0.40	5.00	—	5.00	5.00	—	5.00	—	78,568	78,568	6.95	0.15	—	78,786
General Office Building	7.17	130	109	0.78	9.91	—	9.91	9.91	—	9.91	—	155,526	155,526	13.8	0.29	—	155,957
High Turnover (Sit Down Restaurant)	1.37	24.9	21.0	0.15	1.90	—	1.90	1.90	—	1.90	—	29,769	29,769	2.63	0.06	—	29,851

Manufact	1.20	21.8	18.3	0.13	1.66	—	1.66	1.66	—	1.66	—	26,045	26,045	2.30	0.05	—	26,117
Industrial Park	1.83	33.3	28.0	0.20	2.53	—	2.53	2.53	—	2.53	—	39,781	39,781	3.52	0.07	—	39,891
Single Family Housing	2.73	46.7	19.9	0.30	3.78	—	3.78	3.78	—	3.78	—	59,303	59,303	5.25	0.11	—	59,468
Apartments Low Rise	0.16	2.69	1.14	0.02	0.22	—	0.22	0.22	—	0.22	—	3,410	3,410	0.30	0.01	—	3,419
City Park	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	18.1	326	253	1.97	25.0	—	25.0	25.0	—	25.0	—	392,402	392,402	34.7	0.74	—	393,490
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	3.62	65.8	55.3	0.40	5.00	—	5.00	5.00	—	5.00	—	78,568	78,568	6.95	0.15	—	78,786
General Office Building	7.17	130	109	0.78	9.91	—	9.91	9.91	—	9.91	—	155,526	155,526	13.8	0.29	—	155,957
High Turnover (Sit Down Restaurant)	1.37	24.9	21.0	0.15	1.90	—	1.90	1.90	—	1.90	—	29,769	29,769	2.63	0.06	—	29,851
Manufacturing	1.20	21.8	18.3	0.13	1.66	—	1.66	1.66	—	1.66	—	26,045	26,045	2.30	0.05	—	26,117
Industrial Park	1.83	33.3	28.0	0.20	2.53	—	2.53	2.53	—	2.53	—	39,781	39,781	3.52	0.07	—	39,891
Single Family Housing	2.73	46.7	19.9	0.30	3.78	—	3.78	3.78	—	3.78	—	59,303	59,303	5.25	0.11	—	59,468
Apartments Low Rise	0.16	2.69	1.14	0.02	0.22	—	0.22	0.22	—	0.22	—	3,410	3,410	0.30	0.01	—	3,419
City Park	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	18.1	326	253	1.97	25.0	—	25.0	25.0	—	25.0	—	392,402	392,402	34.7	0.74	—	393,490

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	0.66	12.0	10.1	0.07	0.91	—	0.91	0.91	—	0.91	—	13,008	13,008	1.15	0.02	—	13,044
General Office Building	1.31	23.8	20.0	0.14	1.81	—	1.81	1.81	—	1.81	—	25,749	25,749	2.28	0.05	—	25,821
High Turnover (Sit Down Restaurant)	0.25	4.55	3.82	0.03	0.35	—	0.35	0.35	—	0.35	—	4,929	4,929	0.44	0.01	—	4,942
Manufacturing	0.22	3.98	3.35	0.02	0.30	—	0.30	0.30	—	0.30	—	4,312	4,312	0.38	0.01	—	4,324
Industrial Park	0.33	6.08	5.11	0.04	0.46	—	0.46	0.46	—	0.46	—	6,586	6,586	0.58	0.01	—	6,604
Single Family Housing	0.50	8.53	3.63	0.05	0.69	—	0.69	0.69	—	0.69	—	9,818	9,818	0.87	0.02	—	9,846
Apartments Low Rise	0.03	0.49	0.21	< 0.005	0.04	—	0.04	0.04	—	0.04	—	565	565	0.05	< 0.005	—	566
City Park	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	3.30	59.4	46.2	0.36	4.56	—	4.56	4.56	—	4.56	—	64,967	64,967	5.75	0.12	—	65,147

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00

Consumer Products	973	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	79.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	266	15.5	1,808	0.10	2.68	—	2.68	2.02	—	2.02	—	6,852	6,852	0.29	0.06	—	6,877
Total	1,318	15.5	1,808	0.10	2.68	—	2.68	2.02	—	2.02	0.00	6,852	6,852	0.29	0.06	—	6,877
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	973	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	79.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	1,053	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	178	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	14.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	23.9	1.40	163	0.01	0.24	—	0.24	0.18	—	0.18	—	559	559	0.02	< 0.005	—	561
Total	216	1.40	163	0.01	0.24	—	0.24	0.18	—	0.18	0.00	559	559	0.02	< 0.005	—	561

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	2,892	2,642	5,534	297	7.10	—	15,074
General Office Building	—	—	—	—	—	—	—	—	—	—	5,725	5,229	10,954	588	14.1	—	29,838
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	443	405	848	45.5	1.09	—	2,311
Manufacturing	—	—	—	—	—	—	—	—	—	—	869	793	1,662	89.2	2.13	—	4,527
Industrial Park	—	—	—	—	—	—	—	—	—	—	1,905	1,740	3,646	196	4.68	—	9,930
Single Family Housing	—	—	—	—	—	—	—	—	—	—	433	1,465	1,898	44.6	1.08	—	3,336
Apartments Low Rise	—	—	—	—	—	—	—	—	—	—	47.6	43.5	91.1	4.89	0.12	—	248
City Park	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	12,315	12,318	24,633	1,265	30.2	—	65,265
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	2,892	2,642	5,534	297	7.10	—	15,074

General Office Building	—	—	—	—	—	—	—	—	—	—	5,725	5,229	10,954	588	14.1	—	29,838
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	443	405	848	45.5	1.09	—	2,311
Manufacturing	—	—	—	—	—	—	—	—	—	—	869	793	1,662	89.2	2.13	—	4,527
Industrial Park	—	—	—	—	—	—	—	—	—	—	1,905	1,740	3,646	196	4.68	—	9,930
Single Family Housing	—	—	—	—	—	—	—	—	—	—	433	1,465	1,898	44.6	1.08	—	3,336
Apartments Low Rise	—	—	—	—	—	—	—	—	—	—	47.6	43.5	91.1	4.89	0.12	—	248
City Park	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	12,315	12,318	24,633	1,265	30.2	—	65,265
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	479	437	916	49.2	1.18	—	2,496
General Office Building	—	—	—	—	—	—	—	—	—	—	948	866	1,814	97.3	2.33	—	4,940
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	73.4	67.0	140	7.54	0.18	—	383
Manufacturing	—	—	—	—	—	—	—	—	—	—	144	131	275	14.8	0.35	—	750
Industrial Park	—	—	—	—	—	—	—	—	—	—	315	288	604	32.4	0.77	—	1,644
Single Family Housing	—	—	—	—	—	—	—	—	—	—	71.7	243	314	7.39	0.18	—	552

Apartme Low Rise	—	—	—	—	—	—	—	—	—	—	7.89	7.20	15.1	0.81	0.02	—	41.1
City Park	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	2,039	2,039	4,078	209	5.01	—	10,805

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	4,256	0.00	4,256	425	0.00	—	14,891
General Office Building	—	—	—	—	—	—	—	—	—	—	8,425	0.00	8,425	842	0.00	—	29,477
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	4,889	0.00	4,889	489	0.00	—	17,105
Manufacturing	—	—	—	—	—	—	—	—	—	—	1,310	0.00	1,310	131	0.00	—	4,583
Industrial Park	—	—	—	—	—	—	—	—	—	—	2,873	0.00	2,873	287	0.00	—	10,053
Single Family Housing	—	—	—	—	—	—	—	—	—	—	2,327	0.00	2,327	233	0.00	—	8,141
Apartments Low Rise	—	—	—	—	—	—	—	—	—	—	279	0.00	279	27.9	0.00	—	976
City Park	—	—	—	—	—	—	—	—	—	—	3.15	0.00	3.15	0.32	0.00	—	11.0

Total	—	—	—	—	—	—	—	—	—	—	24,363	0.00	24,363	2,435	0.00	—	85,237
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	4,256	0.00	4,256	425	0.00	—	14,891
General Office Building	—	—	—	—	—	—	—	—	—	—	8,425	0.00	8,425	842	0.00	—	29,477
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	4,889	0.00	4,889	489	0.00	—	17,105
Manufacturing	—	—	—	—	—	—	—	—	—	—	1,310	0.00	1,310	131	0.00	—	4,583
Industrial Park	—	—	—	—	—	—	—	—	—	—	2,873	0.00	2,873	287	0.00	—	10,053
Single Family Housing	—	—	—	—	—	—	—	—	—	—	2,327	0.00	2,327	233	0.00	—	8,141
Apartments Low Rise	—	—	—	—	—	—	—	—	—	—	279	0.00	279	27.9	0.00	—	976
City Park	—	—	—	—	—	—	—	—	—	—	3.15	0.00	3.15	0.32	0.00	—	11.0
Total	—	—	—	—	—	—	—	—	—	—	24,363	0.00	24,363	2,435	0.00	—	85,237
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	705	0.00	705	70.4	0.00	—	2,465
General Office Building	—	—	—	—	—	—	—	—	—	—	1,395	0.00	1,395	139	0.00	—	4,880
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	809	0.00	809	80.9	0.00	—	2,832

Manufacturing	—	—	—	—	—	—	—	—	—	—	217	0.00	217	21.7	0.00	—	759
Industrial Park	—	—	—	—	—	—	—	—	—	—	476	0.00	476	47.5	0.00	—	1,664
Single Family Housing	—	—	—	—	—	—	—	—	—	—	385	0.00	385	38.5	0.00	—	1,348
Apartments Low Rise	—	—	—	—	—	—	—	—	—	—	46.2	0.00	46.2	4.62	0.00	—	162
City Park	—	—	—	—	—	—	—	—	—	—	0.52	0.00	0.52	0.05	0.00	—	1.83
Total	—	—	—	—	—	—	—	—	—	—	4,034	0.00	4,034	403	0.00	—	14,112

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20.7	20.7
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	40.9	40.9
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,192	1,192
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	510	510
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,119	1,119

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	88.8	88.8
Apartments Low Rise	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.31	5.31
City Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2,977	2,977
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20.7	20.7
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	40.9	40.9
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,192	1,192
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	510	510
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,119	1,119
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	88.8	88.8
Apartments Low Rise	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.31	5.31
City Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2,977	2,977
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.42	3.42

General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.77	6.77
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	197	197
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	84.5	84.5
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	185	185
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14.7	14.7
Apartments Low Rise	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.88	0.88
City Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	493	493

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Office Park	18,179	2,693	1,248	4,945,111	111,850	16,570	7,679	30,425,365
Office Park	27,582	4,086	1,894	7,502,927	169,704	25,141	11,651	46,162,623
Office Park	48,244	7,147	3,312	13,123,196	296,825	43,974	20,378	80,741,979
General Office Building	12,049	2,734	866	3,329,162	74,135	16,821	5,328	20,483,052
High Turnover (Sit Down Restaurant)	85,515	93,306	108,734	32,829,876	219,593	574,073	669,001	122,068,549
Manufacturing	7,704	12,584	9,977	3,184,877	47,397	77,427	61,387	19,595,324
Industrial Park	11,407	8,598	4,197	3,641,174	70,184	52,898	25,824	22,402,743
Industrial Park	3,083	2,323	1,134	984,014	18,967	14,296	6,979	6,054,259

Single Family Housing	59,236	59,863	53,651	21,362,654	650,660	657,553	589,316	234,651,812
Single Family Housing	812	820	735	292,779	8,917	9,012	8,077	3,215,945
Apartments Low Rise	5,124	5,698	4,396	1,862,230	56,283	62,588	48,287	20,455,120
City Park	53.0	133	149	28,543	326	820	916	175,614
General Office Building	151,678	34,416	10,901	41,907,581	933,217	211,746	67,069	257,841,235

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

Hearth Type	Unmitigated (number)
Single Family Housing	—
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	6275
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	86
Conventional Wood Stoves	0
Catalytic Wood Stoves	0
Non-Catalytic Wood Stoves	0

Pellet Wood Stoves	0
Conventional Wood Stoves	0
Catalytic Wood Stoves	0
Non-Catalytic Wood Stoves	0
Pellet Wood Stoves	0
Apartments Low Rise	—
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	700
Conventional Wood Stoves	0
Catalytic Wood Stoves	0
Non-Catalytic Wood Stoves	0
Pellet Wood Stoves	0

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
26620548.75	8,873,516	48,485,814	16,161,938	—

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Office Park	34,370,408	204	0.0330	0.0040	47,409,052
Office Park	52,148,205	204	0.0330	0.0040	71,930,975
Office Park	91,211,221	204	0.0330	0.0040	125,812,807
General Office Building	25,891,766	204	0.0330	0.0040	35,713,981
High Turnover (Sit Down Restaurant)	30,609,107	204	0.0330	0.0040	92,886,916
Manufacturing	20,248,783	204	0.0330	0.0040	81,267,163
Industrial Park	70,843,962	204	0.0330	0.0040	97,719,093
Industrial Park	19,145,320	204	0.0330	0.0040	26,408,225
Single Family Housing	53,498,826	204	0.0330	0.0040	182,539,909
Single Family Housing	733,211	204	0.0330	0.0040	2,501,742
Apartments Low Rise	3,111,408	204	0.0330	0.0040	10,639,392
City Park	0.00	204	0.0330	0.0040	0.00
General Office Building	325,926,279	204	0.0330	0.0040	449,568,593

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Office Park	291,876,494	0.00
Office Park	442,847,094	0.00
Office Park	774,573,627	0.00
General Office Building	219,875,131	0.00
High Turnover (Sit Down Restaurant)	231,383,749	0.00
Manufacturing	453,296,250	0.00

Industrial Park	782,760,900	0.00
Industrial Park	211,538,250	0.00
Single Family Housing	222,830,584	1,171,040,430
Single Family Housing	3,053,933	16,049,324
Apartments Low Rise	24,857,595	0.00
City Park	0.00	0.00
General Office Building	2,767,794,337	7,170

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Office Park	1,527	—
Office Park	2,317	—
Office Park	4,053	—
General Office Building	1,151	—
High Turnover (Sit Down Restaurant)	9,071	—
Manufacturing	2,431	—
Industrial Park	4,197	—
Industrial Park	1,134	—
Single Family Housing	4,259	—
Single Family Housing	58.5	—
Apartments Low Rise	518	—
City Park	5.85	—
General Office Building	14,483	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Office Park	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Office Park	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Office Park	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Office Park	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Office Park	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Office Park	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
General Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
High Turnover (Sit Down Restaurant)	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Manufacturing	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0
Industrial Park	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0
Industrial Park	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0

Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00
Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00
Apartments Low Rise	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Apartments Low Rise	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00
City Park	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
City Park	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
General Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	20.4	annual days of extreme heat
Extreme Precipitation	3.15	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	15.8	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	0	0	N/A
Extreme Precipitation	1	0	0	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	0	0	N/A
Flooding	0	0	0	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	1	2
Extreme Precipitation	1	1	1	2
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	1	1	2
Flooding	1	1	1	2
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	35.3

AQ-PM	16.6
AQ-DPM	7.67
Drinking Water	62.6
Lead Risk Housing	17.0
Pesticides	76.2
Toxic Releases	38.6
Traffic	7.65
Effect Indicators	—
CleanUp Sites	61.7
Groundwater	95.7
Haz Waste Facilities/Generators	92.3
Impaired Water Bodies	99.0
Solid Waste	97.9
Sensitive Population	—
Asthma	85.8
Cardio-vascular	84.6
Low Birth Weights	90.7
Socioeconomic Factor Indicators	—
Education	44.9
Housing	37.5
Linguistic	32.0
Poverty	48.9
Unemployment	—

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—

Above Poverty	55.12639548
Employed	6.582830746
Median HI	48.659053
Education	—
Bachelor's or higher	49.15950212
High school enrollment	100
Preschool enrollment	73.18105993
Transportation	—
Auto Access	57.21801617
Active commuting	64.73758501
Social	—
2-parent households	52.4573335
Voting	80.5338124
Neighborhood	—
Alcohol availability	67.04735019
Park access	20.17194919
Retail density	3.27216733
Supermarket access	35.35223919
Tree canopy	68.22789683
Housing	—
Homeownership	71.19209547
Housing habitability	84.66572565
Low-inc homeowner severe housing cost burden	60.91364045
Low-inc renter severe housing cost burden	71.98768125
Uncrowded housing	83.16437829
Health Outcomes	—
Insured adults	34.59514949
Arthritis	0.0

Asthma ER Admissions	29.6
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	29.9
Cognitively Disabled	28.0
Physically Disabled	7.8
Heart Attack ER Admissions	26.8
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	19.6
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	77.3
Children	86.0
Elderly	1.3
English Speaking	64.4
Foreign-born	25.0

Outdoor Workers	14.1
Climate Change Adaptive Capacity	—
Impervious Surface Cover	72.0
Traffic Density	23.1
Traffic Access	23.0
Other Indices	—
Hardship	57.9
Other Decision Support	—
2016 Voting	93.7

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	78.0
Healthy Places Index Score for Project Location (b)	50.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	Lot acreages updated to reflect information provided by the City. Urban reserve not accounted for in the modeling.
Operations: Fleet Mix	Assuming 30% HDT for all industrial land uses.

ATTACHMENT B

CalEEMod Output File for Air Quality and Greenhouse Gas Emissions – Existing General Plan 2001

Existing General Plan Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Existing General Plan
Operational Year	2024
Lead Agency	—
Land Use Scale	Plan/community
Analysis Level for Defaults	County
Windspeed (m/s)	5.70
Precipitation (days)	20.6
Location	Rio Vista, CA 94571, USA
County	Solano-Sacramento
City	Rio Vista
Air District	Yolo/Solano AQMD
Air Basin	Sacramento Valley
TAZ	783
EDFZ	4
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.29

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Office Park	2,821	1000sqft	50.0	2,821,400	0.00	—	—	—
Office Park	229	1000sqft	15.0	228,690	0.00	—	—	—

General Office Building	749	1000sqft	43.0	748,832	0.00	—	—	—
High Turnover (Sit Down Restaurant)	488	1000sqft	32.0	487,872	0.00	—	—	—
Manufacturing	6,792	1000sqft	312	6,792,160	0.00	—	—	—
Industrial Park	1,722	1000sqft	113	1,722,168	0.00	—	—	—
Industrial Park	1,189	1000sqft	78.0	1,188,768	0.00	—	—	—
General Office Building	960	1000sqft	63.0	960,498	0.00	—	—	—
Single Family Housing	4,266	Dwelling Unit	2,093	8,318,700	49,967,048	—	12,030	—
Single Family Housing	85.0	Dwelling Unit	154	165,750	995,593	—	240	—
City Park	15.0	Acre	15.0	0.00	0.00	0.00	—	—
General Office Building	412	1000sqft	27.0	411,642	0.00	—	—	—
General Office Building	5,581	1000sqft	256	5,580,800	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1,834	1,632	8,299	20.3	38.8	85,329	85,368	37.3	8,694	8,731	25,136	2,454,351	2,479,487	2,671	160	10,209	2,604,217

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1,588	1,817	6,895	19.1	37.1	85,329	85,366	36.0	8,694	8,730	25,136	2,334,901	2,360,037	2,685	168	3,553	2,480,823
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1,485	1,363	5,583	14.7	32.9	60,051	60,084	31.9	6,125	6,157	25,136	1,888,389	1,913,525	2,660	129	5,573	2,024,165
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	271	249	1,019	2.69	6.01	10,959	10,965	5.83	1,118	1,124	4,162	312,644	316,806	440	21.4	923	335,124

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	969	1,392	6,963	18.8	19.4	85,329	85,348	18.4	8,694	8,712	—	1,934,443	1,934,443	73.0	134	6,834	1,983,089
Area	853	10.1	1,156	0.07	1.75	—	1.75	1.32	—	1.32	0.00	4,406	4,406	0.18	0.04	—	4,421
Energy	12.7	230	180	1.39	17.6	—	17.6	17.6	—	17.6	—	506,969	506,969	61.8	5.04	—	510,017
Water	—	—	—	—	—	—	—	—	—	—	8,541	8,533	17,075	877	21.0	—	45,256
Waste	—	—	—	—	—	—	—	—	—	—	16,595	0.00	16,595	1,659	0.00	—	58,059
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,375	3,375
Total	1,834	1,632	8,299	20.3	38.8	85,329	85,368	37.3	8,694	8,731	25,136	2,454,351	2,479,487	2,671	160	10,209	2,604,217
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Mobile	894	1,587	6,716	17.7	19.5	85,329	85,349	18.4	8,694	8,712	—	1,819,399	1,819,399	87.6	142	177	1,864,116
Area	681	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Energy	12.7	230	180	1.39	17.6	—	17.6	17.6	—	17.6	—	506,969	506,969	61.8	5.04	—	510,017
Water	—	—	—	—	—	—	—	—	—	—	8,541	8,533	17,075	877	21.0	—	45,256
Waste	—	—	—	—	—	—	—	—	—	—	16,595	0.00	16,595	1,659	0.00	—	58,059
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,375	3,375
Total	1,588	1,817	6,895	19.1	37.1	85,329	85,366	36.0	8,694	8,730	25,136	2,334,901	2,360,037	2,685	168	3,553	2,480,823
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	706	1,128	4,833	13.3	14.5	60,051	60,065	13.7	6,125	6,138	—	1,370,714	1,370,714	62.2	103	2,197	1,405,278
Area	766	4.99	570	0.03	0.86	—	0.86	0.65	—	0.65	0.00	2,173	2,173	0.09	0.02	—	2,180
Energy	12.7	230	180	1.39	17.6	—	17.6	17.6	—	17.6	—	506,969	506,969	61.8	5.04	—	510,017
Water	—	—	—	—	—	—	—	—	—	—	8,541	8,533	17,075	877	21.0	—	45,256
Waste	—	—	—	—	—	—	—	—	—	—	16,595	0.00	16,595	1,659	0.00	—	58,059
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,375	3,375
Total	1,485	1,363	5,583	14.7	32.9	60,051	60,084	31.9	6,125	6,157	25,136	1,888,389	1,913,525	2,660	129	5,573	2,024,165
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	129	206	882	2.43	2.64	10,959	10,962	2.50	1,118	1,120	—	226,937	226,937	10.3	17.1	364	232,660
Area	140	0.91	104	0.01	0.16	—	0.16	0.12	—	0.12	0.00	360	360	0.02	< 0.005	—	361
Energy	2.32	41.9	32.8	0.25	3.21	—	3.21	3.21	—	3.21	—	83,935	83,935	10.2	0.84	—	84,439
Water	—	—	—	—	—	—	—	—	—	—	1,414	1,413	2,827	145	3.47	—	7,493
Waste	—	—	—	—	—	—	—	—	—	—	2,747	0.00	2,747	275	0.00	—	9,612
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	559	559
Total	271	249	1,019	2.69	6.01	10,959	10,965	5.83	1,118	1,124	4,162	312,644	316,806	440	21.4	923	335,124

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	130	108	839	1.86	1.63	9,416	9,418	1.53	959	960	—	189,821	189,821	8.83	9.90	727	193,719
General Office Building	289	240	1,864	4.13	3.62	20,919	20,923	3.41	2,131	2,134	—	421,730	421,730	19.6	22.0	1,615	430,389
High Turnover (Sit Down Restaurant)	268	223	1,729	3.84	3.36	19,407	19,410	3.16	1,976	1,980	—	391,230	391,230	18.2	20.4	1,498	399,263
Manufacturing	82.8	507	735	4.06	6.04	12,174	12,180	5.76	1,243	1,249	—	426,221	426,221	9.68	51.2	1,140	442,867
Industrial Park	18.6	114	165	0.91	1.36	2,739	2,740	1.30	280	281	—	95,886	95,886	2.18	11.5	257	99,631
Single Family Housing	180	201	1,629	4.01	3.42	20,666	20,669	3.23	2,105	2,108	—	409,370	409,370	14.4	19.1	1,596	417,032
City Park	0.13	0.11	0.82	< 0.005	< 0.005	9.16	9.16	< 0.005	0.93	0.93	—	185	185	0.01	0.01	0.71	188
Total	969	1,392	6,963	18.8	19.4	85,329	85,348	18.4	8,694	8,712	—	1,934,443	1,934,443	73.0	134	6,834	1,983,089
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Office Park	120	127	825	1.73	1.63	9,416	9,418	1.54	959	960	—	176,489	176,489	10.8	10.9	18.8	180,017
General Office Building	266	283	1,834	3.84	3.62	20,919	20,923	3.41	2,131	2,134	—	392,110	392,110	24.0	24.1	41.9	399,947
High Turnover (Sit Down Restaurant)	247	262	1,701	3.56	3.36	19,407	19,410	3.16	1,976	1,980	—	363,752	363,752	22.3	22.4	38.8	371,022
Manufacturing	76.0	552	710	3.94	6.06	12,174	12,180	5.78	1,243	1,249	—	413,916	413,916	11.1	52.1	29.6	429,735
Industrial Park	17.1	124	160	0.89	1.36	2,739	2,740	1.30	280	281	—	93,118	93,118	2.50	11.7	6.65	96,676
Single Family Housing	168	238	1,485	3.72	3.43	20,666	20,669	3.23	2,105	2,108	—	379,841	379,841	16.8	20.9	41.4	386,543
City Park	0.12	0.12	0.80	< 0.005	< 0.005	9.16	9.16	< 0.005	0.93	0.93	—	172	172	0.01	0.01	0.02	175
Total	894	1,587	6,716	17.7	19.5	85,329	85,349	18.4	8,694	8,712	—	1,819,399	1,819,399	87.6	142	177	1,864,116
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	16.1	16.1	105	0.24	0.22	1,209	1,209	0.21	123	123	—	22,075	22,075	1.20	1.28	38.7	22,526
General Office Building	36.4	36.4	236	0.54	0.50	2,729	2,729	0.47	278	279	—	49,816	49,816	2.71	2.89	87.4	50,833
High Turnover (Sit Down Restaurant)	34.3	27.2	178	0.34	0.33	1,672	1,672	0.31	170	171	—	31,370	31,370	2.34	2.09	53.5	32,104
Manufacturing	9.63	67.5	85.1	0.50	0.77	1,455	1,455	0.73	149	149	—	47,745	47,745	1.19	5.93	56.5	49,597
Industrial Park	2.73	19.1	24.1	0.14	0.22	413	413	0.21	42.2	42.4	—	13,547	13,547	0.34	1.68	16.0	14,073
Single Family Housing	29.7	39.6	254	0.67	0.61	3,482	3,482	0.58	355	356	—	62,369	62,369	2.51	3.25	112	63,512

City Park	0.01	0.01	0.07	< 0.005	< 0.005	0.83	0.83	< 0.005	0.08	0.08	—	15.1	15.1	< 0.005	< 0.005	0.03	15.4
Total	129	206	882	2.43	2.64	10,959	10,962	2.50	1,118	1,120	—	226,937	226,937	10.3	17.1	364	232,660

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	35,675	35,675	5.77	0.70	—	36,028
General Office Building	—	—	—	—	—	—	—	—	—	—	—	90,084	90,084	14.6	1.77	—	90,975
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	10,948	10,948	1.77	0.21	—	11,056
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	39,211	39,211	6.34	0.77	—	39,599
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	34,048	34,048	5.51	0.67	—	34,384
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	20,731	20,731	3.35	0.41	—	20,936
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	230,697	230,697	37.3	4.52	—	232,978
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Office Park	—	—	—	—	—	—	—	—	—	—	—	35,675	35,675	5.77	0.70	—	36,028
General Office Building	—	—	—	—	—	—	—	—	—	—	—	90,084	90,084	14.6	1.77	—	90,975
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	10,948	10,948	1.77	0.21	—	11,056
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	39,211	39,211	6.34	0.77	—	39,599
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	34,048	34,048	5.51	0.67	—	34,384
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	20,731	20,731	3.35	0.41	—	20,936
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	230,697	230,697	37.3	4.52	—	232,978
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	5,906	5,906	0.96	0.12	—	5,965
General Office Building	—	—	—	—	—	—	—	—	—	—	—	14,914	14,914	2.41	0.29	—	15,062
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	1,813	1,813	0.29	0.04	—	1,830
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	6,492	6,492	1.05	0.13	—	6,556
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	5,637	5,637	0.91	0.11	—	5,693
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	3,432	3,432	0.56	0.07	—	3,466
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

Total	—	—	—	—	—	—	—	—	—	—	—	38,195	38,195	6.18	0.75	—	38,572

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	1.30	23.7	19.9	0.14	1.80	—	1.80	1.80	—	1.80	—	28,220	28,220	2.50	0.05	—	28,298
General Office Building	3.28	59.7	50.2	0.36	4.54	—	4.54	4.54	—	4.54	—	71,258	71,258	6.31	0.13	—	71,455
High Turnover (Sit Down Restaurant)	0.88	16.0	13.4	0.10	1.21	—	1.21	1.21	—	1.21	—	19,052	19,052	1.69	0.04	—	19,105
Manufacturing	4.16	75.6	63.5	0.45	5.75	—	5.75	5.75	—	5.75	—	90,247	90,247	7.99	0.17	—	90,497
Industrial Park	1.24	22.6	19.0	0.14	1.72	—	1.72	1.72	—	1.72	—	26,932	26,932	2.38	0.05	—	27,007
Single Family Housing	1.87	32.0	13.6	0.20	2.58	—	2.58	2.58	—	2.58	—	40,564	40,564	3.59	0.08	—	40,677
City Park	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	12.7	230	180	1.39	17.6	—	17.6	17.6	—	17.6	—	276,272	276,272	24.4	0.52	—	277,039
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	1.30	23.7	19.9	0.14	1.80	—	1.80	1.80	—	1.80	—	28,220	28,220	2.50	0.05	—	28,298
General Office Building	3.28	59.7	50.2	0.36	4.54	—	4.54	4.54	—	4.54	—	71,258	71,258	6.31	0.13	—	71,455

High Turnover (Sit Down Restaurant)	0.88	16.0	13.4	0.10	1.21	—	1.21	1.21	—	1.21	—	19,052	19,052	1.69	0.04	—	19,105
Manufacturing	4.16	75.6	63.5	0.45	5.75	—	5.75	5.75	—	5.75	—	90,247	90,247	7.99	0.17	—	90,497
Industrial Park	1.24	22.6	19.0	0.14	1.72	—	1.72	1.72	—	1.72	—	26,932	26,932	2.38	0.05	—	27,007
Single Family Housing	1.87	32.0	13.6	0.20	2.58	—	2.58	2.58	—	2.58	—	40,564	40,564	3.59	0.08	—	40,677
City Park	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	12.7	230	180	1.39	17.6	—	17.6	17.6	—	17.6	—	276,272	276,272	24.4	0.52	—	277,039
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	0.24	4.32	3.63	0.03	0.33	—	0.33	0.33	—	0.33	—	4,672	4,672	0.41	0.01	—	4,685
General Office Building	0.60	10.9	9.16	0.07	0.83	—	0.83	0.83	—	0.83	—	11,797	11,797	1.04	0.02	—	11,830
High Turnover (Sit Down Restaurant)	0.16	2.91	2.45	0.02	0.22	—	0.22	0.22	—	0.22	—	3,154	3,154	0.28	0.01	—	3,163
Manufacturing	0.76	13.8	11.6	0.08	1.05	—	1.05	1.05	—	1.05	—	14,941	14,941	1.32	0.03	—	14,983
Industrial Park	0.23	4.12	3.46	0.02	0.31	—	0.31	0.31	—	0.31	—	4,459	4,459	0.39	0.01	—	4,471
Single Family Housing	0.34	5.83	2.48	0.04	0.47	—	0.47	0.47	—	0.47	—	6,716	6,716	0.59	0.01	—	6,734
City Park	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	2.32	41.9	32.8	0.25	3.21	—	3.21	3.21	—	3.21	—	45,740	45,740	4.05	0.09	—	45,867

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	630	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	51.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	172	10.1	1,156	0.07	1.75	—	1.75	1.32	—	1.32	—	4,406	4,406	0.18	0.04	—	4,421
Total	853	10.1	1,156	0.07	1.75	—	1.75	1.32	—	1.32	0.00	4,406	4,406	0.18	0.04	—	4,421
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	630	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	51.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	681	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	115	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Architect Coatings	9.39	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	15.5	0.91	104	0.01	0.16	—	0.16	0.12	—	0.12	—	360	360	0.02	< 0.005	—	361
Total	140	0.91	104	0.01	0.16	—	0.16	0.12	—	0.12	0.00	360	360	0.02	< 0.005	—	361

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	1,039	949	1,988	107	2.55	—	5,414
General Office Building	—	—	—	—	—	—	—	—	—	—	2,623	2,396	5,019	269	6.44	—	13,671
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	284	259	543	29.1	0.70	—	1,479
Manufacturing	—	—	—	—	—	—	—	—	—	—	3,010	2,749	5,759	309	7.39	—	15,687
Industrial Park	—	—	—	—	—	—	—	—	—	—	1,290	1,178	2,468	132	3.17	—	6,723
Single Family Housing	—	—	—	—	—	—	—	—	—	—	296	1,002	1,298	30.5	0.74	—	2,282
City Park	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	8,541	8,533	17,075	877	21.0	—	45,256

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	1,039	949	1,988	107	2.55	—	5,414
General Office Building	—	—	—	—	—	—	—	—	—	—	2,623	2,396	5,019	269	6.44	—	13,671
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	284	259	543	29.1	0.70	—	1,479
Manufacturing	—	—	—	—	—	—	—	—	—	—	3,010	2,749	5,759	309	7.39	—	15,687
Industrial Park	—	—	—	—	—	—	—	—	—	—	1,290	1,178	2,468	132	3.17	—	6,723
Single Family Housing	—	—	—	—	—	—	—	—	—	—	296	1,002	1,298	30.5	0.74	—	2,282
City Park	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	8,541	8,533	17,075	877	21.0	—	45,256
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	172	157	329	17.7	0.42	—	896
General Office Building	—	—	—	—	—	—	—	—	—	—	434	397	831	44.6	1.07	—	2,263
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	47.0	42.9	89.9	4.82	0.12	—	245
Manufacturing	—	—	—	—	—	—	—	—	—	—	498	455	953	51.2	1.22	—	2,597
Industrial Park	—	—	—	—	—	—	—	—	—	—	214	195	409	21.9	0.52	—	1,113

Single Family Housing	—	—	—	—	—	—	—	—	—	—	49.0	166	215	5.05	0.12	—	378
City Park	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	1,414	1,413	2,827	145	3.47	—	7,493

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	1,529	0.00	1,529	153	0.00	—	5,349
General Office Building	—	—	—	—	—	—	—	—	—	—	3,860	0.00	3,860	386	0.00	—	13,506
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	3,129	0.00	3,129	313	0.00	—	10,947
Manufacturing	—	—	—	—	—	—	—	—	—	—	4,539	0.00	4,539	454	0.00	—	15,881
Industrial Park	—	—	—	—	—	—	—	—	—	—	1,945	0.00	1,945	194	0.00	—	6,806
Single Family Housing	—	—	—	—	—	—	—	—	—	—	1,592	0.00	1,592	159	0.00	—	5,569
City Park	—	—	—	—	—	—	—	—	—	—	0.70	0.00	0.70	0.07	0.00	—	2.43
Total	—	—	—	—	—	—	—	—	—	—	16,595	0.00	16,595	1,659	0.00	—	58,059

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	1,529	0.00	1,529	153	0.00	—	5,349
General Office Building	—	—	—	—	—	—	—	—	—	—	3,860	0.00	3,860	386	0.00	—	13,506
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	3,129	0.00	3,129	313	0.00	—	10,947
Manufacturing	—	—	—	—	—	—	—	—	—	—	4,539	0.00	4,539	454	0.00	—	15,881
Industrial Park	—	—	—	—	—	—	—	—	—	—	1,945	0.00	1,945	194	0.00	—	6,806
Single Family Housing	—	—	—	—	—	—	—	—	—	—	1,592	0.00	1,592	159	0.00	—	5,569
City Park	—	—	—	—	—	—	—	—	—	—	0.70	0.00	0.70	0.07	0.00	—	2.43
Total	—	—	—	—	—	—	—	—	—	—	16,595	0.00	16,595	1,659	0.00	—	58,059
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	253	0.00	253	25.3	0.00	—	886
General Office Building	—	—	—	—	—	—	—	—	—	—	639	0.00	639	63.9	0.00	—	2,236
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	518	0.00	518	51.8	0.00	—	1,812
Manufacturing	—	—	—	—	—	—	—	—	—	—	751	0.00	751	75.1	0.00	—	2,629
Industrial Park	—	—	—	—	—	—	—	—	—	—	322	0.00	322	32.2	0.00	—	1,127

Single Family Housing	—	—	—	—	—	—	—	—	—	—	264	0.00	264	26.3	0.00	—	922
City Park	—	—	—	—	—	—	—	—	—	—	0.12	0.00	0.12	0.01	0.00	—	0.40
Total	—	—	—	—	—	—	—	—	—	—	2,747	0.00	2,747	275	0.00	—	9,612

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7.42	7.42
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18.7	18.7
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	763	763
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,768	1,768
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	758	758
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	60.8	60.8
City Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,375	3,375

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7.42	7.42
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18.7	18.7
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	763	763
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,768	1,768
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	758	758
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	60.8	60.8
City Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,375	3,375
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.23	1.23
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.10	3.10
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	126	126
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	293	293
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	125	125

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10.1	10.1
City Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	559	559

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Office Park	31,233	4,627	2,144	8,495,941	192,164	28,469	13,193	52,272,256
Office Park	2,532	375	174	688,643	15,576	2,308	1,069	4,236,954
General Office Building	7,294	1,655	524	2,015,176	44,875	10,182	3,225	12,398,606
High Turnover (Sit Down Restaurant)	54,729	59,716	69,590	21,011,120	140,540	367,407	428,161	78,123,871
Manufacturing	26,693	43,606	34,572	11,035,708	164,233	268,289	212,709	67,898,467
Industrial Park	5,804	4,374	2,135	1,852,548	35,708	26,913	13,139	11,398,018
Industrial Park	4,006	3,019	1,474	1,278,766	24,648	18,578	9,069	7,867,757
General Office Building	9,355	2,123	672	2,584,789	57,559	13,060	4,137	15,903,215
Single Family Housing	40,271	40,698	36,474	14,523,200	442,345	447,031	400,641	159,525,837
Single Family Housing	802	811	727	289,375	8,814	8,907	7,983	3,178,550
City Park	11.7	29.4	32.8	6,296	72.0	181	202	38,738
General Office Building	4,009	910	288	1,107,767	24,668	5,597	1,773	6,815,663
General Office Building	54,357	12,334	3,907	15,018,451	334,438	75,884	24,036	92,402,754

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

Hearth Type	Unmitigated (number)
Single Family Housing	—
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	4266
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	85
Conventional Wood Stoves	0
Catalytic Wood Stoves	0
Non-Catalytic Wood Stoves	0
Pellet Wood Stoves	0
Conventional Wood Stoves	0
Catalytic Wood Stoves	0
Non-Catalytic Wood Stoves	0
Pellet Wood Stoves	0

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
17181011.25	5,727,004	31,414,245	10,471,415	—

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Office Park	59,050,030	204	0.0330	0.0040	81,451,054
Office Park	4,786,330	204	0.0330	0.0040	6,602,056
General Office Building	15,672,557	204	0.0330	0.0040	21,618,046
High Turnover (Sit Down Restaurant)	19,589,828	204	0.0330	0.0040	59,447,626
Manufacturing	70,162,725	204	0.0330	0.0040	281,593,497
Industrial Park	36,043,834	204	0.0330	0.0040	49,717,303
Industrial Park	24,880,126	204	0.0330	0.0040	34,318,568
General Office Building	20,102,586	204	0.0330	0.0040	27,728,636
Single Family Housing	36,370,676	204	0.0330	0.0040	124,098,048
Single Family Housing	724,685	204	0.0330	0.0040	2,472,652
City Park	0.00	204	0.0330	0.0040	0.00
General Office Building	8,615,394	204	0.0330	0.0040	11,883,701
General Office Building	116,802,441	204	0.0330	0.0040	161,112,229

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Office Park	501,457,997	0.00
Office Park	40,645,931	0.00
General Office Building	133,092,718	0.00
High Turnover (Sit Down Restaurant)	148,085,599	0.00
Manufacturing	1,570,687,000	0.00
Industrial Park	398,251,350	0.00
Industrial Park	274,902,600	0.00
General Office Building	170,712,909	0.00
Single Family Housing	151,489,286	796,120,869
Single Family Housing	3,018,422	15,862,701
City Park	0.00	0.00
General Office Building	73,162,675	0.00
General Office Building	991,896,501	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Office Park	2,624	—
Office Park	213	—
General Office Building	696	—
High Turnover (Sit Down Restaurant)	5,806	—
Manufacturing	8,422	—
Industrial Park	2,135	—

Industrial Park	1,474	—
General Office Building	893	—
Single Family Housing	2,895	—
Single Family Housing	57.8	—
City Park	1.29	—
General Office Building	383	—
General Office Building	5,190	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Office Park	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Office Park	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Office Park	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Office Park	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
General Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
High Turnover (Sit Down Restaurant)	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0

High Turnover (Sit Down Restaurant)	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Manufacturing	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0
Industrial Park	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0
Industrial Park	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0
General Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00
Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00
City Park	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
City Park	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
General Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0

General Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	20.4	annual days of extreme heat
Extreme Precipitation	3.15	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	15.8	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	0	0	N/A
Extreme Precipitation	1	0	0	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	0	0	N/A
Flooding	0	0	0	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	1	2
Extreme Precipitation	1	1	1	2
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	1	1	2
Flooding	1	1	1	2
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.

The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	35.3
AQ-PM	16.6
AQ-DPM	7.67
Drinking Water	62.6
Lead Risk Housing	17.0
Pesticides	76.2
Toxic Releases	38.6
Traffic	7.65
Effect Indicators	—
CleanUp Sites	61.7
Groundwater	95.7
Haz Waste Facilities/Generators	92.3
Impaired Water Bodies	99.0
Solid Waste	97.9
Sensitive Population	—
Asthma	85.8
Cardio-vascular	84.6
Low Birth Weights	90.7

Socioeconomic Factor Indicators	—
Education	44.9
Housing	37.5
Linguistic	32.0
Poverty	48.9
Unemployment	—

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	55.12639548
Employed	6.582830746
Median HI	48.659053
Education	—
Bachelor's or higher	49.15950212
High school enrollment	100
Preschool enrollment	73.18105993
Transportation	—
Auto Access	57.21801617
Active commuting	64.73758501
Social	—
2-parent households	52.4573335
Voting	80.5338124
Neighborhood	—
Alcohol availability	67.04735019
Park access	20.17194919
Retail density	3.27216733

Supermarket access	35.35223919
Tree canopy	68.22789683
Housing	—
Homeownership	71.19209547
Housing habitability	84.66572565
Low-inc homeowner severe housing cost burden	60.91364045
Low-inc renter severe housing cost burden	71.98768125
Uncrowded housing	83.16437829
Health Outcomes	—
Insured adults	34.59514949
Arthritis	0.0
Asthma ER Admissions	29.6
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	29.9
Cognitively Disabled	28.0
Physically Disabled	7.8
Heart Attack ER Admissions	26.8
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	19.6
Physical Health Not Good	0.0
Stroke	0.0

Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	77.3
Children	86.0
Elderly	1.3
English Speaking	64.4
Foreign-born	25.0
Outdoor Workers	14.1
Climate Change Adaptive Capacity	—
Impervious Surface Cover	72.0
Traffic Density	23.1
Traffic Access	23.0
Other Indices	—
Hardship	57.9
Other Decision Support	—
2016 Voting	93.7

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	78.0
Healthy Places Index Score for Project Location (b)	50.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	Lot acreages updated to reflect information provided by the City. Ag/open space, study are and County Land not accounted for in the modeling.
Operations: Fleet Mix	Industrial park accounts for 30% HDT per the SCAQMD.

Appendix 5.4-1 Biological Resources Assessment

Appendices

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Biological Resources Assessment for the Rio Vista General Plan Update

Rio Vista, Solano County, California

Prepared For:

Placeworks, Inc.

Prepared By:

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS
2525 Warren Drive
Rocklin, California 95677

October 10, 2023

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LIST OF ACRONYMS AND ABBREVIATIONS

Term	Description
Act	Delta Protection Act
BCC	Birds of Conservation Concern
BRA	Biological Resources Assessment
BSA	Biological Study Area
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
City	City of Rio Vista
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
Commission	Delta Protection Commission

Term	Description
CRPR	California Rare Plant Ranks
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationships
Delta	Sacramento-San Joaquin Delta
Delta Plan	Land Use and Resource Management Plan for the Primary Zone of the Delta
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
HCP	Habitat Conservation Plan
LSAA	Lake or Streambed Alteration Agreement
MBTA	Migratory Bird Treaty Act
MCV	Manual of California Vegetation
NCCP	Natural Community Conservation Plan
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
PRC	Public Resources Code
Project	Rio Vista General Plan Update Project
RWQCB	Regional Water Quality Control Board
SNCs	Sensitive natural communities
SOI	Sphere of Influence
SSC	Species of Special Concern
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WL	Watch List

1.0 INTRODUCTION

At the request of Placeworks, Inc., ECORP Consulting, Inc. conducted a Biological Resources Assessment (BRA) for the Rio Vista General Plan Update Project (Project) located in Rio Vista, Solano County, California. The BRA provides a regulatory background for projects within the City of Rio Vista (City) and the City's Sphere of Influence (SOI), and information regarding biological resources potentially occurring within the City and SOI. The SOI is located outside of the City limits and within Solano County. However, regulations specific to Solano County are not included in this BRA.

1.1 Project Description

The City's General Plan is a regulatory document that provides a framework for decision making by establishing goals and policies to guide the community in realizing a future vision. The General Plan was last comprehensively updated in 2001. The new General Plan Update is underway and will set a vision for the year 2045.

1.2 Biological Study Area

The 5,880.99-acre Biological Study Area (BSA) includes the 4,415.79-acre City and the 1,465.20-acre SOI, as depicted on Figure 1, and is generally located on the west side of the Sacramento River east of Suisun Bay and the Montezuma Hills and south of Cache Slough. The BSA corresponds to unsectioned areas (unsectioned wetlands and a portion of the Los Ulpinos Land Grant) and portions of Sections 11 and 14, Township 14 North, and Range 2 East (Mount Diablo Base and Meridian) within the "Rio Vista, California" 7.5-minute quadrangle (U.S. Geological Survey 1978, photorevised 1993). The approximate center of the BSA is located at 38.1767206° North and -121.7028969° West within the Lower Sacramento watershed (Hydrological Unit Code 18020163; Natural Resources Conservation Service [NRCS] et al. 2016).

1.3 Purpose of this Biological Resources Assessment

The purpose of this BRA is to provide a regulatory background and to identity special-status plant and animal species or their habitats, and other sensitive or protected resources such as migratory birds, sensitive natural communities, riparian habitat, oak woodlands, and potential Waters of the U.S. or State including wetlands, with potential to occur in the BSA. This assessment does not include determinate field surveys conducted according to agency-promulgated protocols or field reconnaissance. The conclusions and recommendations presented in this report are based upon a review of available literature.

For the purposes of this assessment, special-status species are defined as plants or animals that:

- are listed, proposed for listing, or candidates for future listing as threatened or endangered under the federal Endangered Species Act (ESA);
- are listed or candidates for future listing as threatened or endangered under the California ESA;

Map Features

Biological Study Area - 5880.99 Acres

City of Rio Vista - 4415.79 Acres

City of Rio Vista Sphere of Influence - 1465.20 Acres

Solano County, California
Unsectioned Wetlands and Los Ulpinos Land Grants
§#11, 14, T.#14N, R.#02E, MDBM
Latitude (NAD83): 38.1767206°N
Longitude (NAD83): -121.7028969°W
Watershed: Lower Sacramento (#18020163)

Scale in Feet
0 1,000 2,000

Rio Vista, CA (1978[P.R.1993], NAD27)
CA 7.5-minute Topographic Quadrangle
US Geological Survey

Location: N:\2023\2023-156 Rio Vista General Plan Update\MAPS\Location, Vicinity\Location and Vicinity.aprx () rhotellini 10/5/2023

Map Date: 10/5/2023
Sources: ESRI, USGS

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Figure 1. Biological Study Area Location and Vicinity

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- meet the definitions of endangered or rare under Section 15380 of the California Environmental Quality Act (CEQA) Guidelines;
- are identified as a Species of Special Concern (SSC) by the California Department of Fish and Wildlife (CDFW);
- are birds identified as Birds of Conservation Concern (BCC) by the U.S. Fish and Wildlife Service (USFWS);
- are included on the CDFW Watch List (WL);
- are plants considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" or "rare, threatened, or endangered in California but more common elsewhere" (California Rare Plant Ranks [CRPRs] 1 and 2), plants listed by CNPS as species about which more information is needed to determine their status (CRPR 3), and plants of limited distribution (CRPR 4);
- are plants listed as rare under the California Native Plant Protection Act (NPPA; California Fish and Game Code, Section 1900 et seq.); or
- are fully protected in California in accordance with the California Fish and Game Code, Sections 3511 (birds), 4700 (mammals), 5050 (amphibians and reptiles), and 5515 (fishes).

2.0 REGULATORY SETTING

2.1 Federal Regulations

2.1.1 Federal Endangered Species Act

The federal ESA protects plants and animals that are listed as endangered or threatened by the USFWS or the National Marine Fisheries Service (NMFS). Section 9 of the ESA prohibits the taking of listed wildlife, where take is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct" (50 Code of Federal Regulations [CFR] 17.3). For plants, the ESA prohibits removing or possessing any listed plant on federal land, maliciously damaging or destroying any listed plant in any area, or removing, cutting, digging up, damaging, or destroying any such species in knowing violation of state law (16 U.S. Code [USC] 1538). Under Section 7 of ESA, federal agencies are required to consult with the USFWS if their actions, including permit approvals or funding, could adversely affect a listed (or proposed) species (including plants) or its designated Critical Habitat. Through consultation and the issuance of a Biological Opinion, the USFWS may issue an incidental take statement allowing take of a listed species that is incidental to an otherwise authorized activity provided the activity will not jeopardize the continued existence of the species. Section 10 of the ESA provides for issuance of incidental take permits where no other federal actions are necessary provided a Habitat Conservation Plan (HCP) is developed.

2.1.2 Critical Habitat

Critical Habitat is defined in Section 3 of ESA as:

1. the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the ESA, on which are found those physical or biological features essential to the conservation of the species and that may require special management considerations or protection; and

2. specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

For inclusion in a Critical Habitat designation, habitat within the geographical area occupied by the species at the time it was listed must first have features that are essential to the conservation of the species. Critical Habitat designations identify, to the extent known and using the best scientific data available, habitat areas that provide essential life cycle needs of the species (areas on which are found the primary constituent elements). Primary constituent elements are the physical and biological features that are essential to the conservation of the species and that may require special management considerations or protection. These include but are not limited to the following:

- Space for individual and population growth and for normal behavior
- Food, water, air, light, minerals, or other nutritional or physiological requirements
- Cover or shelter
- Sites for breeding, reproduction, or rearing (or development) of offspring
- Habitats that are protected from disturbance or are representative of the historic, geographical, and ecological distributions of a species

Excluded essential habitat is defined as areas that were found to be essential habitat for the survival of a species and assumed to contain at least one of the primary constituent elements for the species but were excluded from the Critical Habitat designation. The USFWS has stated that any action within the excluded essential habitat that triggers a federal nexus will be required to undergo the Section 7(a)(1) process, and the species covered under the specific Critical Habitat designation would be afforded protection under Section 7(a)(2) of ESA.

2.1.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements international treaties between the United States and other nations devised to protect migratory birds, any of their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized in the regulations or by permit. The protections of the MBTA extend to disturbances that result in abandonment of a nest with eggs or young. As authorized by the MBTA, the USFWS may issue permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, education, migratory game bird propagation, and salvage), take of depredating birds,

taxidermy, and waterfowl sale and disposal. The regulations governing migratory bird permits can be found in 50 CFR part 13 General Permit Procedures and 50 CFR part 21 Migratory Bird Permits.

2.1.4 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 (as amended) provides for the protection of bald eagle and golden eagle by prohibiting the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit [16 USC 668(a); 50 CFR 22]. The USFWS may authorize take of bald eagles and golden eagles for activities where the take is associated with, but not the purpose of, the activity and cannot practicably be avoided (50 CFR 22.26).

2.1.5 Magnuson-Stevens Act

Essential Fish Habitat (EFH) was defined by the U.S. Congress in the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act, or Magnuson-Stevens Act, as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." Implementing regulations clarified that waters include all aquatic areas and their physical, chemical, and biological properties; substrate includes the associated biological communities that make these areas suitable for fish habitats, and the description and identification of EFH should include habitats used at any time during the species' life cycle. EFH includes all types of aquatic habitat, such as wetlands, coral reefs, sand, seagrasses, and rivers.

2.1.6 Federal Clean Water Act

The purpose of the federal Clean Water Act (CWA) is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” Section 404 of the CWA prohibits the discharge of dredged or fill material into Waters of the U.S. without a permit from the U.S. Army Corps of Engineers (USACE). The definition of Waters of the U.S. includes rivers, streams, estuaries, the territorial seas, ponds, lakes, and wetlands. Wetlands are defined as those areas:

> “that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3 7b).

The U.S. Environmental Protection Agency (USEPA) also has authority over wetlands and may override a USACE permit.

Substantial impacts to wetlands may require an individual permit. Projects that only minimally affect wetlands may meet the conditions of one of the existing Nationwide Permits. A Water Quality Certification or waiver pursuant to Section 401 of the CWA is required for Section 404 permit actions; this certification or waiver is issued by the Regional Water Quality Control Board (RWQCB).

2.2 State or Local Regulations

2.2.1 California Fish and Game Code

2.2.1.1 California Endangered Species Act

The California ESA (California Fish and Game Code §§ 2050-2116) generally parallels the main provisions of the federal ESA, but unlike its federal counterpart, the California ESA applies the take prohibitions to species proposed for listing (called *candidates* by the state). Section 2080 of the California Fish and Game Code prohibits the taking, possession, purchase, sale, and import or export of endangered, threatened, or candidate species, unless otherwise authorized by permit or in the regulations. *Take* is defined in Section 86 of the California Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Section 2081 allows CDFW to authorize incidental take permits if species-specific minimization and avoidance measures are incorporated to fully mitigate the impacts of the project.

2.2.1.2 Fully Protected Species

The State of California first began to designate species as *fully protected* prior to the creation of the federal and California ESAs. Lists of fully protected species were initially developed to provide protection to those animals that were rare or faced possible extinction and included fish, amphibians and reptiles, birds, and mammals. Most fully protected species have subsequently been listed as threatened or endangered under the state and/or federal ESAs. Previously, the regulations that implement the Fully Protected Species Statute (California Fish and Game Code § 4700 for mammals, § 3511 for birds, § 5050 for reptiles and amphibians, and § 5515 for fish) provided that fully protected species may not be taken or possessed at any time. However, on July 10, 2023, Senate Bill 147 was signed into law, authorizing CDFW to issue take permits under the California ESA for fully protected species for qualifying projects through 2033. Qualifying projects include:

- A maintenance, repair, or improvement project to the State Water Project, including existing infrastructure, undertaken by the Department of Water Resources.
- A maintenance, repair, or improvement project to critical regional or local water agency infrastructure.
- A transportation project, including any associated habitat connectivity and wildlife crossing project, undertaken by a state, regional, or local agency, that does not increase highway or street capacity for automobile or truck travel.
- A wind project and any appurtenant infrastructure improvement, and any associated electric transmission project carrying electric power from a facility that is located in the state to a point of junction with any California based balancing authority.

- A solar photovoltaic project and any appurtenant infrastructure improvement, and any associated electric transmission project carrying electric power from a facility that is located in the state to a point of junction with any California-based balancing authority.

The CDFW may also issue licenses or permits for take of these species for necessary scientific research or live capture and relocation, and may allow incidental take for lawful activities carried out under an approved Natural Community Conservation Plan (NCCP) within which such species are covered.

2.2.1.3 Native Plant Protection Act

The NPPA of 1977 was created with the intent to "preserve, protect and enhance rare and endangered plants in this State." The NPPA is administered by CDFW and provided in California Fish and Game Code §§ 1900-1913. The Fish and Wildlife Commission has the authority to designate native plants as *endangered* or *rare* and to protect endangered and rare plants from take. The California ESA of 1984 (California Fish and Game Code §§ 2050-2116) provided further protection for rare and endangered plant species, but the NPPA remains part of the California Fish and Game Code.

2.2.1.4 California Fish and Game Code Special Protections for Birds

Sections 3503, 3513, and 3800 of the California Fish and Game Code specifically protect birds. Section 3503 prohibits the take, possession, or needless destruction of the nest or eggs of any bird. Subsection 3503.5 prohibits the take, possession, or destruction of any birds in the orders Strigiformes (owls) or Falconiformes (hawks and eagles), as well as their nests and eggs. Section 3513 prohibits the take or possession of any migratory nongame bird as designated in the MBTA. Section 3800 states that, with limited exceptions, it is unlawful to take any nongame bird, defined as all birds occurring naturally in California that are not resident game birds, migratory game birds, or fully protected birds. These provisions, along with the federal MBTA, serve to protect all nongame birds and their nests and eggs, except as otherwise provided in the code.

2.2.1.5 Lake or Streambed Alteration Agreements

Section 1602 of the California Fish and Game Code requires that a Notification of Lake or Streambed Alteration be submitted to CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." The notification must incorporate proposed measures to protect affected fish and wildlife resources. During their review, CDFW may suggest additional protective measures. A Lake or Streambed Alteration Agreement (LSAA) is the final proposal mutually agreed upon by CDFW and the applicant. Projects that require an LSAA often also require a permit from the USACE under Section 404 of the CWA. The conditions of the Section 404 permit and the LSAA frequently overlap in these instances.

2.2.2 California Oak Woodlands Conservation Act

The California Oak Woodlands Conservation Act was passed in 2001 to address loss of oak woodland habitats throughout the state. As a result of the Act, the Oak Woodland Conservation Program was established to provide funding for conservation and protection of California oak woodlands. Public

Resources Code (PRC) Section 21083.4 went into effect as of January 1, 2005, and requires lead agencies to analyze potential effects to oak woodlands during the CEQA process. If it is determined that a project may have a significant effect on oak woodlands, the lead agency must implement one of several mitigation alternatives, including conservation of oak woodlands through conservation easements, planting or restoration of oak woodlands, contribution of funds to the Oak Woodlands Conservation Fund, or other appropriate mitigation measures.

2.2.3 Porter-Cologne Water Quality Act

The RWQCB implements water quality regulations under the federal CWA and the Porter-Cologne Water Quality Act. These regulations require compliance with the National Pollutant Discharge Elimination System (NPDES), including compliance with the California Storm Water NPDES General Construction Permit for discharges of storm water runoff associated with construction activities. General Construction Permits for projects that disturb one or more acres of land require development and implementation of a Storm Water Pollution Prevention Plan. Under the Porter-Cologne Water Quality Act, the RWQCB also regulates actions that would involve "discharging waste, or proposing to discharge waste, within any region that could affect the water of the state" (Water Code 13260(a)). Waters of the State are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Water Code 13050 (e)). The RWQCB regulates all such activities, as well as dredging, filling, or discharging materials into Waters of the State, that are not regulated by the USACE due to a lack of connectivity with a navigable water body. The RWQCB may require issuance of a Waste Discharge Requirement for these activities.

2.2.4 California Environmental Quality Act

Per CEQA Guidelines Section 15380, a species not protected on a federal or state list may be considered rare or endangered if the species meets certain specified criteria. These criteria follow the definitions in the federal and California ESAs, and Sections 1900-1913 of the California Fish and Game Code, which deal with rare or endangered plants or animals. Section 15380 was included in the CEQA Guidelines primarily to deal with situations where a project under review may have a significant effect on a species that has not yet been listed by either the USFWS or CDFW.

2.2.4.1 CEQA Significance Criteria

Sections 15063-15065 of the CEQA Guidelines address how an impact is identified as significant. Generally, impacts to listed (rare, threatened, or endangered) species are considered significant. Assessment of "impact significance" to populations of nonlisted species (e.g., SSC) usually considers the proportion of the species' range that will be affected by a project, impacts to habitat, and the regional and population level effects.

Section 15064.7 of the CEQA Guidelines encourages local agencies to develop and publish the thresholds that the agency uses in determining the significance of environmental effects caused by projects under its review. However, agencies may also rely upon the guidance provided by the expanded Initial Study

checklist contained in Appendix G of the CEQA Guidelines. Pursuant to Appendix G, impacts to biological resources would normally be considered significant if a project would:

- 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 CDFW or USFWS;
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW or USFWS;
- have a substantial adverse effect on federally protected Waters of the U.S. including wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, and coastal) through direct removal, filling, hydrological interruption, or other means;
- 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;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP.

An evaluation of whether or not an impact on biological resources would be substantial must consider both the resource itself and how that resource fits into a regional or local context. Substantial impacts would be those that would diminish, or result in the loss of, an important biological resource, or those that would obviously conflict with local, state, or federal resource conservation plans, goals, or regulations. Impacts are sometimes locally important but not significant according to CEQA because although the impacts would result in an adverse alteration of existing conditions, they would not substantially diminish or result in the permanent loss of an important resource on a population-wide or region-wide basis.

2.2.4.2 Species of Special Concern

The CDFW defines SSC as a species, subspecies, or distinct population of an animal native to California that are not legally protected under ESA, the California ESA or the California Fish and Game Code, but currently satisfy one or more of the following criteria:

- The species has been completely extirpated from the state or, as in the case of birds, it has been extirpated from its primary seasonal or breeding role.
- The species is listed as federally (but not state) threatened or endangered, and meets the state definition of threatened or endangered but has not formally been listed.
- The species has or is experiencing serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for state threatened or endangered status.

- The species has naturally small populations that exhibit high susceptibility to risk from any factor that if realized, could lead to declines that would qualify it for state threatened or endangered status.

SSC are typically associated with threatened habitats. Projects that result in substantial impacts to SSC may be considered significant under CEQA.

2.2.4.3 USFWS Bird of Conservation Concern

The 1988 amendment to the Fish and Wildlife Conservation Act mandates the USFWS "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under ESA." To meet this requirement, the USFWS published a list of BCC (USFWS 2021) for the U.S. The list identifies the migratory and nonmigratory bird species (beyond those already designated as federally threatened or endangered) that represent USFWS' highest conservation priorities. Depending on the policy of the lead agency, projects that result in substantial impacts to BCC may be considered significant under CEQA.

2.2.4.4 Watch List Species

The CDFW maintains a list consisting of taxa that were previously designated as "Species of Special Concern" but no longer merit that status, or which do not yet meet SSC criteria, but for which there is concern and a need for additional information to clarify status.

Depending on the policy of the lead agency, projects that result in substantial impacts to species on the CDFW WL may be considered significant under CEQA.

2.2.4.5 California Rare Plant Ranks

The CNPS maintains the Rare Plant Inventory (CNPS 2023a), which provides a list of plant species native to California that are threatened with extinction, have limited distributions, or low populations. Plant species meeting one of these criteria are assigned to one of six CRPRs. The rank system was developed in collaboration with government, academia, non-governmental organizations, and private sector botanists, and is jointly managed by CDFW and the CNPS. The CRPRs are currently recognized in the California Natural Diversity Database (CNDDB). The following are definitions of the CNPS CRPRs:

- CRPR 1A – presumed extirpated in California and either rare or extinct elsewhere
- CRPR 1B – rare, threatened, or endangered in California and elsewhere
- CRPR 2A – presumed extirpated in California, but more common elsewhere
- CRPR 2B – rare, threatened, or endangered in California but more common elsewhere
- CRPR 3 – a review list of plants about which more information is needed
- CRPR 4 – a watch list of plants of limited distribution

Additionally, the CNPS has defined Threat Ranks that are added to the CRPR as an extension. Threat Ranks designate the level of threat on a scale of 0.1 through 0.3, with 0.1 being the most threatened and 0.3 being the least threatened. Threat Ranks are generally present for all plants ranked 1B, 2B, or 4, and for the majority of plants ranked 3. Plant species ranked 1A and 2A (presumed extirpated in California), and some species ranked 3, which lack threat information, do not typically have a Threat Rank extension. The following are definitions of the CNPS Threat Ranks:

- Threat Rank 0.1 – Seriously threatened in California (over 80 percent of occurrences threatened / high degree and immediacy of threat)
- Threat Rank 0.2 – Moderately threatened in California (20 to 80 percent of occurrences threatened / moderate degree and immediacy of threat)
- Threat Rank 0.3 – Not very threatened in California (less than 20 percent of occurrences threatened / low degree and immediacy of threat or no current threats known)

Factors, such as habitat vulnerability and specificity, distribution, and condition of occurrences, are considered in setting the Threat Rank; differences in Threat Ranks do not constitute additional or different protection (CNPS 2023a). Depending on the policy of the lead agency, substantial impacts to plants ranked 1A, 1B, 2A, or 2B are typically considered significant under CEQA Guidelines Section 15380. Significance under CEQA is typically evaluated on a case-by-case basis for plants ranked 3 or 4.

2.2.4.6 Sensitive Natural Communities

Sensitive natural communities (SNCs) are vegetation communities that are imperiled or vulnerable to environmental effects of projects. The CDFW maintains the California Natural Community List (CDFW 2022), which provides a list of vegetation alliances, associations, and special stands as defined in *A Manual of California Vegetation Online* (MCV; CNPS 2023b), along with their respective state and global rarity ranks, if applicable. Natural communities with a state rarity rank of S1, S2, or S3 are considered SNCs. Depending on the policy of the lead agency, impacts to SNCs may be considered significant under CEQA.

2.2.4.7 Wildlife Movement Corridors and Nursery Sites

Impacts to wildlife movement corridors or nursery sites may be considered significant under CEQA. As part of the California Essential Habitat Connectivity Project, CDFW and Caltrans maintain data on Essential Habitat Connectivity areas. These data are available in the CNDDB. The goal of this project is to map large intact habitat or natural landscapes and potential linkages that could provide corridors for wildlife. In urban settings, riparian vegetated stream corridors can also serve as wildlife movement corridors. Nursery sites include but are not limited to concentrations of nest or den sites such as heron rookeries, bat maternity roosts, and mule deer critical fawning areas. These data are available through CDFW's Biogeographic Information and Observation System database or as occurrence records in the CNDDB and may be supplemented with the results of field surveys.

2.2.5 Sacramento-San Joaquin Delta Regulations

The Delta Protection Act of 1992 (Act; PRC Division 19.5) declared that "the Sacramento-San Joaquin Delta (Delta) is a natural resource of statewide, national, and international significance, containing irreplaceable resources, and it is the policy of the state to recognize, preserve, and protect those resources of the Delta for the use and enjoyment of current and future generations." The Act established goals for the Delta and created the Delta Protection Commission (Commission) pursuant to PRC Section 29703.5. The Commission adopted the Land Use and Resource Management Plan for the Primary Zone of the Delta (Delta Plan; Delta Protection Commission 2010) in 2010 pursuant to PRC section 29760. The primary zone is defined as "the delta land and water area of primary state concern and statewide significance which is situated within the boundaries of the Delta, as described in Section 12220 of the Water Code, but that is not within either the urban limit line or sphere of influence line of any local government's general plan or currently existing studies, as of January 1, 1992."

The Delta Plan guides local land use decisions on development projects subject to approval by Delta counties (Contra Costa, Sacramento, San Joaquin, Yolo, and Solano). Per the Plan, should cities propose to expand into the Delta primary zone, or acquire land in the primary zone for utility or infrastructure facility development, those actions are to be carried out in conformity with the Act. General plans and projects in the Delta counties must be consistent with the Delta Plan and are subject to review by the Commission. The Commission also comments on projects in the secondary zone that have the potential to impact the primary zone. If a project in the primary zone is challenged as inconsistent with the Delta Plan, the project can be appealed to the Commission for resolution.

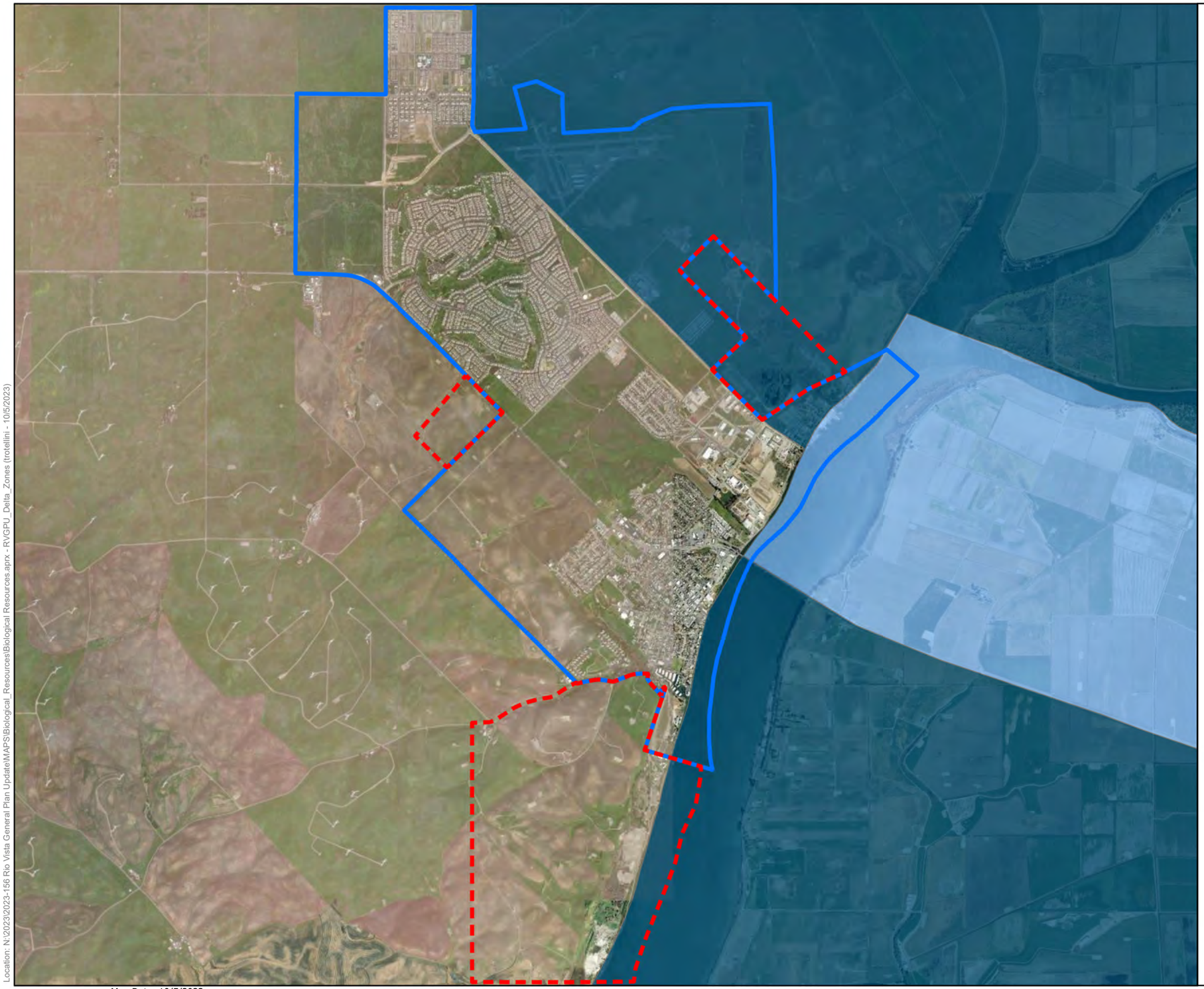
The following areas of the BSA are in the primary zone of the Delta: lands east of Airport Road, lands east of Liberty Island Road, the Sacramento River, and some slivers of land adjacent to the river (Figure 2; State of California 2023).

3.0 METHODS

3.1 Literature Review

ECORP biologists performed a review of existing available information for the BSA. Literature sources included current aerial imagery, topographic mapping, soil survey mapping available from the NRCS Web Soil Survey (NRCS 2023), existing vegetation mapping (CDFW 2018 and 2019; U.S. Department of Agriculture [USDA] 2015), the USFWS National Wetlands Inventory (NWI; USFWS 2017), the USFWS Critical Habitat mapper (USFWS 2023b), the NMFS Essential Fish Habitat Mapper (National Oceanic and Atmospheric Administration [NOAA] 2023), and other relevant literature as cited throughout this document. ECORP biologists reviewed the following resources to identify special-status plant and wildlife species that have been documented in or near the BSA:

- The CDFW CNDDB data for the "Rio Vista, California" 7.5-minute quadrangle and the surrounding eight quadrangles (CDFW 2023c);



Map Contents

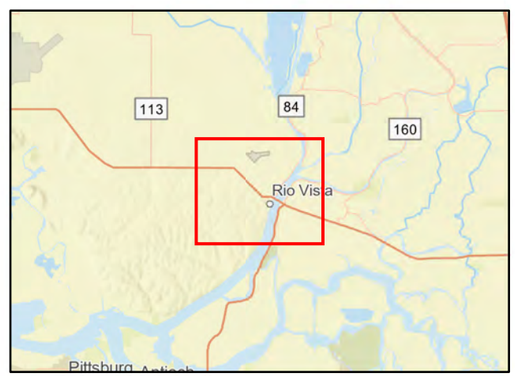
Biological Study Area

- City of Rio Vista
- City of Rio Vista Sphere of Influence

Delta Zones

- Primary
- Secondary

Sources: ESRI, Maxar (2022), National Resources Conservation Service



Location: N:\2023\2023-156 Rio Vista General Plan Update\MAPS\Biological_Resources\Biological Resources.aprx - RVGPU_Delta_Zones (trotellini - 10/5/2023)

Map Date: 10/5/2023

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Scale in Feet
0 1,500 3,000

Figure 2. Delta Zones in Relation to the Biological Study Area

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- The CNPS Rare Plant Inventory data for the "Rio Vista, California" 7.5-minute quadrangle and the surrounding eight quadrangles (CNPS 2023a);
- The USFWS Information for Planning and Consultation Resource Report List for the BSA (USFWS 2023a); and
- The NMFS Resources data for the "Rio Vista, California" 7.5-minute quadrangle (NOAA 2016);

The results of the database queries are provided in Appendix A.

4.0 RESULTS

4.1 Site Characteristics and Land Use

The BSA is a mosaic of urban areas, agricultural lands, and undeveloped areas that are mostly comprised of annual grassland but also include sensitive habitats such as wetland and riparian vegetation communities and the Sacramento River Delta, which supports multiple special-status species and is designated Critical Habitat for delta smelt (*Hypomesus transpacificus*).

The BSA consists of relatively level to gently rolling terrain situated at elevations ranging from sea level at the Sacramento River to approximately 140 feet above mean sea level in the Montezuma Hills, located in the southern portion of the BSA. The BSA is within the Sacramento Valley subregion of the Great Central Valley Region of the California floristic province (Jepson eFlora 2023). This subregion comprises the northern, wetter, cooler area of the Great Valley, which is now predominantly agricultural but still supports some grasslands, marshes, vernal pools, riparian woodlands, alkali sink vegetation, and stands of valley oak (*Quercus lobata*). The average winter low temperature is 49.5 degrees Fahrenheit (˚F) and the average summer high temperature is 74.6 ˚F; the average annual precipitation is approximately 12.60 inches at the closest weather station, which is in Oakley, California, approximately 10 miles south of the BSA (NOAA 2023).

Agriculture is the primary land use surrounding the BSA. Recreational uses along the Sacramento River near the BSA include boat ramps and the Brannan Island State Recreation Area.

4.2 Soils and Geology

Soil survey mapping for the BSA was obtained from the NRCS Web Soil Survey (Figure 3; NRCS 2023). Table 1 provides an overview of the soil map units within the BSA.

Two geologic units are mapped within the BSA: Plio-Pleistocene and Pliocene loosely consolidated deposits (sedimentary, clastic) and older Quaternary alluvium and marine deposits (unconsolidated, undifferentiated). No geological units containing serpentinite are mapped within the BSA or its immediate vicinity (Horton 2017).

Map Contents

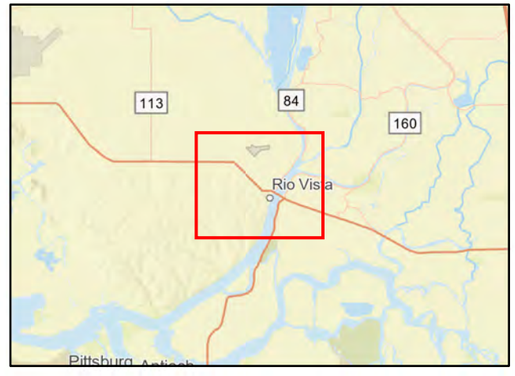
Biological Study Area

- City of Rio Vista
- City of Rio Vista Sphere of Influence

Series Designation - Series Description

- 247 - Water
- AmC - Altamont-Diablo clays, 2 to 9 percent slopes
- AoA - Antioch-San Ysidro complex, 0 to 2 percent slopes
- AoC - Antioch-San Ysidro complex, 2 to 9 percent slopes
- BP - Borrow pit
- CeA - Clear Lake clay, 0 to 2 percent slopes, MLRA 17
- DaC - Diablo-Ayar clays, 2 to 9 percent slopes
- DaE2 - Diablo-Ayar clays, 9 to 30 percent slopes, eroded
- Pc - Pescadero silty clay loam, 0 percent slopes, MLRA 17
- RoA - Rincon clay loam, 0 to 2 percent slope
- Tu - Tujunga fine sand
- Va - Valdez silt loam, drained, 0 to 2 percent slopes, MLRA 16
- W - Water
- Wc - Willows clay, 0 percent slopes, MLRA 17

Sources: ESRI, Maxar (2022), National Resources Conservation Service



Location: N:\2023\2023-156 Rio Vista General Plan Update\MAPS\Soils_and_Geology\Soils.aprx - RVGPU_Soils (trotellini - 10/5/2023)

Map Date: 10/5/2023

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Scale in Feet
0 1,500 3,000

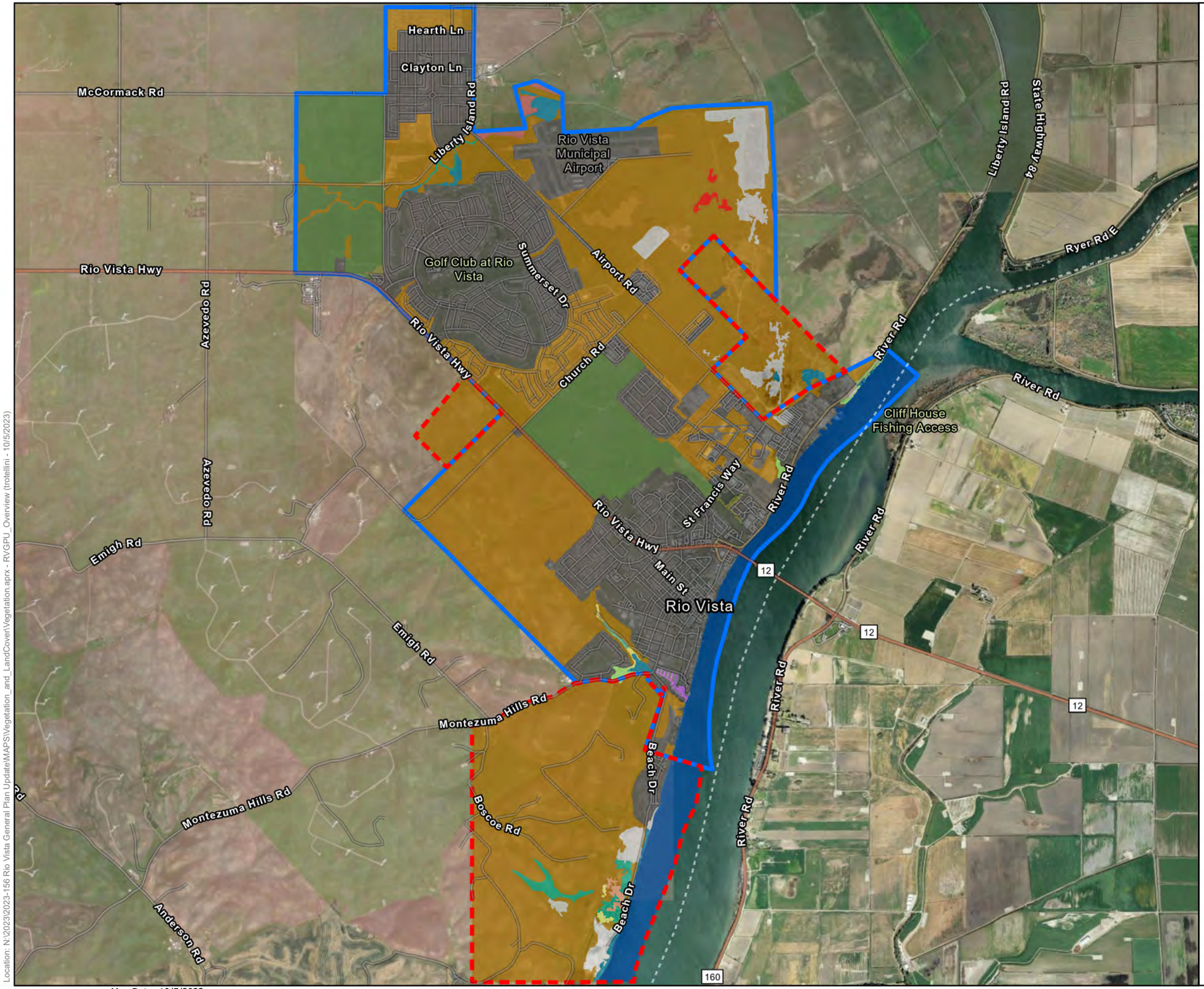
Figure 3. Natural Resources Conservation Service Soil Map Units
2023-156 Rio Vista General Plan Update

Table 1. Soil Map Units in the BSA	
Map Unit Symbol	**Map Unit Name**
247	Water
AmC	Altamont-Diablo clays, 2 to 9 percent slopes
AoA	Antioch-San Ysidro complex, 0 to 2 percent slopes
BP	Borrow pit
CeA	Clear Lake clay, 0 to 2 percent slopes, MLRA 17
DaC	Diablo-Ayar clays, 2 to 9 percent slopes
DaE2	Diablo-Ayar clays, 9 to 30 percent slopes, eroded
Pc	Pescadero silty clay loam, 0 percent slopes, MLRA 17
RoA	Rincon clay loam, 0 to 2 percent slope
Tu	Tujunga fine sand
Va	Valdez silt loam, drained, 0 to 2 percent slopes, MLRA 16
W	Water
Wc	Willows clay, 0 percent slopes, MLRA 17

4.3 Vegetation

4.3.1 Vegetation Communities and Land Cover Types

General vegetation communities and land cover types within the BSA are depicted on Figure 4 and in Appendix B, as approximated from existing CNPS vegetation mapping (CDFW 2023a, 2023b) and California Vegetation Classification (USDA 2015) data, with minor changes based on aerial imagery interpretation. These general vegetation communities or land cover types are presented based on the California Wildlife Habitat Relationships (CWHR) classification, and habitats are described in detail in the associated CWHR publication (Mayer and Laudenslayer 1988). Approximate acreage of each vegetation community and land cover type within the BSA is included in Table 2.



Map Contents

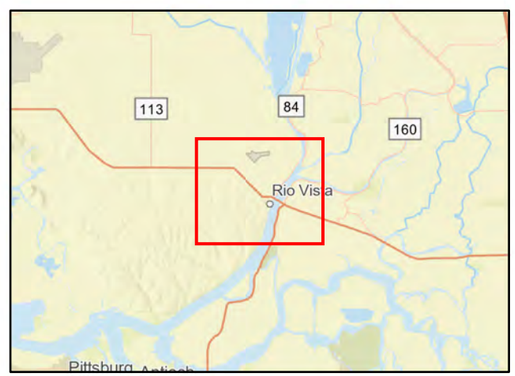
Biological Study Area

- City of Rio Vista
- City of Rio Vista Sphere of Influence

Vegetation Communities and Land Cover Types

- Annual Grassland
- Barren
- Coastal Scrub, Valley Foothill Riparian
- Cropland
- Deciduous Orchard, Evergreen Orchard, Vineyard, Irrigated Row and Field Crops
- Eucalyptus
- Fresh Emergent Wetland
- Fresh Emergent Wetland, Urban
- Lacustrine, Riverine
- Pasture
- Riverine
- Urban
- Valley Foothill Riparian
- Valley Foothill Riparian, Desert Riparian
- Valley Foothill Riparian, Montane Riparian

Sources: ESRI, Maxar (2022), VegCamp, CDFW



Location: N:\2023\2023-156 Rio Vista General Plan Update\MAPS\Vegetation_and_LandCover\Vegetation.aprx - RVGPU_Overview (trotellini - 10/5/2023)

Map Date: 10/5/2023

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Scale in Feet
0 1,500 3,000

Figure 4. Vegetation Communities and Land Cover Types Overview
2023-156 Rio Vista General Plan Update

Table 2. Vegetation Communities and Land Cover Types in the BSA	
Cover Type	**Acreage**
Annual Grassland	2,905.58
Barren	150.69
Coastal Scrub, Valley Foothill Riparian	2.13
Cropland	17.95
Deciduous Orchard, Evergreen Orchard, Vineyard, Irrigated Row and Field Crops	561.91
Eucalyptus	5.43
Fresh Emergent Wetland	39.09
Fresh Emergent Wetland, Urban	29.81
Lacustrine, Riverine	3.64
Pasture	7.43
Riverine	375.06
Urban	1,758.53
Valley Foothill Riparian	12.74
Valley Foothill Riparian, Desert Riparian	5.20
Valley Foothill Riparian, Montane Riparian	5.80

4.3.2 Oak Woodlands, Sensitive Natural Communities, and Riparian Habitat

The BSA includes oak woodlands, SNCs, and riparian habitat. Vegetation communities identified in Section 4.3.1 can be further classified into MCV vegetation alliances and associations. Valley oak woodland within the BSA is a component of the valley foothill riparian vegetation type and is considered an SNC. Table 3 summarizes all SNCs mapped within the BSA based on the available data. Additional SNCs may be present, especially within the fresh emergent wetland and valley foothill riparian communities. Riparian habitat is also a component of those communities.

Smaller inclusions of SNCs, oak woodlands, and riparian habitat may also occur within other areas of the BSA (including areas depicted as developed land cover types such as cropland and urban). Site-specific vegetation mapping would be required to determine the types and extent of SNCs, oak woodlands, and riparian habitat within specific areas of the BSA.

Table 3. Sensitive Natural Communities in the BSA		
Cover Type	**SNC**	**State Rarity Ranking**
Annual Grassland	California vernal pool and grassland matrix	S2
Fresh Emergent Wetland	Hardstem and California bulrush (*Schoenoplectus acutus, californicus*) herbaceous alliance	S3S4
Valley Foothill Riparian	Fremont cottonwood (*Populus fremontii*) forest and woodland alliance	S3.2
	Goodding's willow (*Salix gooddingii*) - red willow (*Salix laevigata*) riparian woodland and forest	S3
	Valley oak woodland and forest	S3

4.4 Aquatic Resources

The NWI data within the BSA is depicted on Figure 5. Approximate acreage of each NWI aquatic resource type within the BSA is included in Table 4. Aquatic resources within the BSA may be considered Waters of the U.S. and/or State. The NWI maps are prepared from the analysis of high-altitude imagery that includes a margin of error. Consequently, on-the-ground delineations will likely result in deletions and/or additions, and revisions to the limits of aquatic features within the BSA. Site-specific ARDs conducted according to USACE protocol would be required to determine the specific types and extent of aquatic resources within the BSA.

Table 4. NWI Aquatic Resources in the BSA	
NWI Type	**Acreage**
Freshwater Emergent Wetland	77.12
Freshwater Forested/Shrub Wetland	7.91
Freshwater Pond	5.58
Lake	41.27
Other	11.91
Riverine	401.86

4.5 Wildlife

The Delta region supports valuable habitat for hundreds of wildlife species. However, within the BSA much of this value has been reduced due to urban development or past and ongoing disturbance from intensive grazing and agricultural uses.

Hearth Ln
Clayton Ln
McCormack Rd
Liberty Island Rd
Rio Vista Municipal Airport
Liberty Island Rd
State Highway 84
Ryer Rd E
Golf Club at Rio Vista
Summerset Dr
Airport Rd
Rio Vista Hwy
Azevedo Rd
Rio Vista Hwy
Church Rd
River Rd
River Rd
Cliff House Fishing Access
St. Francis Way
River Rd
Rio Vista Hwy
Main St
Rio Vista
River Rd
River Rd
12
12
12
Emigh Rd
Emigh Rd
Montezuma Hills Rd
Beach Dr
Montezuma Hills Rd
Boscoe Rd
River Rd
Beach Dr
Anderson Rd
160

Location: N:\2023\2023-156 Rio Vista General Plan Update\MAPS\Watershed_and_Hydro_Analysis\Water and Hydrology.aprx - RVGPU_NWI (trotellini - 10/5/2023)

Map Contents

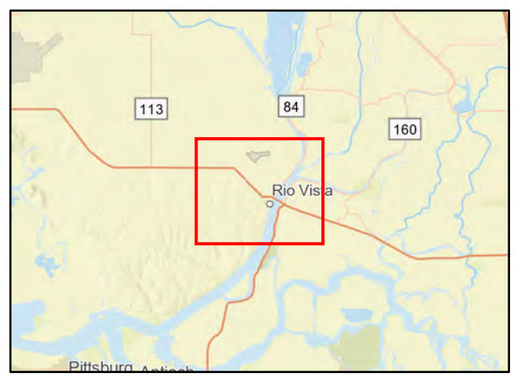
Biological Study Area

- City of Rio Vista
- City of Rio Vista Sphere of Influence

NWI Type

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Sources: ESRI, Maxar (2022), National Wetlands Inventory



Map Date: 10/5/2023

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Scale in Feet
0 1,500 3,000

Figure 5. National Wetlands Inventory

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Wildlife expected to regularly utilize the grassland areas of the BSA include California ground squirrel (*Otospermophilus beecheyi*), western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis catenifer*), black-tailed jackrabbit (*Lepus californicus*), and coyote (*Canis latrans*). Birds that may nest in these grassland communities include northern harrier (*Circus hudsonius*), burrowing owl (*Athene cunicularia*), western kingbird (*Tyrannus verticalis*), loggerhead shrike (*Lanius ludovicianus*), horned lark (*Eremophila alpestris*), western meadowlark (*Sturnella neglecta*), and killdeer (*Charadrius vociferus*). Isolated trees in the grasslands support potential nesting habitat for red-tailed hawk (*Buteo jamaicensis*), great horned owl (*Bubo virginianus*), and the state-threatened Swainson's hawk (*Buteo swainsoni*). The annual grasslands in this region support a significant population of wintering raptors that include golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), red-tailed hawk, rough-legged hawk (*Buteo lagopus*), short-eared owl (*Asio flammeus*), prairie falcon (*Falco mexicanus*), and merlin (*Falco columbarius*).

The riparian woodland or scrub communities in the BSA appear to be restricted to the banks of the Sacramento River and have been largely degraded or developed. Scattered trees and shrubs along the river's edge could support nesting habitat for a variety of birds including Swainson's hawk, red-tailed hawk, American crow (*Corvus brachyrhynchos*), yellow-billed magpie (*Pica nuttalli*), European starling (*Sturnus vulgaris*), and red-winged blackbird (*Agelaius phoeniceus*). Other wildlife expected to utilize the riverside communities within the BSA include American bullfrog (*Lithobates catesbeianus*), Sierran tree frog (*Pseudacris sierra*), red-eared slider (*Trachemys scripta*), valley garter snake (*Thamnophis sirtalis fitchi*), American beaver (*Castor canadensis*), river otter (*Lontra canadensis*), and muskrat (*Ondatra zibethicus*).

Emergent aquatic habitats appear to be restricted to two areas in the north and western portion of the BSA. Emergent marshes support breeding habitat for birds such as mallard (*Anas platyrhynchos*), song sparrow (*Melospiza melodius*), red-winged blackbird, and tricolored blackbird (*Agelaius tricolor*). Other wildlife likely to be found in the marsh habitats include American bullfrog, red-eared slider, northwestern pond turtle (*Actinemys marmorata*), and valley garter snake.

Wildlife expected to utilize more developed areas of the BSA include raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), domestic and feral cats (*Felis catus*), and a variety of birds such as American crow, California scrub-jay (*Aphelocoma californica*), northern mockingbird (*Mimus polyglottos*), barn swallow (*Branta canadensis*), and house sparrow (*Passer domesticus*).

4.6 Special-Status Species

Table 5 presents the full list of special-status plant and animal species identified through the literature review (including "Rio Vista, California" 7.5-minute quadrangle and the surrounding eight quadrangles). For each species, the table provides the listing status, and a brief description of habitat requirements and/or species ecology. Species with at least one mapped CNDDB occurrence within the BSA are indicated by footnote and included in bolded text.

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
Plants				
Ferris' milk-vetch *(Astragalus tener* var. *ferrisiae)*	–	–	1B.1	Vernally mesic meadows and seeps and in sub–alkaline flats within valley and foothill grasslands. Elevation: 5'–245' Bloom Period: April–May
Alkali milk-vetch *(Astragalus tener* var. *tener)*	–	–	1B.2	Alkaline playas and vernal pools, and alkaline adobe clay soils in valley and foothill grasslands. Elevation: 5'–195' Bloom Period: March–June
Heartscale *(Atriplex cordulata* var. *cordulata)*	–	–	1B.2	Alkaline or saline valley and foothill grasslands, meadows and seeps, and chenopod scrub communities. Elevation: 0'–1,835' Bloom Period: April–October
Crownscale *(Atriplex coronata* var. *coronata)*	–	–	4.2	Alkaline, often clay substrates in chenopod scrub, valley and foothill grassland, and vernal pools. Elevation: 5'–1,935' Bloom Period: March–October
Brittlescale *(Atriplex depressa)*	–	–	1B.2	Alkaline and clay soils within chenopod scrub, meadows and seeps, playas, valley and foothill grasslands, and vernal pools. Elevation: 5'–1,050' Bloom Period: April–October
Vernal pool smallscale *(Atriplex persistens)*	–	–	1B.2	Alkaline vernal pools. Elevation: 35'–375' Bloom Period: June–October
Big tarplant *(Blepharizonia plumosa* ssp. *plumosa)*	–	–	1B.1	Valley and foothill grassland. Elevation: 100'–1,655' Bloom Period: July–October
Watershield *(Brasenia schreberi)*	–	–	2B.3	Freshwater marshes and swamps. Elevation: 100'–7,220' Bloom Period: June–September

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
Bristly sedge *(Carex comosa)*	–	–	2B.1	Mesic valley and foothill grassland, coastal prairie, and lake margins of marshes and swamps. (Jepson eFlora 2023) Elevation: 0'–2,050' Bloom Period: May–September
Pappose tarplant (*Centromadia parryi* ssp. *parryi*)	–	–	1B.2	Often on alkaline soils within chaparral, coastal prairie, meadows and seeps, coastal salt marshes and swamps, vernally mesic valley and foothill grassland. Elevation: 0'–1,380' Bloom Period: May–November
Parry's rough tarplant *(Centromadia parryi* ssp. *rudis)*	–	–	4.2	Alkaline, vernally mesic areas, and seeps in valley and foothill grassland and vernal pools, sometimes found on roadsides. Elevation: 0'–330' Bloom Period: May–October
Soft salty bird's-beak *(Chloropyron molle* ssp. *molle)*	FE	CR	1B.2	Coastal salt marshes and swamps. Elevation: 0'–10' Bloom Period: July–November
Bolander's water-hemlock *(Cicuta maculata* var. *bolanderi)*	–	–	2B.1	Coastal, fresh, or brackish marshes and swamps. Elevation: 0'–655' Bloom Period: July–September
Small-flowering morning-glory *(Convolvulus simulans)*	–	–	4.2	Clay, serpentine seeps within chaparral, coastal scrub, and valley and foothill grassland. Elevation: 100'–2,430' Bloom Period: March–July
Dwarf downingia *(Downingia pusilla)*	–	–	2B.2	Mesic areas in valley and foothill grassland, and vernal pools. Species has also been found in disturbed areas such as tire ruts and scraped depressions. (CDFW 2023c) Elevation: 5'–1,460' Bloom Period: March–May
Small spikerush *(Eleocharis parvula)*	–	–	4.3	Marshes and swamps. Elevation: 5'–9,910' Bloom Period: June–August

Table 5. Special-Status Species Documented in or Near the BSA				
Common Name (Scientific Name)	**Status**			**Habitat Description/Species Ecology[1]**
	FESA	**CESA/ NPPA**	**Other**	
Antioch Dunes buckwheat *(Eriogonum nudum* var. *psychicola)*	–	–	1B.1	Inland dune. Elevation: 0'–65' Bloom Period: July–October
Mt. Diablo buckwheat *(Eriogonum truncatum)*	–	–	1B.1	Sandy soils in chaparral, coastal scrub, valley and foothill grassland. Elevation: 10'–1,150' Bloom Period: April–September
Contra Costa wallflower *(Erysimum capitatum* var. *angustatum)*	FE	CE	1B.1	Inland dunes. Elevation: 10'–65' Bloom Period: March–July
Diamond-petaled California poppy *(Eschscholzia rhombipetala)*	–	–	1B.1	Valley and foothill grassland in alkaline and clay soils. Elevation: 0'–3,200' Bloom Period: March–April
San Joaquin spearscale[2] **(*Extriplex joaquinana*)**	**–**	**–**	**1B.2**	**Alkaline soils in chenopod scrub, meadows seeps, playas, and valley and foothill grassland.** **Elevation: 5'–2,740'** **Bloom Period: April–October**
Stinkbells *(Fritillaria agrestis)*	–	–	4.2	Clay and sometimes serpentine soils in chaparral, cismontane woodland, pinyon and juniper woodland, and valley and foothill grassland. Elevation: 35'–5,100' Bloom Period: March–June
Fragrant fritillary *(Fritillaria liliacea)*	–	–	1B.2	Cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland, often on serpentine substrates. Elevation: 10'–1,345' Bloom Period: February–April
Boggs Lake hedge-hyssop *(Gratiola heterosepala)*	–	CE	1B.2	Marshes, swamps, lake margins, and vernal pools. Elevation: 35'–7,790' Bloom Period: April–August

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
Hogwallow starfish *(Hesperevax caulescens)*	–	–	4.2	Mesic areas with clay soil within valley and foothill grassland, shallow vernal pools, and sometimes alkaline areas. Elevation: 0'–1,655' Bloom Period: March–June
Woolly rose-mallow[3] *(Hibiscus lasiocarpos* var. *occidentalis)*	–	–	1B.2	Marshes and freshwater swamps. Often in riprap on sides of levees. Elevation: 0'–395' Bloom Period: June–September
Carquinez goldenbush *(Isocoma arguta)*	–	–	1B.1	Alkaline soils in valley and foothill grasslands. Elevation: 5'–65' Bloom Period: August–December
Alkali-sink goldfields (*Lasthenia chrysantha*)	–	–	1B.1	Alkaline vernal pools. Elevation: 0'–655' Bloom Period: February–April
Contra Costa goldfields *(Lasthenia conjugens)*	FE	–	1B.1	Mesic sites within cismontane woodland, playas with alkaline soils, valley and foothill grassland and vernal pools. Elevation: 0'–1,540' Bloom Period: March–June
Coulter's goldfields *(Lasthenia glabrata* ssp. *coulteri*)	–	–	1B.1	Coastal marshes and swamps, playas, and vernal pools. Elevation: 5'–4,005' Bloom Period: February–June
Delta tule pea (*Lathyrus jepsonii* var. *jepsonii)*	–	–	1B.2	Freshwater and brackish marshes and swamps. Elevation: 0'–15' Bloom Period: May–July
Legenere *(Legenere limosa)*	–	–	1B.1	Various seasonally inundated areas including wetlands, wetland swales, marshes, vernal pools, artificial ponds, and floodplains of intermittent drainages. (USFWS 2005) Elevation: 5'–2,885' Bloom Period: April–June

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
Heckard's pepper-grass *(Lepidium latipes* var. *heckardii)*	–	–	1B.2	Alkaline flats within valley and foothill grasslands. Elevation: 5'–655' Bloom Period: March–May
Mason's lilaeopsis *(Lilaeopsis masonii)*	–	–	1B.1	Brackish or freshwater marshes or swamps and riparian scrub. Elevation: 0'–35' Bloom Period: April–November
Delta mudwort (*Limosella australis*)	–	–	2B.1	Usually mud banks in freshwater or brackish marshes and swamps and riparian scrub. Elevation: 0'–10' Bloom Period: May–August
Abram's lupine (*Lupinus albifrons* var. *abramsii*)	–	–	3.2	Broadleafed upland forest, chaparral, coastal scrub, lower montane coniferous forest, and valley and foothill grassland; sometimes on serpentine substrates. Elevation: 410'–6,560' Bloom Period: April–June
Little mousetail *(Myosurus minimus* ssp. *apus)*	–	–	3.1	Mesic areas of valley and foothill grassland and alkaline vernal pools. Elevation: 65'–2,100' (USACE 2018) Bloom Period: March–June
Baker's navarretia *(Navarretia leucocephala* ssp. *bakeri)*	–	–	1B.1	Vernal pools and mesic areas within cismontane woodlands, lower montane coniferous forests, meadows and seeps, and valley and foothill grasslands. Elevation: 15'–5,710' Bloom Period: April–July
Colusa grass *(Neostapfia colusana)*	FT	CE	1B.1	Large vernal pools with adobe soils. Elevation: 15'–655' Bloom Period: May–August
Antioch Dunes evening-primrose *(Oenothera deltoides* ssp. *howellii)*	FE	CE	1B.1	Inland dunes. Elevation: 0'–100' Bloom Period: March–September

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
Bearded popcornflower (*Plagiobothrys hystriculus*)	–	–	1B.1	Often in vernal swales, and in mesic areas of valley and foothill grassland and vernal pool margins. Elevation: 0'–900' Bloom Period: April–May
Eel-grass pondweed *(Potamogeton zosteriformis)*	–	–	2B.2	Assorted freshwater marshes and swamps. Elevation: 0'–6,105' Bloom Period: June–July
California alkali grass (*Puccinellia simplex*)	–	–	1B.2	Alkaline, vernally mesic areas and sinks, flats and lake margins in chenopod scrub, meadows and seeps, valley and foothill grassland, and vernal pools. Elevation: 5'–3,050' Bloom Period: March–May
Sanford's arrowhead *(Sagittaria sanfordii)*	–	–	1B.2	Shallow marshes and freshwater swamps. Elevation: 0'–2,135' Bloom Period: May–October
Marsh skullcap (*Scutellaria galericulata*)	–	–	2B.2	Mesic areas in lower montane coniferous forest, meadows and seeps, and marshes and swamps. Elevation: 0'–6,890' Bloom Period: June–September
Side-flowering skullcap *(Scutellaria lateriflora)*	–	–	2B.2	Mesic areas in meadows and seeps and marshes and swamps. Elevation: 0'–1,640' Bloom Period: July–September
Sweet marsh ragwort (*Senecio hydrophiloides*)	–	–	4.2	Mesic areas in lower montane coniferous forest and meadows and seeps. Elevation: 0'–9,185' Bloom Period: May–August
Keck's checkerbloom *(Sidalcea keckii)*	FE	–	1B.1	Serpentine and clay soils within cismontane woodland and valley and foothill grasslands. Elevation: 245'–2,135' Bloom Period: April–May

Table 5. Special-Status Species Documented in or Near the BSA				
Common Name (Scientific Name)	**Status**			**Habitat Description/Species Ecology[1]**
	FESA	**CESA/ NPPA**	**Other**	
Suisun Marsh aster[2] **(*Symphyotrichum lentum*)**	**–**	**–**	**1B.2**	**Brackish and freshwater marshes and swamps.** **Elevation: 0'–10'** **Bloom Period: May–November**
Saline clover *(Trifolium hydrophilum)*	–	–	1B.2	Marshes and swamps, mesic and alkaline areas in valley and foothill grassland, and vernal pools. Elevation: 0'–985' Bloom Period: April–June
Solano grass *(Tuctoria mucronata)*	FE	CE	1B.1	Vernal pools and other mesic areas of valley and foothill grasslands. Elevation: 15'–35' Bloom Period: April–August
Invertebrates				
Conservancy fairy shrimp (*Branchinecta conservatio)*	FE	–	–	Vernal pools/wetlands. Survey Period: Wet season November–April when surface water is present; dry season May-October.
Vernal pool fairy shrimp (*Branchinecta lynchi*)	FT	–	–	Vernal pools/wetlands. Survey Period: Wet season November–April when surface water is present; dry season May-October.
Vernal pool tadpole shrimp (*Lepidurus packardi*)	FE	–	–	Vernal pools/wetlands. Survey Period: Wet season November–April when surface water is present; dry season May-October.
Delta green ground beetle *(Elaphrus viridis)*	FT	–	–	Vernal pool edges. Currently found only in the greater Jepson Prairie area in south-central Solano County. Active during the first warm days of late winter/ early spring. Returns to dormant phase during the hot, dry summer months. Survey Period: April-November

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
Western bumble bee *(Bombus occidentalis)*	–	CC	–	Meadows and grasslands with abundant floral resources. Primarily nests underground. Largely restricted to high elevation sites in the Sierra Nevada, although rarely detected on the California coast. Survey Period: April-November
Crotch bumble bee *(Bombus crotchii)*	–	CC	–	Primarily nests underground in open grassland and scrub habitats from the California coast east to the Sierra Cascade and south to Mexico. Survey Period: March-September
Lange's metalmark butterfly (*Apodemia mormo langei*)	FE	–	–	Requires specific sand dune habitat that is found only in Antioch Dunes National Wildlife Refuge. Reliant on a specific subspecies of naked buckwheat for its diet as well as reproduction. Survey Period: Late summer
Fish				
Green sturgeon (Southern DPS)[2] (*Acipenser medirostris*)	**FT**	**–**	**SSC**	**Anadromous; undammed cold-water rivers having relatively deep pools with large substrates.**
Steelhead (CA Central Valley DPS)[2] (*Oncorhynchus mykiss irideus*)	**FT**	**–**	**–**	**Fast-flowing, well-oxygenated rivers and streams below dams in the Sacramento and San Joaquin River systems.**
Delta smelt[2] (*Hypomesus transpacificus*)	**FT**	**CE**	**-**	**Sacramento-San Joaquin Delta.**
Longfin smelt[2] (*Spirinchus thaleichthys*)	**FC**	**CT**	**SSC**	**Freshwater and coastal estuaries.**
Sacramento splittail (*Pogonichthys macrolepidotus*)	–	–	SSC	San Francisco Bay estuary and Central Valley lakes and rivers. Spawns in upstream floodplains and backwater sloughs.

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
Sacramento perch *(Archoplites interruptus)*	–	–	SSC	Ponds, rivers, backwaters, reservoirs, and lakes in the Central Valley.
Amphibians				
California tiger salamander (Central California DPS) (*Ambystoma californiense*)	FT	CT	WL	Breeds in vernal pools and seasonal wetlands in grassland or oak woodland habitats; adults are terrestrial using underground refuges such as ground squirrel or gopher burrows. Central Valley and Inner Coast Range. Survey Period: Winter-Spring.
Reptiles				
Northwestern pond turtle (*Actinemys marmorata*)	–	–	SSC	Requires basking sites and upland habitats up to 0.5 km from water for egg laying. Uses ponds, streams, detention basins, and irrigation ditches. Survey Period: April-September
Northern California legless lizard (*Anniella pulchra*)	–	–	SSC	The most widespread of California's *Anniella* species. Occurs in sandy or loose soils under sparse vegetation from Antioch south coastally to Ventura. Bush lupine is often an indicator plant, and two melanistic populations are known. Survey Period: Generally spring, but depends on location and conditions
California glossy snake (*Arizona elegans occidentalis*)	–	–	SSC	Occurs from the eastern part of the San Francisco Bay Area south to northwestern Baja California. Inhabits arid scrub, rocky washes, grasslands, and chaparral. (Stebbins and McGinnis 2012) Survey Period: April-October
Giant garter snake (*Thamnophis gigas*)	FT	CT	–	Freshwater ditches, sloughs, and marshes in the Central Valley. Almost extirpated from the southern parts of its range. Survey Period: April-October

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
Birds				
Western grebe *(Aechmophorus occidentalis)*	–	–	BCC	Winters on salt or brackish bays, estuaries, sheltered sea coasts, freshwater lakes, and rivers. Nests on freshwater lakes and marshes with open water bordered by emergent vegetation. Nesting: June-August
Clark's grebe *(Aechmophorus clarkii)*	–	–	BCC	Winters on salt or brackish bays, estuaries, sheltered sea coasts, freshwater lakes, and rivers. Breeds on freshwater to brackish marshes, lakes, reservoirs and ponds, with a preference for large stretches of open water fringed with emergent vegetation. Nesting: June-August
Yellow-billed cuckoo (*Coccyzus americanus*)	FT	CE	–	Breeding habitat is generally open woodland with clearings and low, dense, scrubby vegetation associated with watercourses, and includes desert riparian woodlands with willow, Fremont's cottonwood, alder, walnut, box-elder, and dense mesquite. Nests are generally found in deciduous hardwoods with thick bushes, vines, or hedgerows providing dense foliage within 10 meters (33 feet) of ground; prefer riparian patches of at least 81 hectares (200 acres). Winters in South America. (Hughes 2020) Nesting: June 15-August 15
California black rail (*Laterallus jamaicensis coturniculus*)	–	CT	CFP	Salt marsh, shallow freshwater marsh, wet meadows, and flooded grassy vegetation. In California, primarily found in coastal and Bay-Delta communities, but also in Sierran foothills (Butte, Yuba, Nevada, Placer, El Dorado counties). Nesting: March-September

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
Mountain plover (*Charadrius montanus*)	–	–	BCC, SSC	Breeds in the Great Plains/Midwestern US; winters in California, Arizona, Texas, and Mexico; wintering habitat in California includes tilled fields, heavily grazed open grassland, burned fields, and alfalfa fields. Wintering: September-March
Short-billed dowitcher *(Limnodromus griseus)*	–	–	BCC	Nests in Canada, southern Alaska; winters in coastal California south to South America; wintering habitat includes coastal mudflats and brackish lagoons. Migrant/Wintering: late-August-May
California gull (nesting colony) *(Larus californicus)*	–	–	BCC, WL	Nesting occurs in the Great Basin, Great Plains, Mono Lake, and south San Francisco Bay. Breeding colonies located on islands on natural lakes, rivers, or reservoirs. Winters along Pacific Coast from southern British Columbia south to Baja California and Mexico. In California, winters along coast and inland (Central Valley, Salton Sea). Nesting: April-August
Double-crested cormorant *(Nannopterum auritum)*	–	–	WL	Nests near ponds, lakes, artificial impoundments, slow-moving rivers, lagoons, estuaries, and open coastlines and typically forages in shallow water. Non-nesters are found in many coastal and inland waters. Nesting: April-August
White-tailed kite (*Elanus leucurus*)	–	–	CFP	Nesting occurs within trees in low elevation grassland, agricultural, wetland, oak woodland, riparian, savannah, and urban habitats. Nesting: March-August

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
Golden eagle (*Aquila chrysaetos*)	–	–	CFP, WL	Nesting habitat includes mountainous canyon land, rimrock terrain of open desert and grasslands, riparian, oak woodland/ savannah, and chaparral. Nesting occurs on cliff ledges, river banks, trees, and human-made structures (e.g. windmills, platforms, and transmission towers). Breeding occurs throughout California, except the immediate coast, Central Valley floor, Salton Sea region, and the Colorado River region, where they can be found during Winter. Nesting: February-August Wintering in Central Valley: October-February
Swainson's hawk[2] **(*Buteo swainsoni*)**	**–**	**CT**	**–**	**Nesting occurs in trees in agricultural, riparian, oak woodland, scrub, and urban landscapes. Forages over grassland, agricultural lands, particularly during disking/harvesting, irrigated pastures.** **Nesting: March-August**
Burrowing owl *(Athene cunicularia)*	–	–	BCC, SSC	Nests in burrows or burrow surrogates in open, treeless, areas within grassland, steppe, and desert biomes. Often with other burrowing mammals (e.g., prairie dogs, California ground squirrels). May also use human-made habitat such as agricultural fields, golf courses, cemeteries, roadside, airports, vacant urban lots, and fairgrounds. Nesting: February-August
Nuttall's woodpecker *(Dryobates nuttallii)*	–	–	BCC	Resident from northern California south to Baja California. Nests in tree cavities in oak woodlands and riparian woodlands. Nesting: April-July

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
American peregrine falcon[2] ***(Falco peregrinus anatum)***	**De-listed**	**De-listed**	**CFP**	**In California, breeds in coastal region, northern California, and Sierra Nevada. Nesting habitat includes cliff ledges and human-made ledges on towers and buildings. Wintering habitat includes areas where there are large concentrations of shorebirds, waterfowl, pigeons or doves. CA Residents nest in February-June**
Grasshopper sparrow (*Ammodramus savannarum*)	–	–	BCC, SSC	In California, breeding range includes most coastal counties south to Baja California; western Sacramento Valley and western edge of Sierra Nevada region. Nests in moderately open grasslands and prairies with patchy bare ground. Avoids grasslands with extensive shrub cover; more likely to occupy large tracts of habitat than small fragments; removal of grass cover by grazing often detrimental. Nesting: May-August
Belding's savannah sparrow (*Passerculus sandwichensis beldingi*)	–	CE	BCC	Resident coastally from Point Conception south into Baja California; coastal salt marsh. Year-round resident; nests March-August
Song sparrow "Modesto"[2] **(*Melospiza melodia heermanni*)**	**–**	**–**	**SSC**	**Resident in central and southwest California, including Central Valley; nests in marsh, scrub habitat. Nesting: April-June**
Suisun song sparrow (*Melospiza melodia maxillaris*)	–	–	SSC	Resident of brackish marshes of Suisun Bay. Year-round resident; nests March-July
Bullock's oriole (*Icterus bullockii*)	–	–	BCC	Breeding habitat includes riparian and oak woodlands. Nesting: March-July

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
Tricolored blackbird (*Agelaius tricolor*)	–	CT	BCC, SSC	Breeds locally west of Cascade-Sierra Nevada and southeastern deserts from Humboldt and Shasta counties south to San Bernardino, Riverside and San Diego counties. Central California, Sierra Nevada foothills and Central Valley, Siskiyou, Modoc and Lassen counties. Nests colonially in freshwater marsh, blackberry bramble, milk thistle, triticale fields, weedy (mustard, mallow) fields, giant cane, safflower, stinging nettles, tamarisk, riparian scrublands and forests, fiddleneck and fava bean fields. (Beedy et al. 2020) Nesting: March-August
Saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*)	–	–	BCC, SSC	Breeds in salt marshes of San Francisco Bay; winters San Francisco south along coast to San Diego County. Nesting: March-July
Mammals				
Western red bat (*Lasiurus frantzii*)	–	–	SSC	Roosts in 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). (Western Bat Working Group 2023) Survey Period: April-September
Salt-marsh harvest mouse *(Reithrodontomys raviventris)*	FE	CE	CFP	Saline emergent marsh. Survey Period: Any season

Table 5. Special-Status Species Documented in or Near the BSA

Common Name (Scientific Name)	Status			Habitat Description/Species Ecology[1]
	FESA	CESA/ NPPA	Other	
American badger *(Taxidea taxus)*	–	–	SSC	Drier open stages of most shrub, forest, and herbaceous habitats with friable soils. Survey Period: Any season

Notes:
[1] Habitat descriptions for plant species are from the CNPS Rare Plant Inventory (CNPS 2023a), unless otherwise stated.
[2] Species has at least one mapped CNDDB occurrence within the BSA (CDFW 2023c).

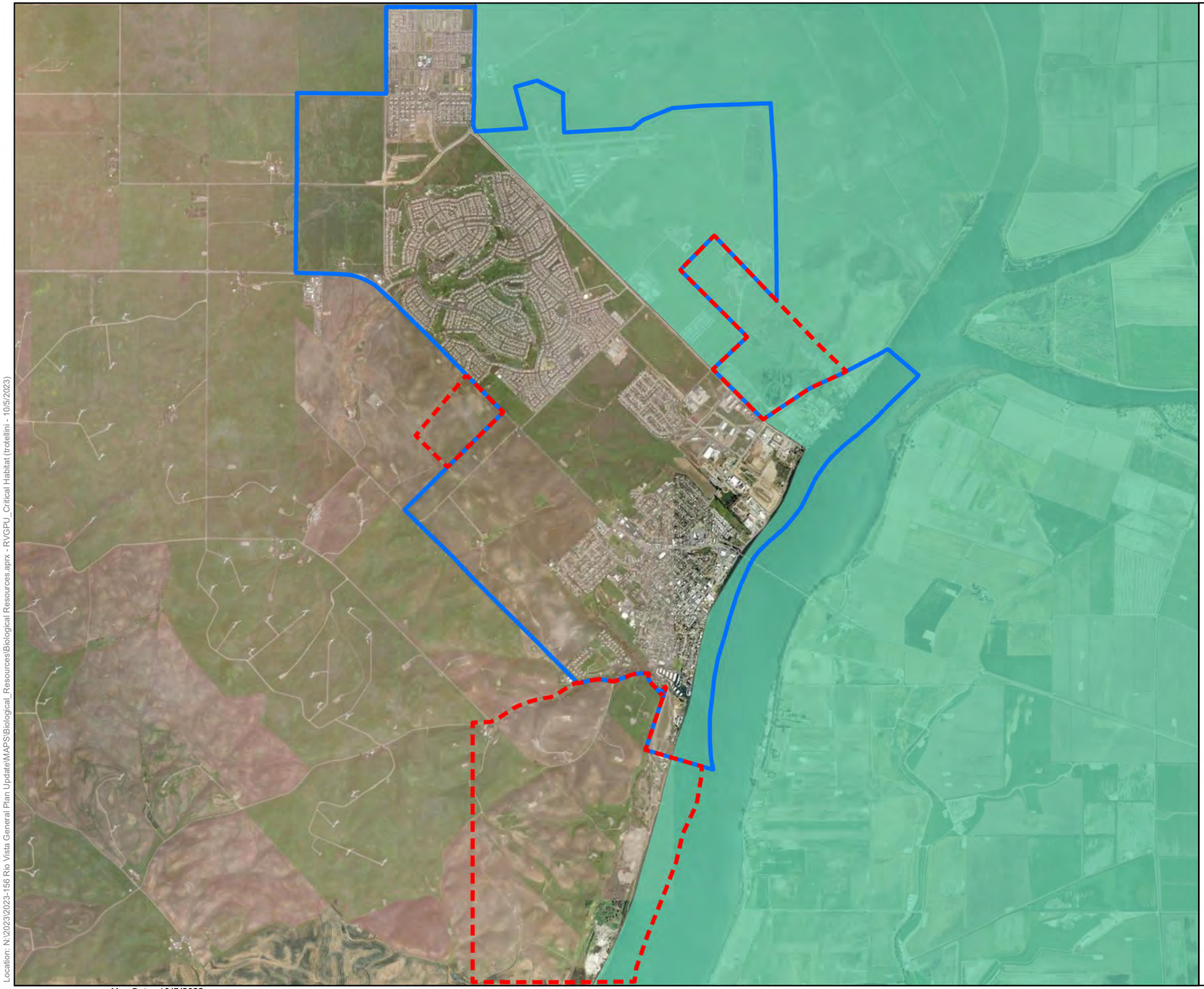
Status Codes:

FESA	Federal Endangered Species Act
CESA	California Endangered Species Act
FE	FESA listed, Endangered
FT	FESA listed, Threatened
FC	Candidate for FESA listing as Threatened or Endangered
BCC	USFWS Bird of Conservation Concern (USFWS 2021)
CE	CESA- or NPPA-listed, Endangered.
CT	CESA- or NPPA-listed, Threatened.
CR	CESA- or NPPA-listed, Rare
CC	Candidate for CESA listing as Endangered or Threatened
CFP	California Fish and Game Code Fully Protected Species (Sections 3511-birds, 4700-mammals, and 5 050-reptiles/amphibians).
SSC	CDFW Species of Special Concern
WL	CDFW Watch List
1B	CRPR/Rare or Endangered in California and elsewhere.
2B	CRPR/Plants rare, threatened, or endangered in California but more common elsewhere.
3	CRPR/Plants About Which More Information is Needed – A Review List.
4	CRPR/Plants of Limited Distribution – A Watch List.
0.1	Threat Rank/Seriously threatened in California (more than 80% of occurrences threatened / high degree and immediacy of threat)
0.2	Threat Rank/Moderately threatened in California (20-80% occurrences threatened/moderate degree and immediacy of threat)
0.3	Threat Rank/Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)
Delisted	Formally Delisted

4.7 Critical Habitat or Essential Fish Habitat

The Delta within the BSA is designated Critical Habitat for delta smelt (Figure 6; USFWS 2023b).

Based on the literature review, anadromous fish Critical Habitat and EFH for Chinook salmon (Central Valley Spring Run, Sacramento River Winter Run), steelhead (Central Valley Distinct Population Segment [DPS]), and green sturgeon (southern DPS), may be present within the "Rio Vista, California" 7.5-minute quadrangle (NOAA 2016).



Map Contents

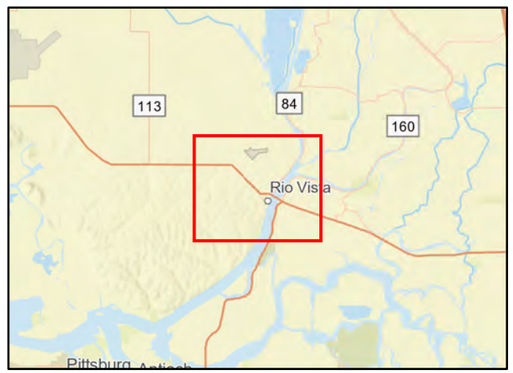
Biological Study Area

- City of Rio Vista
- City of Rio Vista Sphere of Influence

Critical Habitat

- Delta smelt

Sources: ESRI, Maxar (2022), National Resources Conservation Service



Location: N:\2023\2023-156 Rio Vista General Plan Update\MAPS\Biological_Resources\Biological Resources.aprx - RVGPU_Critical Habitat (trdellini - 10/5/2023)

Map Date: 10/5/2023

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 1,500 3,000

Figure 6. Critical Habitat within the Biological Study Area

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The Sacramento River within the BSA contains EFH for groundfish, which refers to more than 90 different species of roundfish, flatfish, rockfish, sharks, and skates off the West Coast. All Chinook salmon habitat within the BSA is considered EFH for Chinook salmon (NOAA 2023b).

4.8 Wildlife Movement Corridors and Nursery Sites

The Sacramento River and Delta within the BSA provides an important migratory corridor for migratory birds of the Pacific Flyway and many fish species, including steelhead (CDFW 2023c). The remainder of the BSA is more limited in suitability for wildlife due to urban development or past and ongoing disturbance from intensive grazing and agricultural uses.

The Essential Connectivity Areas map identifies larger, relatively natural habitat blocks that support native biodiversity and areas essential for connectivity between them. The BSA does not fall within a natural habitat block (CDFW 2023d) or an Essential Habitat Connectivity area (CDFW 2023e). However, the BSA includes small natural areas that could support ecological value (CDFW 2023f) and movement corridors for native resident and migratory wildlife.

The Sacramento River within the BSA provides important spawning grounds for the bay-delta population of longfin smelt and delta smelt, rearing habitat for juvenile green sturgeons, and migration habitat for spawning green sturgeon (CDFW 2023c). Many other habitats within the BSA have potential to support nursery sites for common and special-status species.

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LIST OF APPENDICES

APPENDIX A

Results of Database Queries

Selected Elements by Element Code

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Isleton (3812125) OR Rio Vista (3812126) OR Liberty Island (3812136) OR Courtland (3812135) OR Bouldin Island (3812115) OR Jersey Island (3812116) OR Dozier (3812137) OR Antioch North (3812117) OR Birds Landing (3812127))

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
AAAAA01181	***Ambystoma californiense pop. 1*** California tiger salamander - central California DPS	Threatened	Threatened	G2G3T3	S3	WL
ABNFD01020	***Nannopterum auritum*** double-crested cormorant	None	None	G5	S4	WL
ABNGA04010	***Ardea herodias*** great blue heron	None	None	G5	S4	
ABNGA04040	***Ardea alba*** great egret	None	None	G5	S4	
ABNKC06010	***Elanus leucurus*** white-tailed kite	None	None	G5	S3S4	FP
ABNKC19070	***Buteo swainsoni*** Swainson's hawk	None	Threatened	G5	S4	
ABNKD06071	***Falco peregrinus anatum*** American peregrine falcon	Delisted	Delisted	G4T4	S3S4	
ABNME03041	***Laterallus jamaicensis coturniculus*** California black rail	None	Threatened	G3T1	S2	FP
ABNNB03100	***Charadrius montanus*** mountain plover	None	None	G3	S2	SSC
ABNRB02022	***Coccyzus americanus occidentalis*** western yellow-billed cuckoo	Threatened	Endangered	G5T2T3	S1	
ABNSB10010	***Athene cunicularia*** burrowing owl	None	None	G4	S2	SSC
ABPAU08010	***Riparia riparia*** bank swallow	None	Threatened	G5	S3	
ABPBX1201A	***Geothlypis trichas sinuosa*** saltmarsh common yellowthroat	None	None	G5T3	S3	SSC
ABPBXA0020	***Ammodramus savannarum*** grasshopper sparrow	None	None	G5	S3	SSC
ABPBXA3013	***Melospiza melodia pop. 1*** song sparrow ("Modesto" population)	None	None	G5T3?Q	S3?	SSC
ABPBXA301K	***Melospiza melodia maxillaris*** Suisun song sparrow	None	None	G5T3	S2	SSC
ABPBXB0020	***Agelaius tricolor*** tricolored blackbird	None	Threatened	G1G2	S2	SSC
AFCAA01031	***Acipenser medirostris pop. 1*** green sturgeon - southern DPS	Threatened	None	G2T1	S1	
AFCHA0209K	***Oncorhynchus mykiss irideus pop. 11*** steelhead - Central Valley DPS	Threatened	None	G5T2Q	S2	

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
AFCHB01040	***Hypomesus transpacificus*** Delta smelt	Threatened	Endangered	G1	S1	
AFCHB03010	***Spirinchus thaleichthys*** longfin smelt	Candidate	Threatened	G5	S1	
AFCJB34020	***Pogonichthys macrolepidotus*** Sacramento splittail	None	None	G3	S3	SSC
AFCQB07010	***Archoplites interruptus*** Sacramento perch	None	None	G1	S1	SSC
AMACC05032	***Lasiurus cinereus*** hoary bat	None	None	G3G4	S4	
AMACC05080	***Lasiurus frantzii*** western red bat	None	None	G4	S3	SSC
AMAFF02040	***Reithrodontomys raviventris*** salt-marsh harvest mouse	Endangered	Endangered	G1G2	S3	FP
AMAJF04010	***Taxidea taxus*** American badger	None	None	G5	S3	SSC
ARAAD02030	***Emys marmorata*** western pond turtle	None	None	G3G4	S3	SSC
ARACC01020	***Anniella pulchra*** Northern California legless lizard	None	None	G3	S2S3	SSC
ARADB01017	***Arizona elegans occidentalis*** California glossy snake	None	None	G5T2	S2	SSC
ARADB36150	***Thamnophis gigas*** giant gartersnake	Threatened	Threatened	G2	S2	
CTT23100CA	***Stabilized Interior Dunes*** Stabilized Interior Dunes	None	None	G1	S1.1	
CTT42110CA	***Valley Needlegrass Grassland*** Valley Needlegrass Grassland	None	None	G3	S3.1	
CTT44120CA	***Northern Claypan Vernal Pool*** Northern Claypan Vernal Pool	None	None	G1	S1.1	
CTT52200CA	***Coastal Brackish Marsh*** Coastal Brackish Marsh	None	None	G2	S2.1	
CTT52410CA	***Coastal and Valley Freshwater Marsh*** Coastal and Valley Freshwater Marsh	None	None	G3	S2.1	
ICBRA03010	***Branchinecta conservatio*** Conservancy fairy shrimp	Endangered	None	G2	S2	
ICBRA03030	***Branchinecta lynchi*** vernal pool fairy shrimp	Threatened	None	G3	S3	
ICBRA03150	***Branchinecta mesovallensis*** midvalley fairy shrimp	None	None	G2	S2S3	
ICBRA06010	***Linderiella occidentalis*** California linderiella	None	None	G2G3	S2S3	

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
ICBRA10010	***Lepidurus packardi*** vernal pool tadpole shrimp	Endangered	None	G3	S3	
IICOL36010	***Elaphrus viridis*** Delta green ground beetle	Threatened	None	G1	S1	
IICOL38030	***Hygrotus curvipes*** curved-foot hygrotus diving beetle	None	None	G2	S2	
IICOL49010	***Anthicus sacramento*** Sacramento anthicid beetle	None	None	G4	S4	
IICOL49020	***Anthicus antiochensis*** Antioch Dunes anthicid beetle	None	None	G3	S3	
IICOL4A020	***Coelus gracilis*** San Joaquin dune beetle	None	None	G1	S1	
IICOL5V010	***Hydrochara rickseckeri*** Ricksecker's water scavenger beetle	None	None	G2?	S2?	
IIDIP05010	***Rhaphiomidas trochilus*** San Joaquin Valley giant flower-loving fly	None	None	G1	S1	
IIDIP06010	***Cophura hurdi*** Antioch cophuran robberfly	None	None	GX	SX	
IIDIP07010	***Efferia antiochi*** Antioch efferian robberfly	None	None	G1G2	S1S2	
IIDIP08010	***Metapogon hurdi*** Hurd's metapogon robberfly	None	None	G1G2	S1S2	
IIHYM01021	***Perdita hirticeps luteocincta*** yellow-banded andrenid bee	None	None	GNRTX	SX	
IIHYM01031	***Perdita scitula antiochensis*** Antioch andrenid bee	None	None	G1T1	S2	
IIHYM15010	***Myrmosula pacifica*** Antioch multilid wasp	None	None	GH	SH	
IIHYM18010	***Eucerceris ruficeps*** redheaded sphecid wasp	None	None	G1G3	S2	
IIHYM20010	***Philanthus nasalis*** Antioch specid wasp	None	None	G2	S2	
IIHYM24252	***Bombus occidentalis*** western bumble bee	None	Candidate Endangered	G3	S1	
IIHYM24260	***Bombus pensylvanicus*** American bumble bee	None	None	G3G4	S2	
IIHYM24480	***Bombus crotchii*** Crotch bumble bee	None	Candidate Endangered	G2	S2	
IIHYM35030	***Andrena blennospermatis*** Blennosperma vernal pool andrenid bee	None	None	G2	S1	
IIHYM78010	***Sphecodogastra antiochensis*** Antioch Dunes halcitid bee	None	None	G1	S1	

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
IILEPH7012	***Apodemia mormo langei*** Lange's metalmark butterfly	Endangered	None	G5T1	S1	
IIORT31010	***Idiostatus middlekauffi*** Middlekauff's shieldback katydid	None	None	G1G2	S1	
IMBIV19010	***Gonidea angulata*** western ridged mussel	None	None	G3	S2	
PDAPI0M051	***Cicuta maculata var. bolanderi*** Bolander's water-hemlock	None	None	G5T4T5	S2?	2B.1
PDAPI19030	***Lilaeopsis masonii*** Mason's lilaeopsis	None	Rare	G2	S2	1B.1
PDAST1C011	***Blepharizonia plumosa*** big tarplant	None	None	G1G2	S1S2	1B.1
PDAST4R0P2	***Centromadia parryi ssp. parryi*** pappose tarplant	None	None	G3T2	S2	1B.2
PDAST57050	***Isocoma arguta*** Carquinez goldenbush	None	None	G1	S1	1B.1
PDAST5L030	***Lasthenia chrysantha*** alkali-sink goldfields	None	None	G2	S2	1B.1
PDAST5L040	***Lasthenia conjugens*** Contra Costa goldfields	Endangered	None	G1	S1	1B.1
PDAST5L0A1	***Lasthenia glabrata ssp. coulteri*** Coulter's goldfields	None	None	G4T2	S2	1B.1
PDASTE8470	***Symphyotrichum lentum*** Suisun Marsh aster	None	None	G2	S2	1B.2
PDBOR0A190	***Cryptantha hooveri*** Hoover's cryptantha	None	None	GH	SH	1A
PDBOR0V0H0	***Plagiobothrys hystriculus*** bearded popcornflower	None	None	G2	S2	1B.1
PDBRA16052	***Erysimum capitatum var. angustatum*** Contra Costa wallflower	Endangered	Endangered	G5T1	S1	1B.1
PDBRA1M0K1	***Lepidium latipes var. heckardii*** Heckard's pepper-grass	None	None	G4T1	S1	1B.2
PDCAB01010	***Brasenia schreberi*** watershield	None	None	G5	S3	2B.3
PDCAM060C0	***Downingia pusilla*** dwarf downingia	None	None	GU	S2	2B.2
PDCAM0C010	***Legenere limosa*** legenere	None	None	G2	S2	1B.1
PDCHE040B0	***Atriplex cordulata var. cordulata*** heartscale	None	None	G3T2	S2	1B.2
PDCHE041F3	***Extriplex joaquinana*** San Joaquin spearscale	None	None	G2	S2	1B.2

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
PDCHE042L0	***Atriplex depressa*** brittlescale	None	None	G2	S2	1B.2
PDCHE042P0	***Atriplex persistens*** vernal pool smallscale	None	None	G2	S2	1B.2
PDFAB0F8R1	***Astragalus tener var. tener*** alkali milk-vetch	None	None	G2T1	S1	1B.2
PDFAB0F8R3	***Astragalus tener var. ferrisiae*** Ferris' milk-vetch	None	None	G2T1	S1	1B.1
PDFAB250D2	***Lathyrus jepsonii var. jepsonii*** Delta tule pea	None	None	G5T2	S2	1B.2
PDFAB400R5	***Trifolium hydrophilum*** saline clover	None	None	G2	S2	1B.2
PDLAM1U0J0	***Scutellaria galericulata*** marsh skullcap	None	None	G5	S2	2B.2
PDLAM1U0Q0	***Scutellaria lateriflora*** side-flowering skullcap	None	None	G5	S2	2B.2
PDMAL0H0R3	***Hibiscus lasiocarpos var. occidentalis*** woolly rose-mallow	None	None	G5T3	S3	1B.2
PDMAL110D0	***Sidalcea keckii*** Keck's checkerbloom	Endangered	None	G2	S2	1B.1
PDONA0C0B4	***Oenothera deltoides ssp. howellii*** Antioch Dunes evening-primrose	Endangered	Endangered	G5T1	S1	1B.1
PDPAP0A0D0	***Eschscholzia rhombipetala*** diamond-petaled California poppy	None	None	G1	S1	1B.1
PDPGN0849Q	***Eriogonum nudum var. psychicola*** Antioch Dunes buckwheat	None	None	G5T1	S1	1B.1
PDPGN085Z0	***Eriogonum truncatum*** Mt. Diablo buckwheat	None	None	G1	S1	1B.1
PDPLM0C0E1	***Navarretia leucocephala ssp. bakeri*** Baker's navarretia	None	None	G4T2	S2	1B.1
PDSCR0J0D2	***Chloropyron molle ssp. molle*** soft salty bird's-beak	Endangered	Rare	G2T1	S1	1B.2
PDSCR0R060	***Gratiola heterosepala*** Boggs Lake hedge-hyssop	None	Endangered	G2	S2	1B.2
PDSCR10030	***Limosella australis*** Delta mudwort	None	None	G4G5	S2	2B.1
PMALI040Q0	***Sagittaria sanfordii*** Sanford's arrowhead	None	None	G3	S3	1B.2
PMCYP032Y0	***Carex comosa*** bristly sedge	None	None	G5	S2	2B.1
PMLIL0V0C0	***Fritillaria liliacea*** fragrant fritillary	None	None	G2	S2	1B.2

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
PMPOA4C010	***Neostapfia colusana*** Colusa grass	Threatened	Endangered	G1	S1	1B.1
PMPOA53110	***Puccinellia simplex*** California alkali grass	None	None	G2	S2	1B.2
PMPOA6N020	***Tuctoria mucronata*** Crampton's tuctoria or Solano grass	Endangered	Endangered	G1	S1	1B.1
PMPOT03160	***Potamogeton zosteriformis*** eel-grass pondweed	None	None	G5	S3	2B.2

Record Count: 107

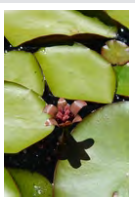
CNPS Rare Plant Inventory

California Native Plant Society

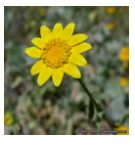
Search Results

52 matches found. Click on scientific name for details

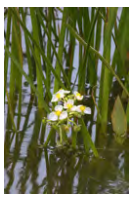
Search Criteria: 9-Quad include [**3812125:3812126:3812136:3812135:3812115:3812116:3812137:3812117:3812127**]

▲ SCIENTIFIC NAME	COMMON NAME	FAMILY	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	GLOBAL RANK	STATE RANK	CA RARE PLANT RANK	CA ENDEMIC	DATE ADDED	PHOTO
Astragalus tener var. *ferrisiae*	Ferris' milk-vetch	Fabaceae	annual herb	Apr-May	None	None	G2T1	S1	1B.1	Yes	1994-01-01	No Photo Available
Astragalus tener var. *tener*	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	None	None	G2T1	S1	1B.2	Yes	1994-01-01	No Photo Available
Atriplex cordulata var. *cordulata*	heartscale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G3T2	S2	1B.2	Yes	1988-01-01	 © 1994 Robert E. Preston, Ph.D.
Atriplex coronata var. *coronata*	crownscale	Chenopodiaceae	annual herb	Mar-Oct	None	None	G4T3	S3	4.2	Yes	1994-01-01	 © 1994 Robert E. Preston, Ph.D.
Atriplex depressa	brittlescale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G2	S2	1B.2	Yes	1994-01-01	 © 2009 Zoya Akulova
Atriplex persistens	vernal pool smallscale	Chenopodiaceae	annual herb	Jun-Oct	None	None	G2	S2	1B.2	Yes	2001-01-01	No Photo Available
Blepharizonia plumosa	big tarplant	Asteraceae	annual herb	Jul-Oct	None	None	G1G2	S1S2	1B.1	Yes	1994-01-01	No Photo Available
Brasenia schreberi	watershield	Cabombaceae	perennial rhizomatous herb (aquatic)	Jun-Sep	None	None	G5	S3	2B.3		2010-10-27	 ©2014 Kirsten Bovee

Carex comosa	bristly sedge	Cyperaceae	perennial rhizomatous herb	May-Sep	None	None	G5	S2	2B.1		1994-01-01	 Dean Wm. Taylor 1997
Centromadia parryi ssp. *parryi*	pappose tarplant	Asteraceae	annual herb	May-Nov	None	None	G3T2	S2	1B.2	Yes	2004-01-01	 © 2016 John Doyen
Centromadia parryi ssp. *rudis*	Parry's rough tarplant	Asteraceae	annual herb	May-Oct	None	None	G3T3	S3	4.2	Yes	2007-05-22	 © 2019 John Doyen
Chloropyron molle ssp. *molle*	soft salty bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Nov	FE	CR	G2T1	S1	1B.2	Yes	1974-01-01	No Photo Available
Cicuta maculata var. *bolanderi*	Bolander's water-hemlock	Apiaceae	perennial herb	Jul-Sep	None	None	G5T4T5	S2?	2B.1		1974-01-01	 © 2007 Doreen L Smith
Convolvulus simulans	small-flowered morning-glory	Convolvulaceae	annual herb	Mar-Jul	None	None	G4	S4	4.2		1994-01-01	No Photo Available
Cryptantha hooveri	Hoover's cryptantha	Boraginaceae	annual herb	Apr-May	None	None	GH	SH	1A	Yes	1974-01-01	No Photo Available
Downingia pusilla	dwarf downingia	Campanulaceae	annual herb	Mar-May	None	None	GU	S2	2B.2		1980-01-01	 © 2013 Aaron Arthur
Eleocharis parvula	small spikerush	Cyperaceae	perennial herb	(Apr)Jun-Aug(Sep)	None	None	G5	S3	4.3		1980-01-01	 ©2018 Ron Vanderhoff
Eriogonum nudum var. *psychicola*	Antioch Dunes buckwheat	Polygonaceae	perennial herb	Jul-Oct	None	None	G5T1	S1	1B.1	Yes	2010-06-21	No Photo Available
Eriogonum truncatum	Mt. Diablo buckwheat	Polygonaceae	annual herb	Apr-Sep(Nov-Dec)	None	None	G1	S1	1B.1	Yes	1974-01-01	No Photo Available
Erysimum capitatum var. *angustatum*	Contra Costa wallflower	Brassicaceae	perennial herb	Mar-Jul	FE	CE	G5T1	S1	1B.1	Yes	1974-01-01	No Photo Available

Eschscholzia rhombipetala	diamond-petaled California poppy	Papaveraceae	annual herb	Mar-Apr	None	None	G1	S1	1B.1	Yes	1980-01-01	No Photo Available
Extriplex joaquinana	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G2	S2	1B.2	Yes	1988-01-01	No Photo Available
Fritillaria agrestis	stinkbells	Liliaceae	perennial bulbiferous herb	Mar-Jun	None	None	G3	S3	4.2	Yes	1980-01-01	 © 2016 Aaron Schusteff
Fritillaria liliacea	fragrant fritillary	Liliaceae	perennial bulbiferous herb	Feb-Apr	None	None	G2	S2	1B.2	Yes	1974-01-01	 © 2004 Carol W. Witham
Gratiola heterosepala	Boggs Lake hedge-hyssop	Plantaginaceae	annual herb	Apr-Aug	None	CE	G2	S2	1B.2		1974-01-01	 ©2004 Carol W. Witham
Hesperevax caulescens	hogwallow starfish	Asteraceae	annual herb	Mar-Jun	None	None	G3	S3	4.2	Yes	2001-01-01	 © 2017 John Doyen
Hibiscus lasiocarpos var. *occidentalis*	woolly rose-mallow	Malvaceae	perennial rhizomatous herb (emergent)	Jun-Sep	None	None	G5T3	S3	1B.2	Yes	1974-01-01	 © 2020 Steven Perry
Isocoma arguta	Carquinez goldenbush	Asteraceae	perennial shrub	Aug-Dec	None	None	G1	S1	1B.1	Yes	1994-01-01	No Photo Available
Lasthenia chrysantha	alkali-sink goldfields	Asteraceae	annual herb	Feb-Apr	None	None	G2	S2	1B.1	Yes	2019-09-30	 © 2009 California State University, Stanislaus
Lasthenia conjugens	Contra Costa goldfields	Asteraceae	annual herb	Mar-Jun	FE	None	G1	S1	1B.1	Yes	1974-01-01	 © 2013 Neal Kramer
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	Asteraceae	annual herb	Feb-Jun	None	None	G4T2	S2	1B.1		1994-01-01	 © 2013 Keir Morse

Lathyrus jepsonii var. *jepsonii*	Delta tule pea	Fabaceae	perennial herb	May-Jul(Aug-Sep)	None	None	G5T2	S2	1B.2	Yes	1974-01-01	 © 2003 Mark Fogiel
Legenere limosa	legenere	Campanulaceae	annual herb	Apr-Jun	None	None	G2	S2	1B.1	Yes	1974-01-01	 ©2000 John Game
Lepidium latipes var. *heckardii*	Heckard's pepper-grass	Brassicaceae	annual herb	Mar-May	None	None	G4T1	S1	1B.2	Yes	1994-01-01	 2018 Jennifer Buck
Lilaeopsis masonii	Mason's lilaeopsis	Apiaceae	perennial rhizomatous herb	Apr-Nov	None	CR	G2	S2	1B.1	Yes	1974-01-01	No Photo Available
Limosella australis	Delta mudwort	Scrophulariaceae	perennial stoloniferous herb	May-Aug	None	None	G4G5	S2	2B.1		1994-01-01	 © 2020 Richard Sage
Lupinus albifrons var. *abramsii*	Abrams' lupine	Fabaceae	perennial herb	Apr-Jun	None	None	G5T3? Q	S3?	3.2	Yes	1974-01-01	No Photo Available
Myosurus minimus ssp. *apus*	little mousetail	Ranunculaceae	annual herb	Mar-Jun	None	None	G5T2Q	S2	3.1		1980-01-01	No Photo Available
Navarretia leucocephala ssp. *bakeri*	Baker's navarretia	Polemoniaceae	annual herb	Apr-Jul	None	None	G4T2	S2	1B.1	Yes	1994-01-01	 © 2018 Barry Rice
Neostapfia colusana	Colusa grass	Poaceae	annual herb	May-Aug	FT	CE	G1	S1	1B.1	Yes	1974-01-01	No Photo Available
Oenothera deltoides ssp. *howellii*	Antioch Dunes evening-primrose	Onagraceae	perennial herb	Mar-Sep	FE	CE	G5T1	S1	1B.1	Yes	1974-01-01	No Photo Available
Plagiobothrys hystriculus	bearded popcornflower	Boraginaceae	annual herb	Apr-May	None	None	G2	S2	1B.1	Yes	1974-01-01	No Photo Available
Potamogeton zosteriformis	eel-grass pondweed	Potamogetonaceae	annual herb (aquatic)	Jun-Jul	None	None	G5	S3	2B.2		1994-01-01	No Photo Available
Puccinellia simplex	California alkali grass	Poaceae	annual herb	Mar-May	None	None	G2	S2	1B.2		2015-10-15	No Photo Available

Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	May-Oct(Nov)	None	None	G3	S3	1B.2	Yes	1984-01-01	 ©2013 Debra L. Cook
Scutellaria galericulata	marsh skullcap	Lamiaceae	perennial rhizomatous herb	Jun-Sep	None	None	G5	S2	2B.2		1994-01-01	 © 2021 Scot Loring
Scutellaria lateriflora	side-flowering skullcap	Lamiaceae	perennial rhizomatous herb	Jul-Sep	None	None	G5	S2	2B.2		1994-01-01	No Photo Available
Senecio hydrophiloides	sweet marsh ragwort	Asteraceae	perennial herb	May-Aug	None	None	G5	S3	4.2		1984-01-01	 © 2021 Scot Loring
Sidalcea keckii	Keck's checkerbloom	Malvaceae	annual herb	Apr-May(Jun)	FE	None	G2	S2	1B.1	Yes	1974-01-01	No Photo Available
Symphyotrichum lentum	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	(Apr)May-Nov	None	None	G2	S2	1B.2	Yes	1974-01-01	No Photo Available
Trifolium hydrophilum	saline clover	Fabaceae	annual herb	Apr-Jun	None	None	G2	S2	1B.2	Yes	2001-01-01	 © 2005 Dean Wm Taylor
Tuctoria mucronata	Crampton's tuctoria or Solano grass	Poaceae	annual herb	Apr-Aug	FE	CE	G1	S1	1B.1	Yes	1974-01-01	No Photo Available

Showing 1 to 52 of 52 entries

Suggested Citation:

California Native Plant Society, Rare Plant Program. 2023. Rare Plant Inventory (online edition, v9.5). Website https://www.rareplants.cnps.org [accessed 19 September 2023].

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Sacramento and Solano counties, California

Local offices

San Francisco Bay-Delta Fish And Wildlife

(916) 930-5603
(916) 930-5654

650 Capitol Mall

Suite 8-300
Sacramento, CA 95814

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

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

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS
California Clapper Rail Rallus longirostris obsoletus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4240	Endangered

Reptiles

NAME	STATUS
Giant Garter Snake Thamnophis gigas Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander Ambystoma californiense There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS

Delta Smelt Hypomesus transpacificus — Threatened
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/321

Longfin Smelt Spirinchus thaleichthys — Proposed Endangered
No critical habitat has been designated for this species.

Insects

NAME	STATUS

Delta Green Ground Beetle Elaphrus viridis — Threatened
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/2319

Monarch Butterfly Danaus plexippus — Candidate
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9743

Valley Elderberry Longhorn Beetle Desmocerus californicus dimorphus — Threatened
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/7850

Crustaceans

NAME	STATUS

Conservancy Fairy Shrimp Branchinecta conservatio — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/8246

Vernal Pool Fairy Shrimp Branchinecta lynchi — Threatened
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/498

Vernal Pool Tadpole Shrimp Lepidurus packardi — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/2246

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Delta Smelt Hypomesus transpacificus https://ecos.fws.gov/ecp/species/321#crithab	Final

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Golden Eagle Aquila chrysaetos This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of

presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

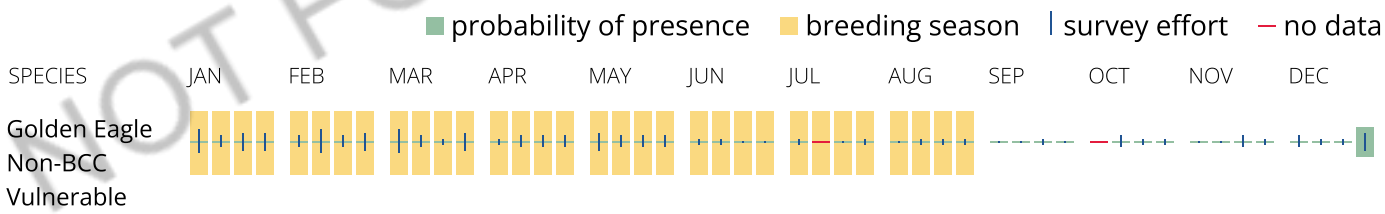
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how

this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Belding's Savannah Sparrow *Passerculus sandwichensis beldingi* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8	Breeds Apr 1 to Aug 15
Bullock's Oriole *Icterus bullockii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 21 to Jul 25
California Gull *Larus californicus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 1 to Jul 31
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Aug 31
Common Yellowthroat *Geothlypis trichas sinuosa* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Nuttall's Woodpecker Picoides nuttallii — Breeds Apr 1 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9410

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Tricolored Blackbird Agelaius tricolor — Breeds Mar 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3910

Western Grebe aechmophorus occidentalis — Breeds Jun 1 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/6743

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

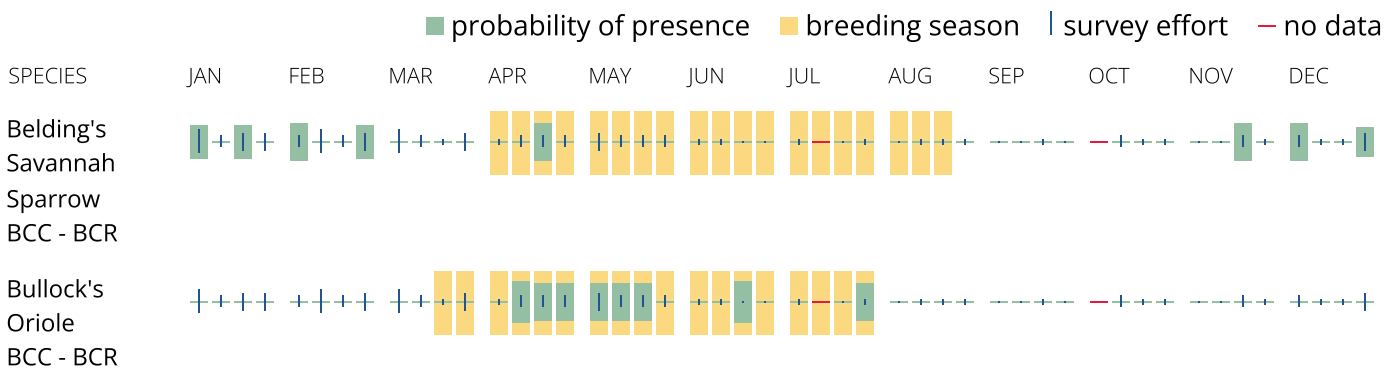
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

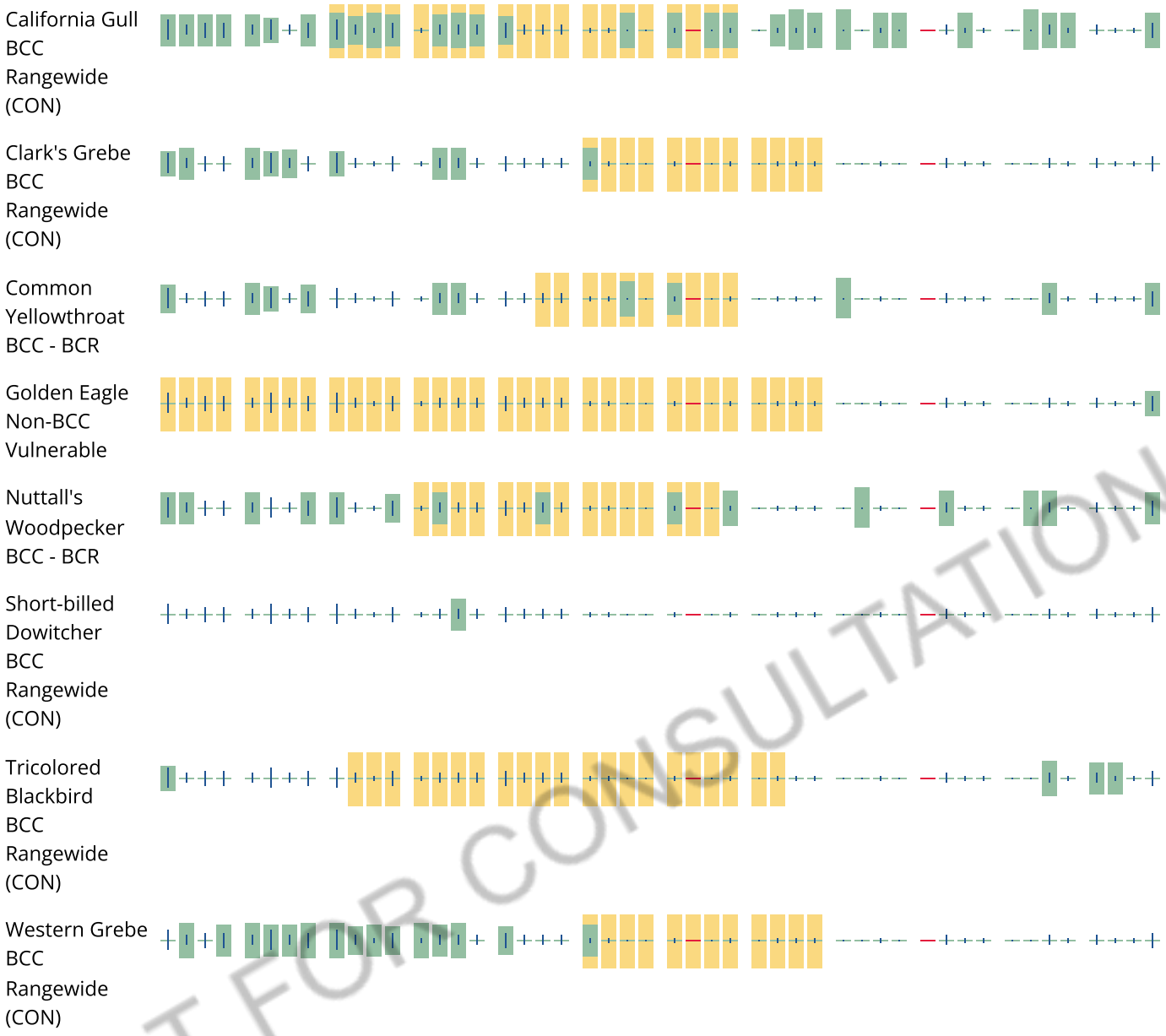
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1A
- PEM1C
- PEM1F

FRESHWATER FORESTED/SHRUB WETLAND

- PSSC
- PSSR

FRESHWATER POND

- PUBFx
- PUSC
- PUBF

LAKE

- L2UBFh

OTHER

- Pf

RIVERINE

- R1UBV
- R4SBC
- R1UBVx
- R2UBHx
- R4SBCx
- R4SBA
- R5UBFx
- R5UBF

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local

government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

National Marine Fisheries Service – West Coast Region – California

December 2016 (Accessed September 19, 2023)

Intersection of USGS 7.5" Quadrangles with NOAA Fisheries ESA Listed Species, Critical Habitat, Essential Fish Habitat, and MMPA Species Data within California

An "X" following a listed feature indicates it may be present. Identified resources may be present throughout the entire quadrangle of only a portion of it.

Quad Name **Rio Vista**
Quad Number **38121-B6**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) -
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) - **X**
SRWR Chinook Salmon ESU (E) - **X**
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) -
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) - **X**
Eulachon (T) -
sDPS Green Sturgeon (T) - **X**

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat -
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat - **X**
SRWR Chinook Salmon Critical Habitat - **X**
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat -
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat - **X**
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat - **X**

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH -
Chinook Salmon EFH - **X**
Groundfish EFH - **X**
Coastal Pelagics EFH -
Highly Migratory Species EFH -

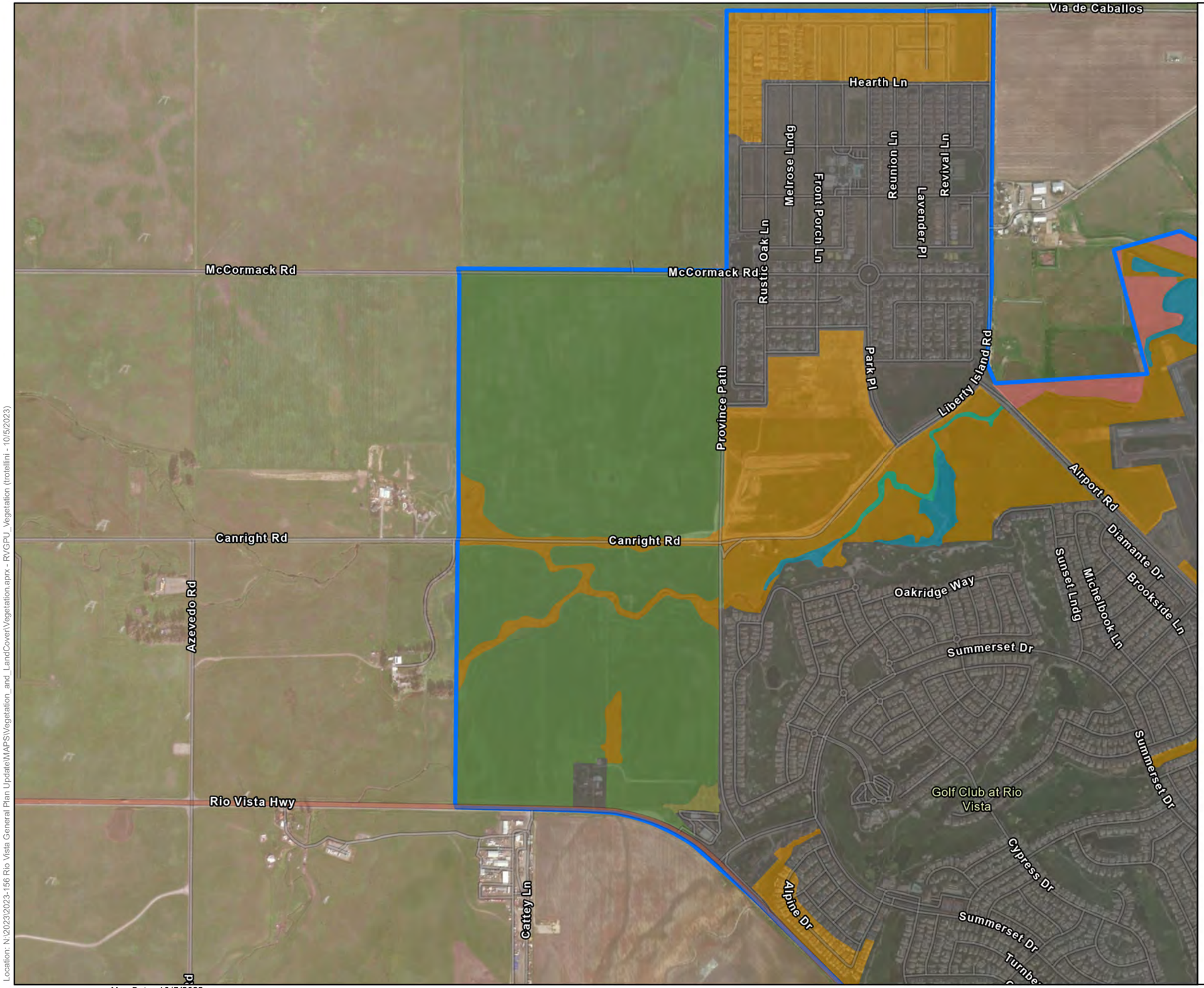
MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds
See list at left and consult the NMFS Long Beach office
562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

APPENDIX B

Vegetation Communities and Land Cover Types (Sheets 1-5)



Map Contents

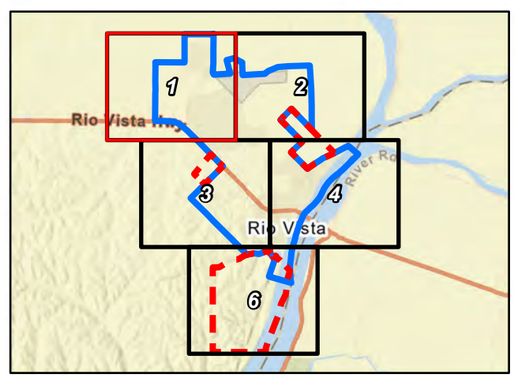
Biological Study Area

- City of Rio Vista

Vegetation Communities and Land Cover Types

- Annual Grassland
- Cropland
- Deciduous Orchard, Evergreen Orchard, Vineyard, Irrigated Row and Field Crops
- Eucalyptus
- Fresh Emergent Wetland
- Fresh Emergent Wetland, Urban
- Urban

Sources: ESRI, Maxar (2022), VegCamp, CDFW



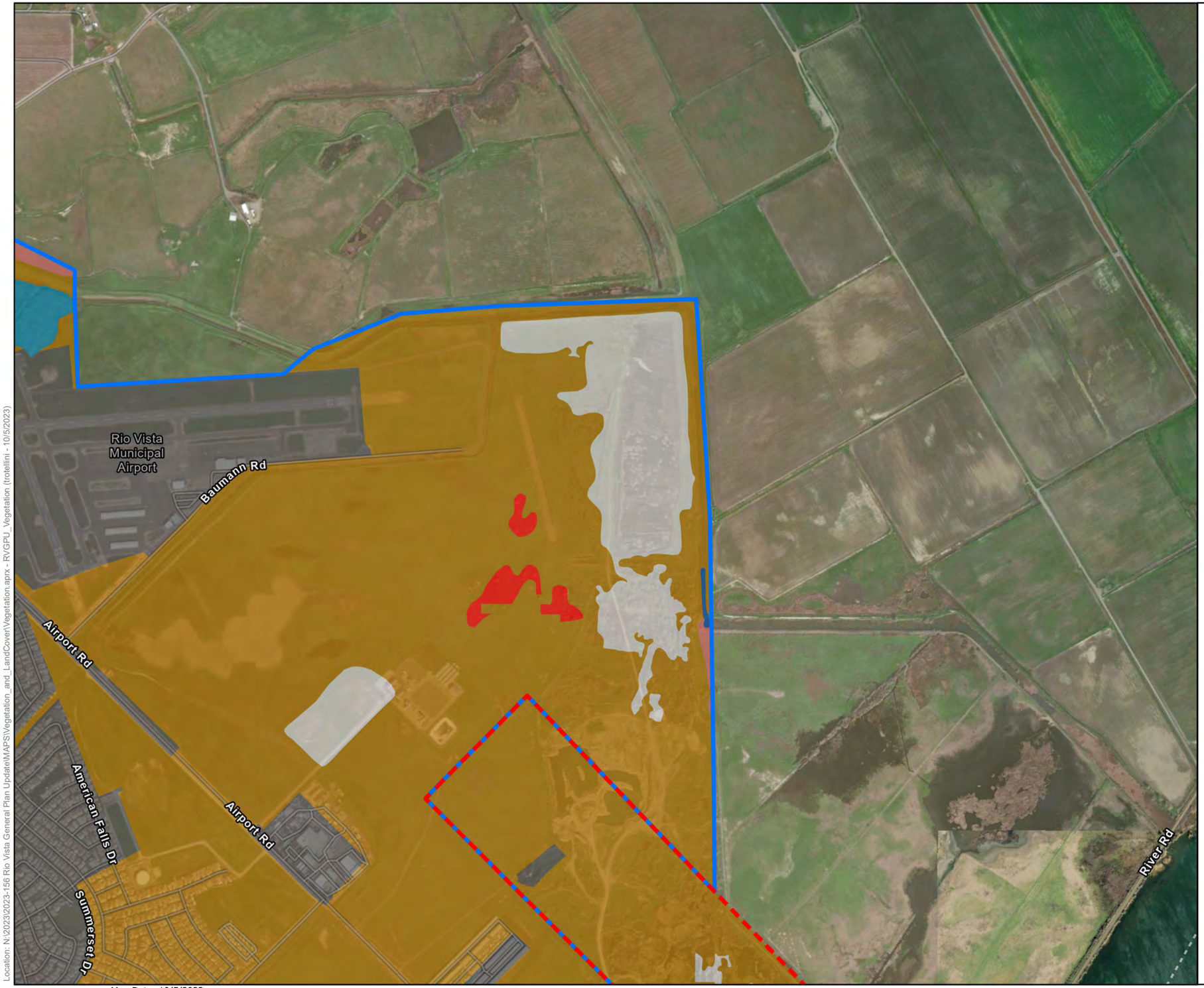
Location: N:\2023\2023-156 Rio Vista General Plan Update\MAPS\Vegetation_and_LandCover\Vegetation.aprx - RVGPU_Vegetation (trotellini - 10/5/2023)

Map Date: 10/5/2023

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 500 1,000

Vegetation Communities and Land Cover Types
Sheet 1 of 5
2023-156 Rio Vista General Plan Update



Map Contents

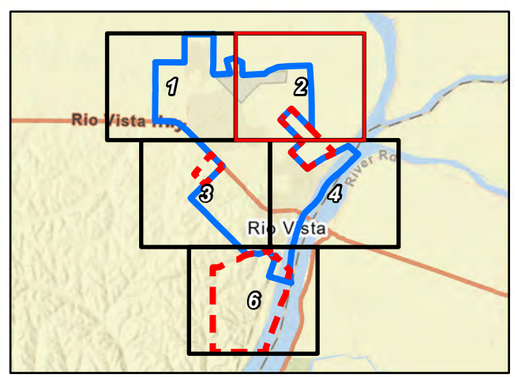
Biological Study Area

- City of Rio Vista
- City of Rio Vista Sphere of Influence

Vegetation Communities and Land Cover Types

- Annual Grassland
- Barren
- Cropland
- Fresh Emergent Wetland
- Pasture
- Riverine
- Urban

Sources: ESRI, Maxar (2022), VegCamp, CDFW



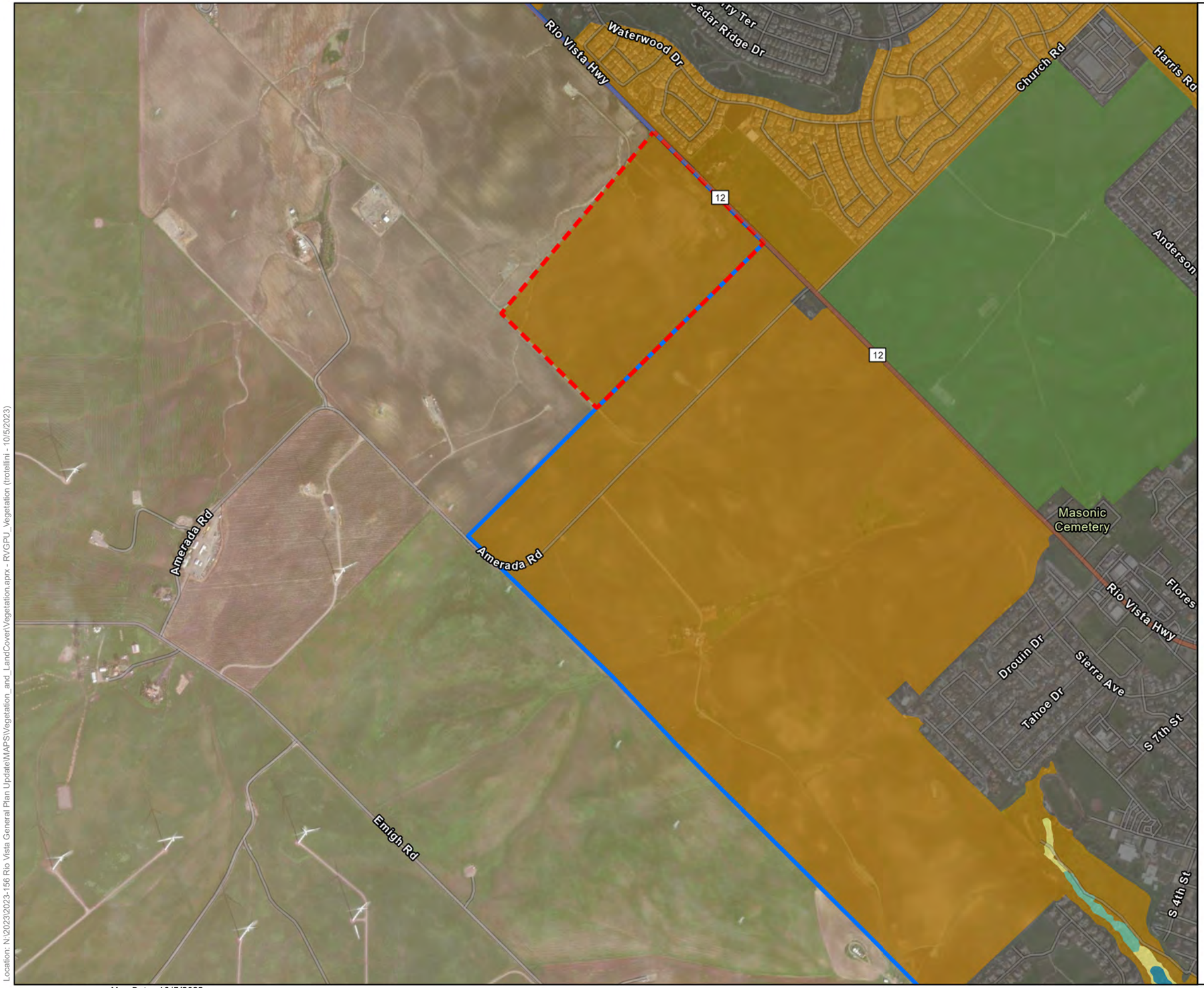
Location: N:\2023\2023-156 Rio Vista General Plan Update\MAPS\Vegetation_and_LandCover\Vegetation.aprx - RVGPU_Vegetation (frotellini - 10/5/2023)

Map Date: 10/5/2023

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 500 1,000

Vegetation Communities and Land Cover Types
Sheet 2 of 5
2023-156 Rio Vista General Plan Update



Map Contents

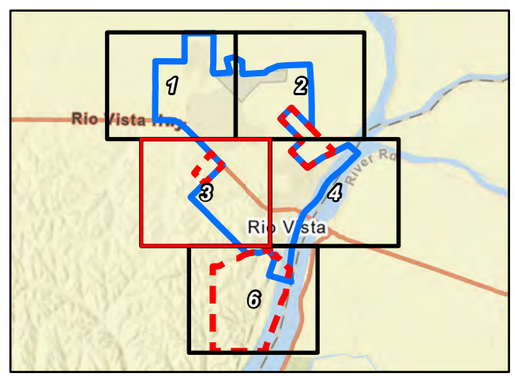
Biological Study Area

- City of Rio Vista
- City of Rio Vista Sphere of Influence

Vegetation Communities and Land Cover Types

- Annual Grassland
- Coastal Scrub, Valley Foothill Riparian
- Deciduous Orchard, Evergreen Orchard, Vineyard, Irrigated Row and Field Crops
- Fresh Emergent Wetland
- Urban
- Valley Foothill Riparian, Desert Riparian

Sources: ESRI, Maxar (2022), VegCamp, CDFW



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Map Date: 10/5/2023

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Scale in Feet
0 500 1,000

Vegetation Communities and Land Cover Types
Sheet 3 of 5
2023-156 Rio Vista General Plan Update

Location: N:\2023\2023-156 Rio Vista General Plan Update\MAPS\Vegetation_and_LandCover\Vegetation.aprx - RVGPU_Vegetation (trotellini - 10/5/2023)

Airport Rd
River Rd
Cliff House Fishing Access
160
Way
Airport Rd
River Rd
Elm Way
Gardiner Way
Virginia Dr
Way
12
84
12
River Rd
Main St
Logan St
N Front St
S 4th St
Rio Vista
S 3rd St
S 2nd St
S Front St
State Highway 12
River Rd

Map Contents

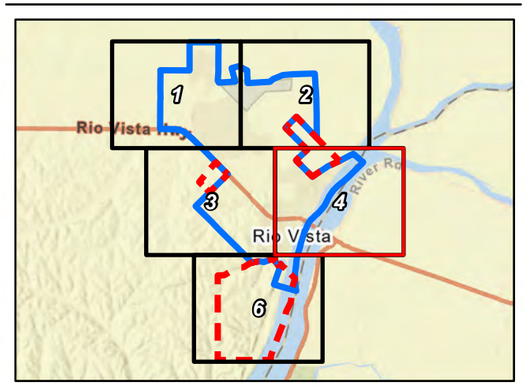
Biological Study Area

- City of Rio Vista
- City of Rio Vista Sphere of Influence

Vegetation Communities and Land Cover Types

- Annual Grassland
- Barren
- Deciduous Orchard, Evergreen Orchard, Vineyard, Irrigated Row and Field Crops
- Eucalyptus
- Fresh Emergent Wetland
- Riverine
- Urban
- Valley Foothill Riparian

Sources: ESRI, Maxar (2022), VegCamp, CDFW



Map Date: 10/5/2023

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Scale in Feet
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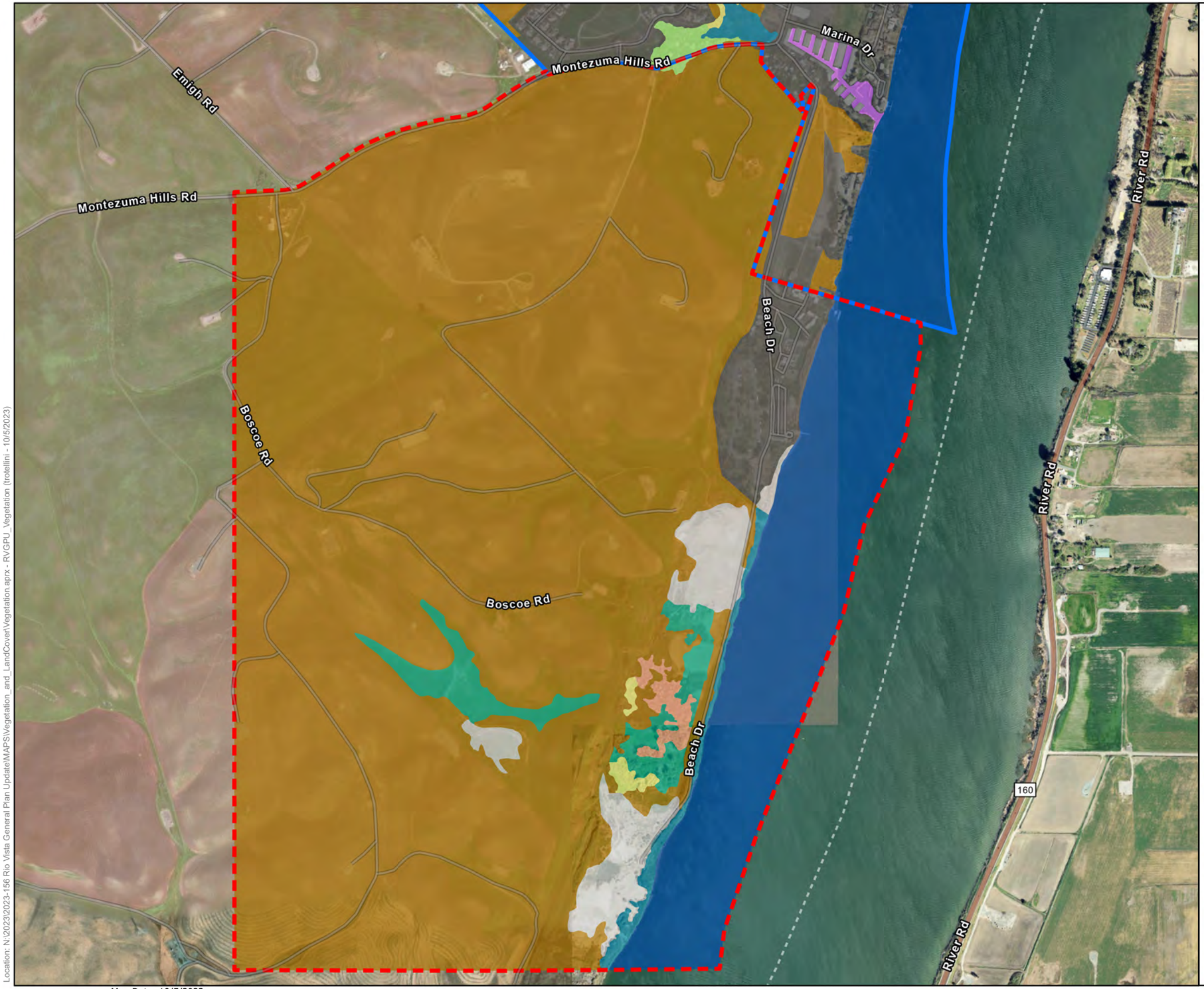
Vegetation Communities and Land Cover Types
Sheet 4 of 5
2023-156 Rio Vista General Plan Update



Map Contents

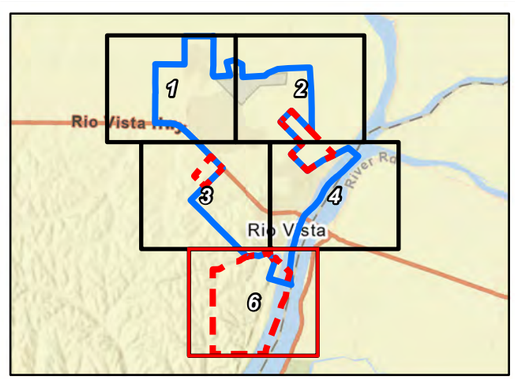
Biological Study Area

- City of Rio Vista
- City of Rio Vista Sphere of Influence

Vegetation Communities and Land Cover Types

- Annual Grassland
- Barren
- Fresh Emergent Wetland
- Fresh Emergent Wetland, Urban
- Lacustrine, Riverine
- Riverine
- Urban
- Valley Foothill Riparian
- Valley Foothill Riparian, Desert Riparian
- Valley Foothill Riparian, Montane Riparian

Sources: ESRI, Maxar (2022), VegCamp, CDFW



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Map Date: 10/5/2023

ECORP Consulting, Inc.
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Scale in Feet
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Vegetation Communities and Land Cover Types
Sheet 5 of 5
2023-156 Rio Vista General Plan Update

Appendix 5.5-1 Cultural Resources Memo

Appendices

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July 9, 2024

City of Rio Vista
One Main Street
Rio Vista, California 94571

RE: Desktop Cultural Resources Records Search for the Rio Vista General Plan Update, City of Rio Vista, Solano County, California

Greetings:

The purpose of this memorandum is to relay information that ECORP Consulting, Inc. gathered to inform the general cultural resources sensitivity of the City of Rio Vista's General Plan Update for the City of Rio Vista and the City's Sphere of Influence. ECORP reviewed current laws and regulations regarding cultural resources that may apply to the City and SOI and available literature, current cultural sources, lists, and databases to gather the requisite information to inform the General Plan Update. This memorandum provides an overview of any cultural resources in the City and SOI, including an overview of the pre-contact (prehistoric) and historic-era cultural setting, a discussion of federal, state, and local regulations pertaining to the management of cultural resources, and any known cultural resources within the City and SOI.

Registered Professional Archaeologist (RPA) Christa Westphal, M.A. conducted or supervised all work completed for this review. Ms. Westphal meets the Secretary of the Interior's Professional Qualification Standards for historic and prehistoric archaeology.

METHODS

ECORP reviewed the current laws and regulations regarding cultural resources at the federal, state, and local levels. This includes cultural resources laws at the federal level in U.S. Government Codes and Code of Federal Regulations (CFR), the California Public Resources Code (PRC), the City of Rio Vista Municipal Code, and any existing guiding policies and implementing actions in the current City 2001 General Plan.

Records Search and Literature Review

The Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS) at Sonoma State University in Rohnert Park, California, completed the records search for the City of Rio Vista and SOI on September 12, 2023 (NWIC Search #23-0317), provided herein as Appendix A. The purpose of the records search is to determine the extent of previous cultural studies conducted within the limits of the City and SOI as part of the City's 2023 General Plan Update, and what previously documented, pre-contact or historic-era archaeological sites, architectural resources, or traditional cultural resources exist within the City and SOI.

In addition to the official records and maps for archaeological sites and surveys in Solano County, ECORP reviewed the following historic references: Built Environment Resource Directory (BERD) for Solano County (California Office of Historic Preservation [OHP] 2023; Historic Property Data File for Solano County (OHP

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2012); the National Register Information System (National Park Service [NPS] 2023; OHP California Historical Landmarks (OHP 2023); California Points of Historical Interest (OHP 1992 and updates); Directory of Properties in the Historical Resources Inventory (1999); Caltrans Local Bridge survey (Caltrans 2019); and *Historic Spots in California* (Kyle 2002).

Other references examined include General Land Office land patent records (Bureau of Land Management 2023). ECORP reviewed maps and aerial photographs of the City and SOI for general information on how the landscape of the City and SOI and the surrounding vicinity historically evolved.

REGULATORY INFORMATION

Federal

National Historic Preservation Act

The federal law that covers cultural resources that could be affected by federal undertakings is the National Historic Preservation Act (NHPA) of 1966, as amended. Section 106 of the NHPA requires that federal agencies take into account the effects of a federal undertaking on properties listed in or eligible for the National Register of Historic Places (NRHP). The agencies must afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on the undertaking. A federal undertaking is defined in 36 CFR 800.16(y) as:

> "A federal undertaking means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license, or approval."

The regulations that stipulate the procedures for complying with Section 106 are in 36 CFR 800. The Section 106 regulations require:

- definition of an Area of Potential Effect (APE);
- identification of cultural resources within the APE;
- evaluation of the identified resources in the APE using NRHP eligibility criteria;
- determination of whether the effects of the undertaking or project on eligible resources will be adverse; and
- agreement on and implementation of efforts to resolve adverse effects, if necessary.

The federal agency must seek comment from the State Historic Preservation Officer (SHPO) and, in some cases, the ACHP, for its determinations of eligibility, effects, and proposed mitigation measures. Section 106 procedures for a specific project can be modified by negotiation of a Memorandum of Agreement or Programmatic Agreement between the federal agency, the SHPO, and, in some cases, the project proponent.

Effects to a cultural resource are potentially adverse if the lead federal agency, with the SHPO's concurrence, determines the resource eligible for the NRHP, making it a Historic Property, and if application of the Criteria of Adverse Effects (36 CFR 800.5[a][2] et seq.) results in the conclusion that the effects will be adverse. The NRHP eligibility criteria, contained in 36 CFR 63, are as follows:

> "The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess aspects of integrity of location, design, setting, materials, workmanship, feeling, association, and
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) that are associated with the lives of persons significant in our past; or
>
> (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) that have yielded, or may be likely to yield, information important in prehistory or history.

In addition, the resource must be at least 50 years old, barring exceptional circumstances (36 CFR 60.4). Resources that are eligible for, or listed on, the NRHP are *historic properties*.

Regulations implementing Section 106 of the NHPA (36 CFR 800.5) require that the federal agency, in consultation with the SHPO, apply the Criteria of Adverse Effect to historic properties within the APE. According to 36 CFR 800.5(a)(1):

> "An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association."

State

California Environmental Quality Act

The California Environmental Quality Act (CEQA) is the state law that applies to a project's impacts on cultural resources. A project is an activity that may cause a direct or indirect physical change in the environment and that is undertaken or funded by a state or local agency, or requires a permit, license, or lease from a state or local agency. CEQA requires that impacts to Historical Resources be identified and, if the impacts will be significant, then apply mitigation measures to reduce the impacts.

A Historical Resource is a resource that 1) is listed in or has been determined eligible for listing in the California Register of Historical Resources (CRHR) by the State Historical Resources Commission, or has been determined historically significant by the CEQA lead agency because it meets the eligibility criteria for the CRHR; 2) is included in a local register of historical resources, as defined in PRC 5020.1(k); or (3),

and has been identified as significant in a historical resources survey, as defined in PRC 5024.1(g) (CCR Title 14, Section 15064.5(a)).

The eligibility criteria for the CRHR are as follows (CCR Title 14, Section 4852(b)):

(1) It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the U.S.;

(2) It is associated with the lives of persons important to local, California, or national history;

(3) It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or

(4) It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

In addition, the resource must retain integrity, which is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association (CCR Title 14, Section 4852(c)). Resources that have been determined eligible for the NRHP are automatically eligible for the CRHR.

Impacts to a Historical Resource, as defined by CEQA (listed in an official historic inventory or survey or eligible for the CRHR), are significant if the resource is demolished or destroyed or if the characteristics that made the resource eligible are materially impaired (CCR Title 14, Section 15064.5(b)). Demolition or alteration of eligible buildings, structures, and features that they would no longer be eligible would result in a significant impact. Whole or partial destruction of eligible archaeological sites would result in a significant impact. In addition to impacts from construction resulting in destruction or physical alteration of an eligible resource, impacts to the integrity of setting (sometimes termed *visual impacts*) of physical features in the Project Area could also result in significant impacts.

Public Resources Code 21073 and 21074

PRCs 21073 and 21074 define a California Native American tribe and tribal cultural resource, respectively. PRC 21073 defines a "California Native American tribe" as a Native American tribe located in California that is on the contact list maintained by the Native American Heritage Commission (NAHC).

Tribal cultural resources (TCRs) are defined in Section 21074 of the California PRC as sites, features, places, cultural landscapes (geographically defined in terms of the size and scope), sacred places, and objects with cultural value to a California Native American tribe that are either included in or determined to be eligible for inclusion in the CRHR, or are included in a local register of historical resources as defined in subdivision (k) of Section 5020.1, or are a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1.

California State Assembly Bill 52

Assembly Bill (AB) 52, Section 1(b)(4) established that a project that may cause a substantial adverse change in the significance of a TCR is a project that may have a significant effect on the environment. A lead agency must begin consultation with California Native American tribes that are traditionally and

culturally affiliated with the geographic area of the proposed project if the tribe requests to be informed of projects prior to the determination of a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report, or if the tribe responds within 30 days of formal notification. Only California Native American tribes, as defined in Section 21073 of the California PRC, are experts in the identification of TCRs and impacts thereto. If the lead agency determines that a tribal cultural resource is present in a project area and mitigation measures are not otherwise specified by the tribe, the lead agency may use the following to avoid impacts to the TCR:

- Avoid damaging effects to any tribal cultural resource;
- Protect the cultural character and integrity of the resource;
- Protect the traditional use of the resource;
- Protect the confidentiality of the resource; and
- Development of permanent conservation easements or other cultural appropriate management plans.

California Senate Bill 18

California Senate Bill (SB) 18 requires any state agency to consult with California Native American tribes for the preservation of or mitigation of impacts to specified Native American places, prior to the adoption or amendment of a city or county general plan. It also specifies that consultation with California Native American tribes is required for the purposes of preserving specified places, features, and objects that are located within a cities or counties jurisdiction.

The goal of SB 18 is to recognize that pre-contact, archaeological, cultural, spiritual, and ceremonial places are essential elements of Native American culture and to establish meaningful government-to-government consultations early in the planning process to identify, consider, and preserve these places. The legislation enables California Native American tribes to manage and act as caretakers of California Native American prehistoric, archaeological, cultural, spiritual, and ceremonial places. Local governments are encouraged to consider the preservation and cultural aspects of these places.

California Senate Bill 35

For projects not subject to CEQA, but that are applying for streamlined ministerial approvals for affordable multifamily housing developments under SB 35, the local agency in charge of granting such approval is responsible for conducting scoping consultation with California Native American Tribes under AB 168 to identify and consider impacts of the project to TCRs.

- Within 30 days after a project proponent submits a notice of intent to apply for a streamlined ministerial approval, the issuing agency must offer California Native American tribes on the NAHC's list an opportunity for "scoping consultation."
- The agency must engage in consultation with any tribe that responds within 30 days of receiving the notice. If TCRs are identified, the agency and tribe will consult on appropriate Conditions of

Approval (COAs) or other type of agreement to mitigate adverse effects to TCRs as a result of the project.

- The project proponent must abide by the terms of any COAs or agreements, which are enforceable by the local agency.
- If agreement is not reached, or if TCRs are present in the project area but no agreements or COAs are established, the project is not eligible for a streamlined ministerial approval under SB 35 and the project proponent may then seek a Conditional Use Permit or discretionary approval under CEQA.

Human Remains

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA) is a federal law passed in 1990 that mandates museums and federal agencies to return certain Native American cultural items—such as human remains, funerary objects, sacred objects, or objects of cultural patrimony—to lineal descendants or culturally affiliated Native American tribes.

State Laws Pertaining to Human Remains

Section 7050.5 of the California Health and Safety Code requires that all work in the vicinity of the find stop until the county coroner determines if the remains are Native American and not the result of a crime scene. If the remains are determined to be Native American, the coroner must notify the NAHC within 24 hours. The NAHC will designate a Most Likely Descendent. Section 5097.94 provides additional guidance if human remains are identified during a project.

PRE-CONTACT AND HISTORIC CONTEXTS

Ethnographic History

Rio Vista is in the western portion of the territory occupied by the Eastern Miwok; however, it is also approximately 8 miles east of the territory occupied by the Patwin. Given that Rio Vista, including the SOI, is located within an area of cultural overlap, this section includes the ethnographic histories for both the Eastern Miwok, specifically the Plains Miwok, and the Patwin.

Ethnographically, the City and SOI is in the western portion of the territory occupied by the Utian-speaking Eastern Miwok. The Eastern Miwok is comprised of three groups: the Plains Miwok, who occupied the area between Freeport and Rio Vista along the Sacramento River, and extends eastward along the Mokelumne and Cosumnes rivers; the Bay Miwok, who occupied the Sacramento-San Joaquin Delta area west to the eastern portion of Contra Costa County; and the Sierra Miwok, who occupied the foothill region south of the Cosumnes River to the upper drainages of the Chowchilla and Merced rivers (Levy 1978).

The City and SOI are located on the margin of the Plains Miwok area, which includes tribelets along the Sacramento, Cosumnes, and Mokelumne rivers. Tribelets were the primary political units and had defined boundaries which excluded resource use by members of other tribelets. Tribelets often consisted of a population of 300 to 500 people. Within each tribelet were permanent settlements, as well as seasonal hunting and gathering campsites (Levy 1978). A total of 28 tribelets made up the Plains Miwok, and according to Bennyhoff (1977), tribelets would sometimes group together to form larger units, such as the Mokelumne, the Cosumnes, and the North Delta groups.

Subsistence for the Plains Miwok centered on hunting, gathering, and fishing within the confines of their tribelet areas. During the fall and early winter, acorns were gathered, stored and processed for consumption year-round. Acorns were the main staple in the Plains Miwok diet, with at least seven different types available; acorns from valley oaks were the most commonly used. In addition to acorns, seeds and roots were also important food items, gathered primarily in the summer (Levy 1978). Hunting of game animals occurred during the winter months with deer, tule elk, and antelope being the most common. These animals were hunted individually and by families and tribelets. Smaller game, such as rabbits and various waterfowl, were also hunted, but were usually taken by trapping. The dominant aquatic resource for the Plains Miwok was salmon, which was caught primarily using nets but also by harpoons during the spring and summer months. Sturgeons were also fished using a line and hook (Levy 1978).

Among the Plains Miwok, the most common dwelling unit consisted of conical shaped thatched structures with grasses, brush, and tules applied to the exterior. Wealthier people, or those of higher status, sometimes lived in earthen semi-subterranean dwellings. At the center of the village were roundhouses or assembly houses. These large gathering structures were usually composed of a 40-foot to 50-foot diameter pit dug down to about 3 to 4 feet below the surface. The structure had a planked roof with a layer of earth on top and resembled a mound (Levy 1978).

The role of tribelet chief was passed down from father to son. The chief was responsible for advising the tribe, managing the natural resources of the area, acting as a delegate between the other tribes, and serving as leaders during times of war. The chief had control of religious and social gatherings, as well as acting as the deciding body in times of arguments and disputes (Aginsky 1947). Under the chief were messengers and speakers. The roles of messengers were to deliver invitations to ceremonies and to announce during ritual ceremonies. The titles of messengers were passed down to males within the families, in the same fashion as the chief. The roles of the speakers were to gather food contributions and ritual paraphernalia for ceremonies, and to make announcements for the chief regarding food preparation and gathering. The speaker's position was an elected one and there were speakers elected for each settlement within the tribelet (Merriam 1966-1967).

The Plains Miwok came into contact with European culture beginning in the late 1700s as a result of increased incursions into the area by the Spanish. Traditional lifeways were drastically altered during the early to mid-1800s as Spanish colonization and proselytization, Mexican land grants, and the American takeover and settlement pushed indigenous peoples into the rugged California interior and reduced their numbers through transport to the missions, introduction of disease, and because of abuse and violence.

According to Levy (1978), the nearest village is the *Anizumne* located approximately 1.5 miles north of the City along the western bank of the Sacramento River. There is a single previously recorded pre-contact isolate within the City limits. A tribelet center may have been at Rio Vista, or on a knoll located approximately 0.5 mile north of Rio Vista near a marsh along the western bank of the Sacramento River.

Patwin

Patwin territory includes both the River Patwin and Hill Patwin and extends from the southern portion of the Sacramento River Valley to the west of the river, from the town of Princeton south to San Pablo and Suisun bays. As a language, Patwin (meaning "people") is part of the Wintu linguistic family which has three main groups: Southern, or Patwin; Central, of Glenn and Tehama counties; and the Northern, of the upper Sacramento, lower Pit, and the upper Trinity drainages (Johnson 1978). The Hill Patwin territory includes the lower hills of the eastern Coast Range Mountain slope (Long, Indian, Bear, Capay, Cortina, and Napa Valley). Between there and the foothills, the grassy plains were largely unsettled, used mainly as a foraging ground by both valley and hill groups (Johnson 1978). Patwin pre-contact population numbers are not precise, but Kroeber (1932) estimates 12,500 for the Wintu, Nomlaki, and Patwin groups. These numbers reflect groups prior to the 1833 malaria epidemic.

Individual and extended families "owned" hunting and gathering grounds, and trespassing was discouraged. Residence and marriage were generally matrilocal, but unrestricted. Politically, the Patwin were divided into "tribelets," made up of a primary village and a series of outlying hamlets, presided over by a more-or-less hereditary chief. Villages typically included family dwellings, acorn granaries, a sweathouse, and a dance house, owned by the chief. The chief had unrestricted power and presided over economic and ceremonial decisions (Johnson 1978).

Subsistence activities centered around fishing and hunting of deer, Tule elk, antelope, bear, ducks, geese, quail, turtles, fish, and other small animals. Hunting of deer often took the form of communal drives, with the actual killing of the deer performed by individuals or groups. Decoys were used for attracting such game as deer and ducks. Nets and holding pens were used for fishing, which was also an important part of normal subsistence activities. Types of fish included sturgeon, salmon, perch, chub, sucker, hardhead, pike, trout, steelhead, and mussels. Although acorns were the staple of the Patwin diet, they also harvested sunflower, alfilaria, clover, bunchgrass, wild oak, and yellow flower, which was parched or dried, then pounded into a meal. Buckeye, pine nuts, juniper berries, manzanita berries, blackberries, wild grapes, *Brodiaea* bulbs, and tule roots were also collected. Each village had its own locations for these food sources, and the village chief was in charge of assigning particular families to each collecting area. Game was prepared by roasting, baking, or drying the meat. Tobacco was collected along the river and inhaled, but not cultivated. Salt was scraped off rocks (in the Cortina region) or by burning grass found in the plains (Johnson 1978).

Patwin houses were built in the form of a dome, using tree branches for the framing, then covered with thatch and earth. House floors were typically dug out and the walls were built up as a mound, with the entrance to the building made through the roof (Powers 1976). As described by Kroeber (1925) and Johnson (1978) the closest village location was Moso, located on the north bank of Cache Creek around the town of Capay. No cultural material has been located or observed to support this claim.

One of the most distinctive aspects of the Patwin culture was the cult system, found throughout northern central California. The main feature of the cult was the occurrence of one or more secret societies whose membership was by strict initiation, each with its own series of dances and rituals (Johnson 1978). Patwin culture is most distinctive in that it possessed three secret societies: the ghost, Hesi, and Kuksu. These involved elaborate ceremonial activities consisting of singing and dancing (Foster 1995). Membership included mostly males, beginning around the ages of eight to 16, but on limited occasions, included high status women (Johnson 1978). Everyday Patwin life centered on the rituals performed within the secret societies. Details involving the ceremonies varied, but most had sacred dances requiring careful preparation, costume, and music. These dances could last several days. Detailed summaries are provided by Kroeber (1932) and Loeb (1933).

Regional History

The first significant European settlement of California began during the Spanish Period (1769 to 1821) when 21 missions and four presidios were established between San Diego and Sonoma. Although located primarily along the coast, the missions dominated much of the California region during this period. The purpose of the missions and presidios was to establish Spanish economic, military, political, and religious control over the Alta California territory. This included the forced conversion of the native population to Spanish colonial society and Catholicism, which often consisted of subjugating Native Americans into a life of servitude to Spanish citizens (Castillo 1978; Cleland 1941). The nearest missions to the Delta region were Mission San Rafael established near San Rafael in 1817 and Mission San Francisco Solano, established in Sonoma in 1823. A mission outpost, or asistencia, was established at the confluence of the Santa Clara River and Castaic Creek in 1804 (Castillo 1978).

The Mexican Period (1821 to 1848) began with the success of the Mexican Revolution in 1821, but changes to the mission system were slow to follow. When secularization of the missions occurred in the 1830s, the vast land holdings of the missions in California were divided into large land grants called *ranchos*. The Mexican government granted ranchos throughout California to Spanish and Hispanic soldiers and settlers (Castillo 1978).

In 1848, the Treaty of Guadalupe Hidalgo ended the Mexican-American War and marked the beginning of the American Period (1848 to present). The discovery of gold the same year initiated the 1849 California Gold Rush, bringing thousands of miners and settlers to California, most of whom settled in the north. For those settlers who chose to come to southern California, much of their economic prosperity was fueled by cattle ranching rather than by gold. This prosperity, however, came to a halt in the 1860s as a result of severe floods and droughts, which put many ranchers into bankruptcy (Castillo 1978; Cleland 1941).

The earliest recorded settlement in the area was established by General John Bidwell in 1844, after petitioning the Mexican Government for rights to the Ulpinos Grant. After the Mexican Government lost its claim to California, a patent was issued to Bidwell in 1866 by the United States Government for 17,726 acres. By the time the patent was issued, Bidwell had already sold portions of the land grant to various parties who then entered a suit for partition leading to clear ownership of titles.

History of Rio Vista

In 1855, Colonel Nathan H. Davis purchased six lots of the Los Ulpinos Land Grant from John Bidwell with the intent to subdivide the lots in part for a town. In 1857, Colonel Davis surveyed a plat on Lot No. 3 for the new settlement. It was located approximately one mile south of the confluence of Cache Slough and the Sacramento River, near three branches of the river. He named the settlement "Brazos del Rio," (Arms of the River) given its location to multiple Sacramento River tributaries. Over the next five years, several buildings were erected; the first being Colonel Davis's home. In 1858, a post office was established with the caveat that the settlement's name be changed. The founding settlers agreed upon "Vista del Rio;" however, this was only used for a short period of time. The wife of postmaster Charles Kirkpatrick changed the name once more and chose "Rio Vista," which translates to River View, and the settlement began to thrive. That same year, a daily steamship service was established between Sacramento and San Francisco, and Rio Vista was the main port of call between the two cities. In December 1861, a heavy winter storm destroyed and swept away several of the smaller buildings. The worst of the storm arrived on January 9, 1862, which brought a surplus of rain and wind that caused the river and tributaries to rise above the banks and flooded the town (Pezzaglia 2023). The entire town was completely under water.

In March 1862, four of the original inhabitants, Samuel R. Perry, John M. Sidwell, William K. Squires, and Issac Dunham visited Joseph Bruning, who owned additional plots of land in the Montezuma Hills to the west and southwest of the City of Rio Vista and within the Los Ulpinos Land Grant, to obtain land on which to re-establish their town (Pezzaglia 2023). This area was on higher ground and located approximately 1-mile south of the original settlement. Mr. Bruning, along with T. J. McWorthy, who owned land adjacent to Mr. Bruning's, provided, surveyed, and recorded the town plat for the "New Rio Vista." The dividing line between the two properties was selected to be Rio Vista's Main Street. Rio Vista became a prosperous town and one of the largest providers of fresh fish and canned salmon that were shipped to San Francisco and beyond (Rio Vista Chamber of Commerce 2023).

Water was supplied to the town from the Sacramento River and was lifted by steam pumps to water tanks near the town center. The reclamation of surrounding swampland has also led to the increase of agricultural production in the vicinity (Palmer 1879). The dark soils of the Montezuma Hills were first used for grazing but were later used for grain production, which continues today. By the 1870s, three warehouses had been constructed to store the high yield of grain before being distributed to markets via steamships (Rio Vista Chamber of Commerce 2023). In the same decade, the clamshell dredge was developed which would take mud from the bottom of waterways called "slickens" and was deposited on shore to construct levees. The levees were constructed to protect the Delta from inundation and to provide consistent irrigation to agricultural fields (California Delta 2023). In 1894 Rio Vista was incorporated as a city.

In the mid-1930s, natural gas was discovered in the Montezuma Hills region, making the area the largest gas field in northern California. Presently, several shut-in gas wells, some of which overlie gas well sites from the 1930s, are spread across the City and SOI within fenced perimeters. The main sources of employment and commerce for the city are agriculture, manufacturing, and tourism activities. The town has also become part of the commuting belt for the surrounding cities (Rio Vista Chamber of Commerce 2006).

RECORDS SEARCH RESULTS

The records search consisted of a review of previous research and literature, records on file with the NWIC for previously recorded resources, and aerial photographs and maps of the vicinity.

Forty previous cultural resource investigations have been conducted within the City and SOI. The records search also determined that 41 previously recorded cultural resources are within the City and SOI. Of the 41 cultural resources, one is a pre-contact obsidian core isolate likely associated with Native American habitation in the vicinity of the SOI. The remaining 40 previously recorded cultural resources are historic-era resources that are associated with 20th century residences, businesses, farming, ranching, and forms of transportation such as roadways, waterways, and wharfs and barges. Appendix A lists the resources located within the SOI.

Records

The OHP's BERD for Solano County (dated April 5, 2018 plus updates) lists 45 built environment resources in Rio Vista. Of the 45 listed built environment resources, 29 of them are buildings associated with the Rio Vista Army Reserve Center. Each of the 29 Army Reserve buildings were evaluated and determined not eligible for the NRHP through the Section 106 process; however, they were not evaluated for the CRHR or local listing.

The National Register Information System (NPS 2023) failed to indicate any listed resources in the SOI or City. The nearest listed resource is the Delta King, a paddlewheel riverboat (78000797). The Delta King was originally built in Glasgow, Scotland and assembled in Stockton, California. It was christened in May 1927 (Delta 2017). At the time of the National Register submittal in 1978, the Delta King was anchored approximately 3 miles north of Rio Vista along California State Highway 84 near the intersection of River and Airport roads; however, the Delta King has been permanently moored in Old Sacramento and has been operating as a hotel, bar and restaurant, and entertainment venue since 1989.

The OHP's register of California Historical Landmarks did not list any landmarks in the SOI or the City of Rio Vista. The nearest listed landmark is No. 779, Rockville Stone Chapel, located approximately 26 miles west of Rio Vista.

The California Inventory of Historic Resources (1976) lists 30 sites in Solano County; however, there are no sites listed in Rio Vista.

A review of the Solano County local historical registry did not reveal any resources in the City or SOI.

Map and Aerial Photograph Review

The review of aerial photographs and maps of the SOI provides information on the past land uses of the property and potential for buried archaeological sites. The following is a summary of the review of maps and aerial photographs.

- The 1910 U.S. Geological Survey (USGS) Rio Vista, California topographic quadrangle map (1:31,680 scale) depicts a large island in the Sacramento River as "Wood Island" east of Rio Vista.

Several structures are depicted on the island. The city grid of Rio Vista is labeled as such on the western side of the Sacramento River. The map also depicts a dirt road that contours the western bank of the river. The southern side of Rio Vista is depicted as gently rolling hills adjacent to swampland along the river at the base of the hills. Two map features, "Pier No. 6" and "Benchmark number 29" are labeled as such south of the city grid. Benchmark 23 is labeled as such west of the City grid. Several roads such as present-day River Road and Montezuma Hills Road, and internal city roads are depicted on the map.

- A 1934 aerial photograph shows the City and SOI on the western side of the Sacramento River. A paved road that leads to an east-west oriented bridge is visible crossing the river providing access to and from the western bank, where Rio Vista is situated, to the eastern bank, where numerous agricultural fields are shown. This road corresponds to present-day Highway 12. The city grid is visible near the river on the southern side of present-day Highway 12. The northern side of present-day Highway 12 consists mostly of agricultural fields and an industrial complex composed of several rectangular buildings. A north-south paved road parallels the river. This road corresponds to present-day River Road/Highway 84. The aerial photograph no longer shows the island within the river.
- The 1936 USGS Rio Vista, California topographic quadrangle map does not depict any notable changes compared to the 1910 topographic map.
- A 1937 aerial photograph does not show any notable changes compared to the 1934 aerial photograph.
- The 1947 USGS Sacramento, California topographic quadrangle map (1:250,000 scale) depicts State Highway 12 labeled as such. The map also depicts a single-track railroad along the western bank of the Sacramento River. The track terminates in Rio Vista; however, the city grid is not depicted on this topographic map compared to the 1936 topographic map.
- The 1953 USGS Rio Vista, California topographic map (1:24,000 scale) depicts a significant amount of development compared to the 1947 topographic map. The map depicts a two-lane road with a "drawbridge" crossing the Sacramento River. This drawbridge is the same one shown on the 1934 aerial. An area labeled "Military Res" is shown south of the city grid and west of the Sacramento River. A tide gage and two USGS benchmarks are depicted within the military base. Several structures are depicted, north of Highway 12; most of the structures are shown in the 1934 aerial photograph. Other newly mapped features in the vicinity of Rio Vista, include an airport landing strip, multiple gas wells, multiple water tanks, a windmill, a pumping station, two cemeteries, a high school, several unimproved roads, and two tributaries that converge on the northern side of the military base and flow into the Sacramento River.
- The 1957 aerial photograph does not show any major developmental changes compared to the 1955 topographic map.

- A 1959 aerial photograph shows the construction of roadways for development on the northern side of Highway 12. The photograph does not show any changes to the military base; however, several ships are moored in the river adjacent to the base.
- The 1964 and 1965 aerial photographs show an increase in residential development to the southeastern, northeastern, and northwestern perimeters of the city. The marina, adjacent to the military base, appears to have been widened for the construction of several covered boat docks. Additionally, the drawbridge has been realigned straight across and now contains the addition of two towers.
- The 1974 aerial photograph shows further residential and structure development in the central area of the city as well as to the northwest.
- The 1984, 1987, and 1993 aerial photographs appear relatively unchanged compared to the 1974 aerial photograph.
- The 2005 aerial photograph shows additional residential development in the south-southwest of the city adjacent to the northern side of Montezuma Hills Road.
- The 2012 USGS Rio Vista, California topographic quadrangle map (1:24,000 scale) shows further road development to the north and west of the central area of Rio Vista. The marina appears relatively unchanged.

The records search indicated that 41 previously recorded cultural resources are located within the City and SOI, including buildings, structures, and historic and pre-contact archaeological resources. There are buildings and structures in the City of Rio Vista that still retain elements from the mid-1800s, when the city was first inhabited. The 29 Rio Vista Army Reserve Center buildings were determined ineligible for the NRHP; however, they were not evaluated against the CRHR or any local registry, therefore, ECORP recommends evaluating the buildings for potential listing on the CRHR or any local registry. There is the potential for previously unknown surficial and/or buried pre-contact cultural resources located near the waterway of the Sacramento River. Careful consideration of these resources should be included in future development of the City and SOI.

If you have any questions or would like to discuss, please contact me at cwestphal@ecorpconsulting.com or by phone at 916-782-9100.

Sincerely,

Christa Westphal, RPA
Principal Investigator/Staff Archaeologist

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LIST OF APPENDICES

APPENDIX A

Records Search Results

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM

ALAMEDA
COLUSA
CONTRA COSTA
DEL NORTE
HUMBOLDT
LAKE
MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO
SAN FRANCISCO
SAN MATEO
SANTA CLATA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Sonoma State University
1400 Valley House Drive, Suite 210
Rohnert Park, California 94928-3609
Tel: 707.588.8455
nwic@sonoma.edu
http://nwic.sonoma.edu

9/12/2023 NWIC File No.: 23-0317

Sonia Sifuentes
ECORP Consulting, Inc.
2525 Warren Drive
Rocklin, CA 95677

Re: 2023-156 Rio Vista General Plan Update

The Northwest Information Center received your record search request for the project area referenced above, located on the Rio Vista USGS 7.5' quad(s). The following reflects the results of the records search for the project area and NO radius:

Resources within project area:	[41] Please see attached list, page 3
Resources within *distance* radius:	Not requested
Reports within project area:	[40] Please see attached list, page 4
Reports within *distance* radius:	Not requested

Resource Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Digital Database Records:	☐ enclosed	☒ not requested	☐ nothing listed
Report Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Report Database Printout (details):	☐ enclosed	☒ not requested	☐ nothing listed
Report Digital Database Records:	☐ enclosed	☒ not requested	☐ nothing listed
Resource Record Copies:	☐ enclosed	☒ not requested	☐ nothing listed
Report Copies:	☐ enclosed	☒ not requested	☐ nothing listed
OHP Built Environment Resources Directory:	☒ enclosed	☐ not requested	☐ nothing listed
Archaeological Determinations of Eligibility:	☐ enclosed	☐ not requested	☒ nothing listed
CA Inventory of Historic Resources (1976):	☒ enclosed	☐ not requested	☐ nothing listed
GLO and/or Rancho Plat Maps:	☐ enclosed	☒ not requested	☐ nothing listed
Historical Maps:	☐ enclosed	☒ not requested	☐ nothing listed

Local Inventories:	☐ enclosed	☒ not requested	☐ nothing listed
Caltrans Bridge Survey:	☐ enclosed	☒ not requested	☐ nothing listed
Ethnographic Information:	☐ enclosed	☒ not requested	☐ nothing listed
Historical Literature:	☐ enclosed	☒ not requested	☐ nothing listed
Shipwreck Inventory:	☐ enclosed	☒ not requested	☐ nothing listed

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Requests made after initial invoicing will result in the preparation of a separate invoice.

Thank you for using the California Historical Resources Information System (CHRIS).

Sincerely,

Annette Neal

Researcher

PrimCo	PrimNo
P-48-	000577
P-48-	000578
P-48-	000795
P-48-	000796
P-48-	000797
P-48-	000798
P-48-	000799
P-48-	000800
P-48-	000801
P-48-	000802
P-48-	000803
P-48-	000804
P-48-	000805
P-48-	000806
P-48-	000834
P-48-	000911
P-48-	000916
P-48-	000917
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P-48-	000946
P-48-	000948
P-48-	000951
P-48-	000952
P-48-	000953
P-48-	001027
P-48-	002017
P-48-	002018
P-48-	002019
P-48-	002020
48	002022

DocCo	DocNo
S-	000595
S-	000848
S-	005055
S-	005141
S-	005208
S-	007448
S-	009462
S-	009795
S-	011115
S-	011246
S-	012790
S-	015793
S-	016744
S-	016745
S-	017835
S-	027048
S-	027856
S-	027857
S-	029351
S-	030204
S-	030284
S-	030907
S-	031570
S-	032596
S-	033012
S-	033032
S-	033587
S-	033600
S-	033878
S-	035361
S-	035661
S-	038066
S-	038635
S-	038637
S-	042689
S-	047442
S-	047932
S-	048768
S-	049780
S-	054999

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-000595		1974	R.F. King	A Report on the Status of Generally Available Data Regarding Archaeological, Ethnographic, and Historical Resources Within a Five Mile Wide Corridor Through Portions of Colusa, Yolo, Solano, and Contra Costa Counties, California		07-000091, 48-000009, 48-000010, 48-000011, 48-000012, 48-000013, 48-000018, 48-000020, 57-000130, 57-000131
S-000848	Agency Nbr - Contract AA550-CT6-52	1976	David A. Fredrickson	A Summary of Knowledge of the Central and Northern California Coastal Zone and Offshore Areas, Vol. III, Socioeconomic Conditions, Chapter 7: Historical & Archaeological Resources	The Anthropology Laboratory, Sonoma State College; Winzler & Kelly Consulting Engineers	
S-005055	Voided - ASC #52	1976	Jeffry S. Seldomridge and Connie Smith-Madsen	Cultural Resources Reconnaissance: Sacramento River Deep Water Ship Channel (Collinsville to Sacramento)	California State University, Sacramento	57-000045
S-005141	Voided - ASC #555	1980	Michael F. Rondeau	A Cultural Resource Survey of the Proposed Drouin Park Unit Number Seven, Solano County, California.	Archaeological Study Center, California State University, Sacramento	
S-005208	Agency Nbr - DACW05-77-P-1466; Voided - ASC #89	1977	Gregory Greenway and William E. Soule	Sacramento-San Joaquin Delta Investigations: Cultural Resources Reconnaissance		07-000021, 07-000022, 07-000023, 07-000025, 07-000036, 07-000037, 07-000039, 07-000044, 07-000069, 07-000070, 07-000072, 07-000076, 07-000078, 07-000080, 07-000081, 07-000082, 07-000083, 07-000085, 07-000086, 07-000087, 07-000089, 07-000090, 07-000091, 07-000092, 07-000179, 07-000711, 48-000009, 48-000010, 48-000011, 48-000012, 48-000013, 48-000041, 48-000042, 57-000021, 57-000029, 57-000030, 57-000032, 57-000033, 57-000034, 57-000045, 57-000047, 57-000048, 57-000049, 57-000050, 57-000051, 57-000052, 57-000053, 57-000054, 57-000055, 57-000056, 57-000063, 57-000065, 57-000066, 57-000092, 57-000107, 57-000146
S-007448	Agency Nbr - Contract No. DACW05-85-P-0572; Voided - S-7295	1985	Roger H. Werner	Sacramento Deep Water Ship Channel, Cultural Resources Survey and Literature Review, Yolo and Solano Counties, California.	Archaeological Services	57-000045

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-007448a		1985	Roger H. Werner	Intensive Cultural Resource Survey and Literature Review for the Sacramento Deep Water Ship Channel Project, Yolo and Solano County, California	Archaeological Services	
S-009462		1977	Teresa Ann Miller	Identification and Recording of Prehistoric Petroglyphs in Marin and Related Bay Area Counties	San Francisco State University	07-000323, 21-000087, 21-000376, 21-000378, 21-000379, 21-000380, 21-000381, 21-000382, 21-000383, 21-000384, 21-000386, 21-000387, 21-000388, 21-000389, 21-000390, 21-000391, 21-000392, 21-000393, 21-000394, 21-000395, 21-000396, 21-000397, 21-000398, 21-000399, 21-000400, 21-000401, 21-000402, 21-000546, 23-000434, 23-000789, 23-000790, 49-000629, 49-000785, 49-000787
S-009795		1986	Thomas Lynn Jackson	Late Prehistoric Obsidian Exchange in Central California	Stanford University	06-000025, 07-000047, 07-000080, 07-000188, 07-000440, 17-000320, 17-000601, 21-000163, 21-000218, 21-000235, 21-000242, 21-000283, 21-000290, 21-000368, 21-000423, 21-000628, 23-001589, 23-001659, 23-003068, 23-003119, 28-000015, 28-000068, 28-000116, 28-000199, 28-000205, 28-000828, 49-000135, 49-000360, 49-000423, 49-000424, 49-000518, 49-000521, 49-000533, 49-000536, 49-000558, 49-000801, 57-000114
S-011115		1989	Paul D. Bouey	An archaeological survey of the proposed Del Rio Hills golf course and residential development adjacent to the City of Rio Vista (letter report)	Far Western Anthropological Research Group, Inc.	
S-011246		1989	L. Kyle Napton	Cultural Resource Investigation of the Proposed McCormack Annexation to the City of Rio Vista (320 Acres), Solano County, California	Institute for Archaeological Research, California State University, Stanislaus	
S-012790		1991	Kenneth N. Owens	Sacramento-San Joaquin Delta, California: Historical Resources Overview	Public History Research Institute, California State University, Sacramento	07-000910, 07-000918

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-015793		1992	Miley Paul Holman	Archaeological Archival Research and Field Inspection of the Proposed Rio Vista Marina Study Area, Rio Vista, Solano County, California (letter report)	Holman & Associates	
S-016744	Caltrans - 10-110-45950K	1993	Virginia Lee and Susan E. Page	Negative Archaeological Survey Report, proposed work on Highway 12, 10-Sol-12 P.M. 20.6/22.7 10-110-45950K	California Department of Transportation	
S-016745	Caltrans - 110-267301	1991	Susan E. Page	Archaeological Survey Report, proposed removal of maintenance station buildings and construction of a new facility, 10-Sol-12 P.M. 26.10 110-267301	Caltrans	
S-017835		1975	Judy Myers Suchey	Biological Distance of Prehistoric Central California Populations Derived from Non-Metric Traits of the Cranium	University of California, Riverside	01-000086, 01-000104, 01-000105, 06-000025, 07-000080, 07-000081, 07-000083, 07-000087, 21-000017, 21-000193, 21-000242, 21-000252, 48-000010, 57-000145
S-027048		2003	Deborah Sterling and John Holson	Archaeological Survey and Literature Review for the Calpine Natural Gas Company, City of Rio Vista Gas Gathering System, Solano County, California	Pacific Legacy, Inc.	
S-027856		2003	Ric Windmiller	Archaeological Resource Inventory & Evaluation, Riverwalk, Rio Vista, Solano County, California.		48-000577, 48-000578
S-027857		2003	Ric Windmiller	Archaeological Resource Inventory & Evaluation, Riverwalk East, Rio Vista, Solano County, California		48-000577
S-029351	OHP PRN - USA940325A	1997	Rand F. Herbert and Davis S. Byrd	Evaluation of National Register Eligibility, Rio Vista Army Reserve Center, Rio Vista, Solano County, California	JRP Historical Consulting Services	
S-029351a		1997	Cherilyn Widell, Paul R. McGuff, Cynthia Howse, and Joseph Murphey	USA940325A: National Register Determination of Eligibility for Government Buildings at Rio Vista Army Reserve Center, Rio Vista, Solano County, CA	California Office of Historic Preservation; U.S. Department of the Army	
S-030204		2003	Donna L. Gillette	The Distribution and Antiquity of the California Pecked Curvilinear Nucleated (PCN) Rock Art Tradition.	University of California, Berkeley	01-002148, 21-000384, 23-000810
S-030284		2005	Kevin M. Bartoy	Archaeological Survey for the Proposed Rio Vista Calpine Yard Natural Gas Well Project, Solano County, California (letter report)	Pacific Legacy, Inc.	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-030907	Caltrans - EA 43-984433	2004	Christopher McMorris	Caltrans Historic Bridge Inventory Update: Metal Truss, Moveable, and Steel Arch Bridges, Contract: 43A0086, Task Order: 01, EA: 43-984433, Volume I: Report and Figures	JRP Historical Consulting	01-003158, 01-003190, 01-010835, 01-011433, 23-004262, 27-001805, 28-001020, 35-000383, 38-001339, 38-002455, 38-004878, 49-002862, 49-002864, 49-002865, 49-002866, 49-002867, 49-002870, 49-004522
S-031570		2005	Miley Paul Holman	A Cultural Resource Study of the Brann Ranch, Rio Vista, Solano County, California	Holman & Associates	
S-032596	Caltrans - EA No. 447600; Other - Contract #04A2098	2006	Randall Milliken, Jerome King, and Patricia Mikkelsen	The Central California Ethnographic Community Distribution Model, Version 2.0, with Special Attention to the San Francisco Bay Area, Cultural Resources Inventory of Caltrans District 4 Rural Conventional Highways	Consulting in the Past; Far Western Anthropological Research Group, Inc.	
S-033012		2006	Colin I. Busby	Archaeological Resources Assessment - Literature Review/Field Inventory, Shea Homes McGraugh Property, Rio Vista, Solano County (letter report)	Basin Research Associates, Inc.	
S-033032		1999	Deborah McLean	Results and Recommendations for Cultural Resource Assessment of the Connector Road Project in the County of Solano, California (letter report)	LSA Associates, Inc.	
S-033587		2007	Kari Jones	Cultural Resources Assessment of Rosetta's Proposed Thor Shea Well Site, Rio Vista, Solano County, California (letter report)	Pacific Legacy, Inc.	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-033600	Agency Nbr - Contract No. 04A2098; Caltrans - EA No. 447600	2007	Jack Meyer and Jeff Rosenthal	Geoarchaeological Overview of the Nine Bay Area Counties in Caltrans District 4	Far Western Anthropological Research Group, Inc.	01-000001, 01-000002, 01-000014, 01-000063, 01-000064, 01-000067, 01-000080, 01-000124, 01-000139, 01-000140, 01-001795, 01-002110, 01-002160, 01-002162, 01-002245, 07-000019, 07-000024, 07-000037, 07-000047, 07-000075, 07-000079, 07-000088, 07-000089, 07-000108, 07-000182, 07-000185, 07-000186, 07-000217, 07-000239, 07-000401, 07-000721, 21-000010, 21-000048, 21-002615, 28-000009, 28-000028, 28-000301, 28-000967, 38-000006, 38-000028, 38-000101, 38-000102, 38-000119, 41-000080, 41-000284, 43-000016, 43-000189, 43-000296, 43-000308, 43-000310, 43-000423, 43-000424, 43-000448, 43-000451, 43-000485, 43-000561, 43-000604, 43-000608, 43-000614, 43-000623, 43-001015, 43-001058, 43-001080, 43-001163, 43-001194, 43-001576, 48-000007, 48-000157
S-033878		2007		Cultural Resources Inventory of the Del Rio Hills Project Area, Solano County, California, Project 2005-124	ECORP Consulting, Inc.	48-000795, 48-000796, 48-000797, 48-000798, 48-000799, 48-000800, 48-000801, 48-000802, 48-000803, 48-000804, 48-000805, 48-000806
S-035361	Caltrans - EA 2A6200	2008	Andrew Hope	Historical Resources Evaluation Report for the State Route 12 Improvements in Solano County, California; 04-SOL-12, PM 20.6/23.7, EA 2A6200	Caltrans	48-000834, 48-000835, 48-000836
S-035661	Caltrans - EA 2A6200	2008	Maureen Zogg	Archaeological Survey Report for the SR-12 Shoulder Widening Project in Solano County, California; 04-Sol-12, PM 20.6/23.7, EA: 2A6200	Caltrans	
S-038066		2011	Sean Michael Jensen	Archaeological Inventory Survey, Rio Vista Flood Wall Project, c. 1,600' Linear Corridor, Solano County, California	Genesis Society	

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S-038635	Other - Contract #W91238-07-D-0015; Other - ICF International Project No. 00627.08	2010	Andrew D.W. Lydecker	Cultural Resources Remote Sensing Survey and Diver Investigations at Selected Target Locations, Sacramento River Bank Protection Project (SRBPP), Sacramento River and Tributaries	Panamerican Consultants,Inc.	48-000911, 48-000912, 48-000913, 48-000914, 48-000915, 48-000916, 48-000917, 48-000918, 48-000935, 48-000936, 48-000937, 48-000938, 48-000939, 48-000940, 48-000941, 48-000942, 48-000943, 48-000944, 48-000945, 48-000946, 48-000947, 48-000948, 48-000950, 48-000951, 48-000952, 48-000953, 48-000954, 57-000651, 57-000653, 57-000654, 57-000655, 57-000656, 57-000657, 57-000658, 57-000659, 57-000660, 57-000661, 57-000662, 57-000666
S-038637		2012	Christian Havelaar, Melissa Cascella, Patricia Ambacher, and Gabriel Roark	Historic Properties Treatment Plan, Sacramento River Bank Protection Project	ICF International	48-000941, 48-000942, 48-000943, 48-000944, 48-000945, 48-000946, 48-000947, 48-000948, 48-000950, 48-000951, 48-000952, 48-000953, 57-000666
S-042689	Other - FHWA081009A	2008	Andrew Hope	Historic Property Survey Report: 04-Sol-12, PM 20.6 / 23.7 EA 2A6200	Caltrans	48-000834, 48-000835, 48-000836
S-042689a		2008	Andrew Hope	Historical Resources Evaluation Report for the State Route 12 Improvements in Solano County, California; 04-Sol-12, PM 20.6/23.7, EA 2A6200	Caltrans	
S-042689b		2008	Maureen Zogg	Archaeological Survey Report for the SR-12 Shoulder Widening Project in Solano County, California; 04-Sol-12 PM 20.6/23.7, EA: 2A6200	Caltrans	
S-047442	Caltrans - EA 0G0500	2016	Andrew Ugan and Adrian R. Whitaker	Archaeological Survey Report, State Route 12 (SR 12)/Church Road Intersection Improvements Project, 04-Sol-12-PM 24.3/25.2, EA 0G0500	Far Western Anthropological Research Group	48-000802
S-047932	OHP PRN - FWS_2015_0827_001	2015	Ben Elliott	Archaeological Inventory Report, Delta Research Station Project, Solano and San Joaquin Counties, California	URS Corporation	48-000916, 48-000917, 48-000938, 48-000951, 48-000953
S-047932a		2015	Julianne Polanco and Anan Raymond	FWS_2015_0827_001; Delta Research Station, Rio Vista, Solano County, California	California Office of Historic Preservation; U.S. Department of the Interior, Fish and WIdlife Service	

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Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-048768	OHP PRN - USDA_2015_1223_004	2015	Alex DeGeorgey	Archaeological Survey Report for Hamilton Brothers, Producer, Solano County, California; Farm No. 3943, Tract No. 1248, 1376, and 1378.	Alta Archaeological Consulting	
S-048768a		2016	Julianne Polanco	USDA_2015_1223_004: Section 106 Consultation, Livestock Watering Facilities, Hamilton Brothers, Solano County, CA	California Office of Historic Preservation	

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Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
S-049780	OTIS Report Number - FHWA_2016_0615_001	2017	Brian F. Byrd, Adrian R. Whitaker, Patricia J. Mikkelsen, and Jeffrey S. Rosenthal	San Francisco Bay-Delta Regional Context and Research Design for Native American Archaeological Resources, Caltrans District 4	California Department of Transportation, District 4	01-000001, 01-000002, 01-000014, 01-000015, 01-000022, 01-000033, 01-000034, 01-000038, 01-000062, 01-000066, 01-000080, 01-000084, 01-000086, 01-000087, 01-000089, 01-000104, 01-000105, 01-000106, 01-000107, 01-000116, 01-000117, 01-000139, 01-000152, 01-000175, 01-000197, 01-000201, 01-000202, 01-000234, 01-000237, 01-001795, 01-002120, 01-002160, 01-002162, 01-002245, 01-002280, 01-010509, 01-010610, 01-011556, 07-000019, 07-000021, 07-000029, 07-000033, 07-000037, 07-000047, 07-000066, 07-000070, 07-000079, 07-000080, 07-000089, 07-000093, 07-000098, 07-000105, 07-000117, 07-000118, 07-000147, 07-000148, 07-000149, 07-000150, 07-000154, 07-000168, 07-000173, 07-000174, 07-000175, 07-000176, 07-000185, 07-000186, 07-000189, 07-000197, 07-000217, 07-000227, 07-000230, 07-000238, 07-000239, 07-000242, 07-000309, 07-000359, 07-000365, 07-000366, 07-000400, 07-000401, 07-000440, 07-000441, 07-000459, 07-000461, 07-000462, 07-000721, 07-000724, 07-000790, 07-000792, 07-002570, 07-002592, 07-002650, 07-004537, 21-000002, 21-000036, 21-000043, 21-000045, 21-000048, 21-000051, 21-000057, 21-000058, 21-000066, 21-000070, 21-000072, 21-000073, 21-000074, 21-000075, 21-000097, 21-000106, 21-000109, 21-000142, 21-000143, 21-000152, 21-000163, 21-000164, 21-000165, 21-000166, 21-000167, 21-000175, 21-000177, 21-000193, 21-000195, 21-000196, 21-000199, 21-000200, 21-000217, 21-000218, 21-000219, 21-000220, 21-000221, 21-000222, 21-000256, 21-000295, 21-000305, 21-000306, 21-000327, 21-000332, 21-000337,

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S-049780a		2016	Julianne Polanco	FHWA_2016_0615_001, Caltrans District 4 Archaeological Context	California Office of Historic Preservation	
S-054999	Submitter - D201900946.00	2021	Robin Hoffman, Katherine Cleveland, and Ashleigh Sims	Little Egbert Tract Geotechnical Explorations Project, Solano County, California: Cultural Resources Inventory Report	Environmental Science Associates	48-001027, 48-002017, 48-002018, 48-002019, 48-002020, 48-002021, 48-002022, 48-002023

Appendix 5.6-1 General Plan Update Energy Consumption Calculations

Appendices

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Energy Consumption Analysis
Operational On-Road Fuel Consumption
Existing General Plan Buildout

Vehicle Type	Percent of Vehicle Trips[1]	Annual Trips[2]	Annual Vehicle Miles Traveled	Average Fuel Economy (miles per gallon)[3]	Total Annual Fuel Consumption (gallon)[4]
Gasoline Vehicles	0.89	70,943,495	455,442,678	24.08722587	18,908,059
Diesel Vehicles	0.11	8,964,285	56,618,008	7.798398133	7,260,210
Total	***1.00***	**79,907,780**	**512,060,686**	**--**	***26,168,269***

Total Operations On-Road Gasoline Consumption (gallon)	Total Operations On-Road Diesel Consumption (gallon)
18,908,059	7,260,210
Countywide On-Road Gasoline Consumption (2023)	**Countywide On-Road Diesel Consumption (2023)**
170,084,056	47,393,420
Percentage Increase Countywide	
Gasoline Consumption[5]	**Diesel Consumption[5]**
11.1169%	15.3190%

Notes:

1. Percent of Vehicle Trip distribution based on default trip characteristics within the CalEEMod model.
2. Annual Trips taken from Traffic Study and CalEEMod outputs.
3. Average fuel economy derived from EMFAC countywide fuel consumption divided by miles traveled.
4. Total Annual Fuel Consumption calculated by dividing the annual VMT by the average fuel economy (i.e., VMT/Average Fuel Economy).
5. Countywide on-road gasoline and diesel consumption are from CARB's EMFAC2021.

Source: Refer to CalEEMod outputs for assumptions used in this analysis.

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Energy Consumption Analysis
Operational On-Road Fuel Consumption
Proposed General Plan Buildout

Vehicle Type	Percent of Vehicle Trips[1]	Annual Trips[2]	Annual Vehicle Miles Traveled	Average Fuel Economy (miles per gallon)[3]	Total Annual Fuel Consumption (gallon)[4]
Gasoline Vehicles	0.92	123,530,912	791,327,824	24.08722587	32,852,593
Diesel Vehicles	0.08	11,463,212	72,945,796	7.798398133	9,353,946
Total	***1.00***	**134,994,124**	**864,273,620**	**--**	***42,206,539***

Total Operations On-Road Gasoline Consumption (gallon)	Total Operations On-Road Diesel Consumption (gallon)
32,852,593	9,353,946
Countywide On-Road Gasoline Consumption (2023)	**Countywide On-Road Diesel Consumption (2023)**
170,084,056	47,393,420
Percentage Increase Countywide	
Gasoline Consumption[5]	**Diesel Consumption[5]**
19.3155%	19.7368%

Notes:

1. Percent of Vehicle Trip distribution based on default trip characteristics within the CalEEMod model.
2. Annual Trips taken from Traffic Study and CalEEMod outputs.
3. Average fuel economy derived from EMFAC countywide fuel consumption divided by miles traveled.
4. Total Annual Fuel Consumption calculated by dividing the annual VMT by the average fuel economy (i.e., VMT/Average Fuel Economy).
5. Countywide on-road gasoline and diesel consumption are from CARB's EMFAC2021.

Source: Refer to CalEEMod outputs for assumptions used in this analysis.

Appendix 5.12-1 Noise and Vibration Assessment

Appendices

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Noise and Vibration Impact Assessment for the City of Rio Vista 2045 General Plan Update

City of Rio Vista, California

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September 2024

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LIST OF ACRONYMS AND ABBREVIATIONS

ALUCP	Airport Land Use Compatibility Plan
CALGreen	California Green Building Standards Code
Caltrans	California Department of Transportation
CBC	California Building Code
City	City of Rio Vista
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	Decibel is A-weighted
FHWA	Federal Highway Administration
FICON	Federal Interagency Committee on Noise
FTA	Federal Transit Administration
HUD	Housing and Urban Development
HVAC	Heating, ventilation, and air conditioning
Hz	Hertz
L_{dn}	Day-night average sound level
L_{eq}	Measure of ambient noise
L_{max}	The maximum A-weighted noise level during the measurement period.
L_{min}	The minimum A-weighted noise level during the measurement period.
NIOSH	National Institute for Occupational Safety and Health
PPV	Peak particle velocity
RMS	Root mean square
SEL	Single Event Level
USEPA	United States Environmental Protection Agency
VdB	Vibration Velocity Level

1.0 INTRODUCTION

This report describes the potential impacts of noise resulting from adoption and implementation of the proposed City of Rio Vista 2045 General Plan Update. This section describes the regulatory framework and existing conditions of the City General Plan Study Area, identifies criteria used to determine impact significance, provides an analysis of the potential noise impacts, and identifies proposed 2045 General Plan Update policies that could minimize any potentially significant impacts. Noise monitoring and modeling data are included as Attachments to this report.

1.1 Project Location and Description

Rio Vista is a small community located in the heart of the Sacramento River Delta, situated about 65 miles northeast of San Francisco and about 50 miles southwest of Sacramento. State Route 12 (Highway 12) runs through Rio Vista, providing a corridor from Lodi and Stockton in the Central Valley to Suisun City, Fairfield and the counties of the northern Bay Area. Residents often note the access to surrounding urban centers combined with the small-town character, rural setting, and location along the Sacramento River as some of Rio Vista's greatest qualities. Expansion of Rio Vista is constrained by the Sacramento River and lands subject to flooding to the north and east and by the East Solano New Community land ownership to the north and west. In recognition of these constraints, this General Plan contemplates new development primarily as intensification of uses in the existing footprint of Rio Vista. This includes three large and undeveloped properties in the City: the Brann Ranch project (Highway 12 and Liberty Island Road), the Riverwalk Project (Highway 12 and Church Road), and the City-owned property at Airport and Church Roads.

The greatest source of noise throughout Rio Vista is vehicle traffic on Highway 12 and the city's major arterial streets (Highway 84 is another substantial source of noise yet predominately traverses a portion of the city devoid of noise-sensitive receptors). Another noise source in Rio Vista is the aircraft operations associated with the Rio Vista Municipal Airport. High levels of noise on airport land as well as in surrounding neighborhoods can result when aircraft takeoff and land. Other major noise sources are fixed and on-site mobile equipment at commercial and industrial uses; parks with active sports fields; playgrounds; athletic and music events; mechanical equipment like heating, ventilation, and air conditioning systems; loading docks and other delivery-related activities, and businesses like car washes, automobile repair including autobody repair, the fire station at 350 Main Street, outdoor dining, and drive-throughs. Natural gas wells and transmission facilities (pipelines and compressors) are located within and around Rio Vista. The compressors are automatically activated from time to time and create high levels of noise while they are operating. In some cases, natural gas wells are located in residential neighborhoods and have the potential to create noise impacts near residential development.

The General Plan establishes the community's long-term vision for the future. It serves as guidance for all zoning and land use decisions within the city. It will shape future housing, support job growth, foster healthy and resilient neighborhoods, and ensure community safety. The proposed 2045 General Plan Update policy document contains the goals and policies that will guide future decisions within the city and identifies programs to ensure the vision and goals of the General Plan are carried out. The 2045 General Plan Update also contains a land use diagram, which serves as a general guide to the distribution of land uses throughout

the city. The General Plan Update addresses all the elements required by State law, in addition to optional elements that the City has elected to include.

2.0 ENVIRONMENTAL SETTING

2.1 Noise and Vibration Fundamentals

Noise can be generally defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement. The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude. When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. Therefore, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements.

2.1.1 Noise Exposure and Community Noise

Noise exposure is a measure of noise over a period of time. Noise level is a measure of noise at a given instant in time. Community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual receptor. These successive additions of sound to the community noise environment vary the community noise level from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors.

Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people

is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise include the average hourly noise level (in L_{eq}) and the average daily noise levels/community noise equivalent level (in L_{dn}/CNEL). The L_{eq} is a measure of ambient noise, while the L_{dn} and CNEL are measures of community noise. Each is applicable to this analysis and defined as follows:

- **Equivalent Noise Level (L_{eq})** is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
- **L_{max}** is the instantaneous maximum noise level for a specified period of time.
- **L_{min}** is the minimum, instantaneous noise level experienced during a given period of time.
- **Day-Night Average (L_{dn})** is a 24-hour average L_{eq} with a 10-dBA "weighting" added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
- **Community Noise Equivalent Level (CNEL)** is a 24-hour average L_{eq} with a 5-dBA weighting during the hours of 7:00 pm to 10:00 pm and a 10-dBA weighting added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the evening and nighttime, respectively.

Table 2-1, *Common Noise Descriptors*, provides a list of other common acoustical descriptors.

Table 2-1. Common Acoustical Descriptors

Descriptor	Definition
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micropascals (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micropascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sounds are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	A 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level, CNEL	A 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content, as well as the prevailing ambient noise level.
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.

2.1.2 Sound Measurements

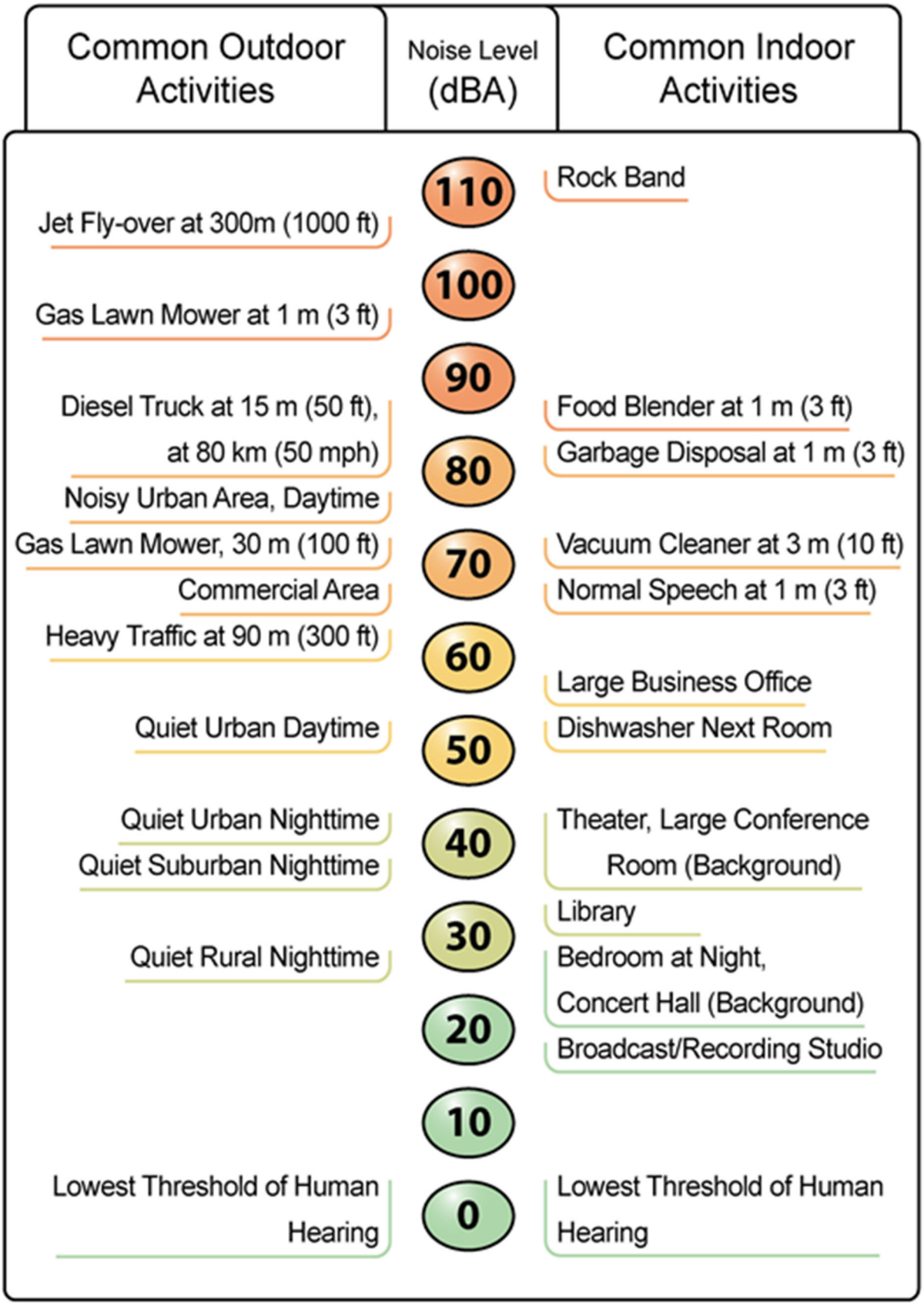
As previously described, sound pressure is measured through the A-weighted measure to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies.

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. On a logarithmic scale, an increase of 10 dBA is 10 times more intense than 1 dBA, 20 dBA is 100 times more intense, and 30 dBA is 1,000 times more intense. A sound as soft as human breathing is about 10 times greater than 0 dBA. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud). When the standard logarithmic dB is A-weighted (dBA), 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. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be three dB higher than one source under the same conditions (Federal Transit Administration [FTA] 2018). For example, a 65-dBA source of sound, such as a truck, when joined by another 65 dBA source results in a sound amplitude of 68 dBA, not 130 dBA (i.e., doubling the source strength increases the sound pressure by three dBA). Under the decibel scale, three sources of equal loudness together would produce an increase of five dBA.

Typical noise levels associated with common noise sources are depicted in Figure 2-1, *Common Noise Levels*.

Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called L_{eq}), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time it is less than this level. This level also represents the level exceeded 30 minutes in an hour. Similarly, the L_2, L_8 and L_{25} values represent the noise levels that are exceeded 2, 8, and 25 percent of the time, or 1, 5, and 15 minutes per hour. These "L_n" values are typically used to demonstrate compliance for stationary noise sources with a city's noise ordinance, as discussed below. Other values typically noted during a noise survey are the L_{min} and L_{max}. These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, State law requires that, for planning purposes, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (L_{dn}). As described above, the CNEL descriptor requires that an artificial increment of 5 dBA be added to the actual noise level for the hours from 7:00 p.m. to 10:00 p.m. and 10 dBA for the hours from 10:00 p.m. to 7:00 a.m. The L_{dn} descriptor uses the same methodology but only adds a 10 dBA increment between 10:00 p.m. and 7:00 a.m. Both descriptors give roughly the same 24-hour level, with the CNEL being only slightly more restrictive (i.e., higher).



Source: California Department of Transportation (Caltrans) 2020a

Figure 2-1. Common Noise Levels

2.1.3 Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL or L_{dn} is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in A-weighted noise levels (dBA), the following relationships should be noted in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.
- 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 community response is expected. An increase of 5 dBA is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

2.1.3.1 Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA, averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

2.1.3.2 Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. Both the L_{dn} and CNEL as measures of noise have been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources.

2.1.3.3 Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA could result in permanent hearing damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain.

2.1.4 Noise Propagation and Attenuation

Noise can be generated by a number of sources, including mobile sources such as automobiles, trucks, and airplanes, as well as stationary sources such as construction sites, machinery, and industrial operations. Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6.0 dB (dBA) for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3.0 dBA for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics. No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dBA per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3.0 dB per doubling of distance is assumed (Federal Highway Administration [FHWA] 2017a).

Noise levels may also be reduced by intervening structures; generally, a single row of detached buildings between the receptor and the noise source reduces the noise level by about 5 dBA (FHWA 2006), while a solid wall or berm generally reduces noise levels by 10 to 20 dBA (FHWA 2017b). However, noise barriers or enclosures specifically designed to reduce site-specific construction noise can provide a sound reduction of 35 dBA or greater (Western Electro-Acoustic Laboratory, Inc. 2021). To achieve the most potent noise-reducing effect, a noise enclosure/barrier must physically fit in the available space, must completely break the "line of sight" between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces. Noise barriers must be sizable enough to cover the entire noise source and extend lengthwise and vertically as far as feasibly possible to be most effective. The

limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In general, barriers contribute to decreasing noise levels only when the structure breaks the "line of sight" between the source and the receiver.

The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows (California Department of Transportation [Caltrans] 2002). The exterior-to-interior reduction of newer residential units is generally 30 dBA or more (Harris Miller, Miller & Hanson Inc. 2006). Generally, in exterior noise environments ranging from 60 dBA L_{dn} to 65 dBA L_{dn}, interior noise levels can typically be maintained below 45 dBA, a typical residential interior noise standard, with the incorporation of an adequate forced air mechanical ventilation system in each residential building, and standard thermal-pane residential windows/doors with a minimum rating of Sound Transmission Class 28. In exterior noise environments of 65 dBA L_{dn} or greater, a combination of forced-air mechanical ventilation and sound-rated construction methods is often required to meet the interior noise level limit. Attaining the necessary noise reduction from exterior to interior spaces is readily achievable in noise environments less than 75 dBA L_{dn} with proper wall construction techniques following California Building Code (CBC) methods, the selections of proper windows and doors, and the incorporation of forced-air mechanical ventilation systems.

2.1.5 Vibration Fundamentals

Vibration is an oscillating motion in the earth. Like noise, vibration is transmitted in waves, but through the earth or solid objects. Unlike noise, vibration is typically of a frequency that is felt rather than heard. Sources of earthborne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or humanmade causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions).

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. As with noise, vibration can be described by both its amplitude and frequency. Amplitude can be characterized in three ways—displacement, velocity, and acceleration. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

PPV is generally accepted as the most appropriate descriptor for evaluating the potential for building damage. For human response; however, an average vibration amplitude is more appropriate because it takes time for the human body to respond to the excitation (the human body responds to an average vibration amplitude, not a peak amplitude). Because the average particle velocity over time is zero, the RMS amplitude is typically used to assess human response. The RMS value is the average of the amplitude squared over time, typically a 1-second period (FTA 2018).

Table 2-2, *Human Reaction and Damage to Buildings from Typical Vibration Levels,* displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower

levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high-noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Table 2-2. Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibration Levels

Peak Particle Velocity (inches/second)	Approximate Vibration Velocity Level (VdB)	Human Reaction	Effect on Buildings
0.006–0.019	64–74	Range of threshold of perception	Vibrations unlikely to cause damage of any type
0.08	87	Vibrations readily perceptible	Threshold at which there is a risk of architectural damage to extremely fragile historic buildings, ruins, ancient monuments
0.1	92	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities	Threshold at which there is a risk of architectural damage to fragile buildings. Virtually no risk of architectural damage to normal buildings
0.25	94	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to historic and some old buildings
0.3	96	Vibrations may begin to feel severe to people in buildings	Threshold at which there is a risk of architectural damage to older residential structures
0.5	103	Vibrations considered unpleasant by people subjected to continuous vibrations	Threshold at which there is a risk of architectural damage to new residential structures and Modern industrial/commercial buildings

Source: Caltrans 2020c

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. For instance, heavy-duty trucks generally generate groundborne vibration velocity levels of 0.006 PPV at 50 feet under typical circumstances, which as identified in Table 2-2 is considered very unlikely to cause damage to buildings of any type. Common sources for groundborne vibration are planes, trains, and construction activities such as earth moving that requires the use of heavy-duty equipment.

The way in which vibration is transmitted through the earth is called propagation. As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

3.0 REGULATORY FRAMEWORK

3.1 Federal Regulations

3.1.1 Federal Highway Administration

Proposed federal or federal-aided highway construction projects at a new location, or the physical alteration of an existing highway that significantly changes the horizontal or vertical alignment or increases the number of through-traffic lanes, require an assessment of noise and consideration of noise abatement per 23 Code of Federal Regulations Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise." The Federal Highway Administration (FHWA) has adopted noise abatement criteria for sensitive receivers—such as picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals—when "worst-hour" noise levels approach or exceed 67 dBA L_{eq} (Caltrans 2020b).

3.1.2 U.S. Environmental Protection Agency

In addition to FHWA standards, the United States Environmental Protection Agency (USEPA) has identified the relationship between noise levels and human response. The USEPA has determined that over a 24-hour period, a L_{eq} of 70 dBA will result in some hearing loss. Interference with activity and annoyance will not occur if exterior levels are maintained at a L_{eq} of 55 dBA and interior levels at or below 45 dBA. These levels are relevant to planning and design and useful for informational purposes, but they are not land use planning criteria because they do not consider economic cost, technical feasibility, or the needs of the community; therefore, they are not mandated.

The USEPA also set 55 dBA L_{dn} as the basic goal for exterior residential noise intrusion. However, other federal agencies, in consideration of their own program requirements and goals, as well as the difficulty of actually achieving a goal of 55 dBA L_{dn}, have settled on the 65 dBA L_{dn} level as their standard. At 65 dBA L_{dn}, activity interference is kept to a minimum, and annoyance levels are still low. It is also a level that can realistically be achieved.

3.1.3 United States Department of Housing and Urban Development

The United States Department of Housing and Urban Development (HUD) has set the goal of 65 dBA L_{dn} as a desirable maximum exterior standard for residential units developed under HUD funding. (This level is also generally accepted within the State of California.) Although HUD does not specify acceptable interior noise levels, standard construction of residential dwellings typically provides 20 dBA or more of attenuation with the windows closed. Based on this premise, the interior L_{dn} should not exceed 45 dBA.

3.1.4 Federal Interagency Committee on Noise

The Federal Interagency Committee on Noise (FICON) thresholds of significance assist in the evaluation of increased traffic noise. The 2000 FICON findings provide guidance as to the significance of changes in

ambient noise levels due to transportation noise sources. FICON recommendations are based on studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. FICON's measure of substantial increase for transportation noise exposure is as follows:

- If the existing ambient noise levels at existing and future noise-sensitive land uses (e.g., residential, etc.) are less than 60 dBA L_{dn} and the project creates a readily perceptible 5 dBA L_{dn} or greater noise level increase; or
- If the existing noise levels range from 60 to 65 dBA L_{dn} and the project creates a barely perceptible 3 dBA L_{dn} or greater noise level increase; or
- If the existing noise levels already exceed 65 dBA L_{dn} and the project creates a community noise level increase of greater than 1.5 dBA L_{dn}.

The rationale for this criteria is that as ambient noise levels increase, a smaller increase in noise resulting from a project would be noticeable.

3.1.5 National Institute of Occupational Safety and Health

A division of the US Department of Health and Human Services, the National Institute for Occupational Safety and Health (NIOSH) has established a construction-related noise level threshold as identified in the Criteria for a Recommended Standard: Occupational Noise Exposure prepared in 1998. NIOSH identifies a noise level threshold based on the duration of exposure to the source. The NIOSH construction-related noise level threshold starts at 85 dBA for 8 hours of exposure per day; for every 3-dBA increase, the exposure time is cut in half. This reduction results in noise level thresholds of 88 dBA for 4 hours of exposure per day, 92 dBA for 1 hour of exposure per day, 96 dBA for 30 minutes of exposure per day, and up to 100 dBA for 15 minutes of exposure per day. The intention of these thresholds is to protect people from hearing losses resulting from occupational noise exposure.

3.1.6 Aircraft Noise Standards

The Federal Aviation Administration Advisory Circular Number 150 5020 2, entitled "Noise Assessment Guidelines for New Helicopters" recommends the use of a cumulative noise measure, the 24-hour equivalent sound level [$L_{eq}(24)$], so that the relative contributions of the heliport and other sound sources within the community may be compared. The $L_{eq}(24)$ is similar to the L_{dn} used in assessing the impacts of fixed wing aircraft. The helicopter $L_{eq}(24)$ values are obtained by logarithmically adding the single-event level (SEL) values over a 24-hour period.

Public Law 96 193 also directs the Federal Aviation Administration to identify land uses which are "normally compatible" with various levels of noise from aircraft operations. Because of the size and complexity of many major hub airports and their operations, Federal Aviation Regulation Part 150 identifies a large number of land uses and their attendant noise levels. These recommended noise levels are included in Table 3-1, *Federal Aviation Administration Normally Compatible Community Sound Levels*.

Table 3-1. Federal Aviation Administration Normally Compatible Community Sound Levels	
Type of Area	**L_{eq} (24)**
Residential Suburban Urban City	 57 67 72
Commercial	72
Industrial	77

Source: Federal Aviation Administration Advisory Circular 1983

Notes: The L_{eq} is the Equivalent Continuous Noise Level, which describes sound levels that vary over time, resulting in a single decibel value that takes into account the total sound energy over the period of time of interest.

3.2 State Regulations

3.2.1 State of California General Plan Guidelines

The State of California, through its General Plan Guidelines, discusses how ambient noise should influence land use and development decisions and includes a table of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable uses at different noise levels. A conditionally acceptable designation implies new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use and needed noise insulation features are incorporated in the design. By comparison, a normally acceptable designation indicates that standard construction can occur with no special noise reduction requirements. The General Plan Guidelines provide cities with recommended community noise and land use compatibility standards that can be adopted or modified at the local level based on conditions and types of land uses specific to that jurisdiction.

3.2.2 California Building Code

The State of California provides a minimum standard for building design through Title 24, Part 2, of the California Code of Regulations, commonly referred to as the "California Building Code" (CBC). The CBC is updated every three years. It is generally adopted on a jurisdiction-by-jurisdiction basis, subject to further modification based on local conditions. The City of Rio Vista Building Regulations are presented in Title 15 of the City's Municipal Code.

The State of California's noise insulation standards for non-residential uses are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 11, California Green Building Standards Code (CALGreen). CALGreen noise standards are applied to new or renovation construction projects in California to control interior noise levels resulting from exterior noise sources. Future individual projects may use either the prescriptive method (Section 5.507.4.1) or the performance method (5.507.4.2) to show compliance. Under the prescriptive method, a project must demonstrate transmission loss ratings

for the wall and roof-ceiling assemblies and exterior windows when located within a noise environment of 65 dBA CNEL or higher. Under the performance method, a project must demonstrate that interior noise levels do not exceed 50 dBA $L_{eq(1hr)}$.

3.2.3 Airport Noise Standards

California Code of Regulations Title 21, Section 5012, establishes 65 dBA CNEL as the acceptable level of aircraft noise for persons living in the vicinity of airports. Noise-sensitive land uses are generally incompatible in locations where the aircraft exterior noise level exceeds 65 dBA CNEL, unless an aviation easement for aircraft noise has been acquired by the airport proprietor. Assembly Bill 2776 requires any person who intends to sell or lease residential properties in an Airport Influence Area to disclose that fact to the person buying the property.

3.3 Regional Regulations

3.3.1 Solano County Airport Land Use Commission

The Solano County Airport Land Use Commission's Rio Vista Airport Land Use Compatibility Plan (adopted in 2018) addresses land use compatibility associated with the Rio Vista Municipal Airport and surrounding lands. The Solano County Airport Land Use Commission is responsible for promoting land use compatibility around the Rio Vista Municipal Airport in order to minimize public exposure to excessive noise and safety hazards, and the Commission's Solano County Airport Land Use Compatibility Plan (ALUCP) identifies noise compatibility zones in the form of airport noise contour graphics that are intended to prevent development that is incompatible with airport operations.

To the greatest extent feasible, it is the objective of the Solano County Airport Land Use Commission to minimize new residential development within areas significantly impacted by noise from aircraft operations at Rio Vista Municipal Airport. According to the ALUCP (2018), new residential development is deemed normally unacceptable in areas exposed to noise levels between 55 - 64 dBA CNEL. Residential land uses in these areas must be sound-insulated to achieve an indoor noise level of 45 dBA CNEL or lower. Above 65 dBA CNEL, new residential uses are prohibited. The acceptability of nonresidential development in noise-impacted areas is dependent upon the noise sensitivity of the specific use and the extent to which the usage can be shielded from aircraft noise (Solano County Airport Land Use Commission 2018).

3.4 Local Regulations

3.4.1 City of Rio Vista General Plan

The proposed City of Rio Vista 2045 General Plan Update goals and policies that are relevant to noise are primarily contained in the Noise Element. As part of the proposed General Plan Update, some existing General Plan goals and policies would be amended, substantially changed, or new policies would be added. Applicable goals and policies are identified and assessed for their effectiveness and potential to result in an adverse physical impact later in this chapter under Section 5.3, *Impact Analysis*.

3.4.2 City of Rio Vista Municipal Code

The City's Municipal Code includes various directives pertaining to noise. The Municipal Code is organized by title, chapter, and section. Provisions related to noise and vibration impacts are included in Title 17, Chapter 17.52, *Noise Standards*. Section 17.52.050, *Noise Limits*, establishes permissible sound levels by land use category as shown in Table 3-2, *Noise Limits*.

Table 3-2. Noise Limits

Zoning District	Time Period	Maximum Allowable Noise Level (dBA)
Residential – One/Two Family (R-1, R-E-1, R-2)	7:00 a.m. – 10:00 p.m.	75
	10:00 p.m. – 7:00 a.m.	60
Residential – Multiple; Public Space (R-3, R-4, P-L)	7:00 a.m. – 10:00 p.m.	75
	10:00 p.m. – 7:00 a.m.	60
Light Commercial (C-1, C-2, C-2-A)	7:00 a.m. – 10:00 p.m.	75
	10:00 p.m. – 7:00 a.m.	60
Commercial (C-3-I, C-H, D-W, A-B, F-W, O-A-R)	7:00 a.m. – 10:00 p.m.	75
	10:00 p.m. – 7:00 a.m.	60
Industrial (I-P-I, M-G, I-R, D-R, B-P)	7:00 a.m. – 10:00 p.m.	85
	10:00 p.m. – 7:00 a.m.	65

Source: *Extrapolated from the Rio Vista Municipal Code, Chapter 17.52, Noise Standards, Section 17.52.050 (2021).*

Additionally, Section 17.52.060, *Specific Noise Source Exemptions*, incentivizes construction activities to occur during the less noise-sensitive daytime hours in order to protect the inhabitants of the city against construction noise. Specifically, Section 17.52.060 exempts private construction projects located one-quarter of a mile or less from an inhabited dwelling from City noise standards provided that construction occurs between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and 8:00 a.m. and 7:00 p.m. on Saturdays and Sundays.

4.0 EXISTING CONDITIONS

4.1 Noise Sensitive Land Uses

Some land uses are considered more sensitive to noise levels than others due to the duration and nature of time people spend at these uses. In general, residences are considered most sensitive to noise as people spend extended periods of time in them, including the nighttime hours. Therefore, noise impacts affecting rest and relaxation, sleep, and communication are highest at residential uses. Schools, hotels, hospitals, nursing homes, and recreational uses are also considered to be more sensitive to noise, as activities at these land uses involve rest, recovery, relaxation, and concentration, and increased noise levels tend to disrupt such activities. Places such as churches, libraries, and cemeteries, where people tend to pray, study, and/or contemplate, are also sensitive to noise but, due to the limited time people spend at these uses, impacts are usually tolerable. Commercial and industrial uses are considered the least noise sensitive.

4.2 Existing Noise Environment

Noise sources are typically categorized as mobile or stationary. Most mobile sources are transportation related from vehicles operating on roadways, fixed railways, and aircraft and airport operations. Stationary noise sources typically include machinery; fabrication; heating, ventilation, and air conditioning systems; compressors and generators; and landscape maintenance equipment. Stationary noise sources generated by light industrial and commercial activities can result in noise-related land use conflicts when these operations (e.g., loading docks or equipment operations) are adjacent to residential land uses.

The greatest source of noise throughout Rio Vista is vehicle traffic on Highway 12 and the city's major arterial streets (Highway 84 is another substantial source of noise yet predominately traverses a portion of the city devoid of noise-sensitive receptors). Another noise source in Rio Vista is the aircraft operations associated with the Rio Vista Municipal Airport. High levels of noise on airport land as well as in surrounding neighborhoods can result when aircraft takeoff and land. Other major noise sources are fixed and on-site mobile equipment at commercial and industrial uses; parks with active sports fields; playgrounds; athletic and music events; mechanical equipment like heating, ventilation, and air conditioning systems; loading docks and other delivery-related activities, and businesses like car washes, automobile repair including autobody repair, animal board and care, the fire station, outdoor dining, and drive-throughs, where proximity to sensitive land uses can create noise nuisance concerns. Natural gas wells and transmission facilities (pipelines and compressors) are located within and around Rio Vista. The compressors are automatically activated from time to time and create high levels of noise while they are operating. In some cases, natural gas wells are located in residential neighborhoods and have the potential to create noise impacts near residential development.

4.2.1 Existing Community Noise

In order to quantify existing ambient noise levels within the city, ECORP Consulting, Inc. conducted three long-term (24-hour) noise measurements spanning various locations throughout Rio Vista in order to record the ambient noise levels throughout the city when no specific or unusual activity or events are occurring. The sound level meter used for noise monitoring is a Larson Davis SoundExpert LxT precision

sound level meter, which satisfies the American National Standards Institute for general environmental noise measurement instrumentation. Prior to the measurements, the SoundExpert LxT sound level meter was calibrated according to manufacturer specifications with a Larson Davis CAL200 Class I Calibrator. The measurement locations, described below, are shown in Figure 4-1, *Existing Noise Measurement Locations*, and the results are reported in Table 4-1, *Existing (Baseline) Noise Measurements*, below.

- **Location 1** is located on Airport Road across from the Airport Road Self Storage facility approximately 42 feet from the centerline of the roadway. A 24-hour noise measurement began on October 16, 2023, at 11:46 a.m. The noise environment is characterized by transportation noise from vehicles on Airport Road. The ambient recorded noise level was 66.1 dBA CNEL.
- **Location 2** is located directly adjacent to the Second Street and Main Street intersection. A 24-hour noise measurement began on October 17, 2023, at 12:05 p.m. The noise environment is characterized by transportation noise from vehicles on adjacent roadways as well as pedestrian activity (i.e., people talking). The ambient recorded noise level was 64.6 dBA CNEL.
- **Location 3** is located at Drouin Drive Park, approximately 200 feet from the park entrance. A 24-hour noise measurement began on November 30, 2023, at 2:48 p.m. The noise environment is characterized by neighborhood noise (i.e., people talking, dogs barking, car doors opening and closing, etc.). The ambient recorded noise level was 59.7 dBA CNEL.

Location: W:\Projects\2023\2023-156 Rio Vista GP Update\Noise\Baseline Noise Measurements\Mapping\Rio Vista Gen Plan Noise Measurement Map.aprx - Portrait Template (agne - 12/13/2023)

Map Date: 12/13/2023

Sources: Esri 2023

Figure 1 - Noise Measurement Locations Map

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Rio Vista General Plan Update Project, 2023-156

Table 4-1. Existing (Baseline) Noise Measurements						
Location Number	**Location Description**	**L_{dn} dBA**	**L_{eq} dBA**	**L_{min} dBA**	**L_{max} dBA**	**Time**
Long Term Measurements						
1	Airport Road, adjacent to the Airport Road Self Storage, approximately 42 feet from the center of the roadway	**65.9**	63.4	28.2	87.8	October 16, 2023, at 11:46 a.m. – October 17, 2023, at 11:46 a.m.
2	Second Street and Main Street Intersection, approximately two blocks north of City Hall	**64.3**	62.0	35.6	102.0	October 17, 2023, at 12:05 p.m. – October 18, 2023, at 12.05 p.m.
3	In Drouin Drive Park, approximately 200 feet from the park entrance	**59.6**	70.0	40.4	103.0	November 30, 2023, at 2:48 p.m. – December 1, 2023, at 2:48 p.m.

Source: Measurements were taken with a Larson Davis SoundExpert LxT precision sound level meter, which satisfies the American National Standards Institute for general environmental noise measurement instrumentation. Prior to the measurements, the SoundExpert LxT sound level meter was calibrated according to manufacturer specifications with a Larson Davis CAL200 Class I Calibrator. See Attachment A for noise measurement outputs.

Notes: L_{eq} is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. L_{min} is the minimum noise level during the measurement period and L_{max} is the maximum noise level during the measurement period.

L_{dn} is a 24-hour average L_{eq} with a 10-dBA "weighting" added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the nighttime.

As shown in Table 4-1, the ambient recorded noise levels range over the course of the four long term noise measurements was 59.6 to 65.9 dBA L_{dn}.

4.2.2 Existing Traffic Noise

Traffic noise levels depend primarily on the speed of the traffic and the volume of trucks. The primary source of noise from automobiles is high-frequency tire noise, which increases with speed. Trucks and older automobiles produce engine and exhaust noise, and trucks can also generate wind noise. Tire noise from cars is produced at ground level (i.e., where the tire contacts the road), whereas truck noise can be generated at a height of 10 to 15 feet above the road, depending on the height of the exhaust pipe(s) and engine. As a result, sound walls are not as effective at reducing truck noise unless they are very tall.

The greatest source of noise throughout Rio Vista is vehicle traffic on Highway 12 and the city's major arterial streets (Highway 84 is another substantial source of noise yet predominately traverses a portion of the city devoid of noise-sensitive receptors). Existing roadway noise levels were calculated for roadway segments throughout Rio Vista. This task was accomplished using the FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108) (see Attachment B for detailed traffic noise modeling outputs) and traffic volumes from Fehr & Peers Transportation Consultants (2024). The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (energy rates) used in the FHWA model have

been modified to reflect average vehicle noise rates identified for California by the California Department of Transportation (Caltrans). The Caltrans data shows that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. The average daily noise levels along these roadway segments are presented in Table 4-2, *Existing Roadway Noise Levels*.

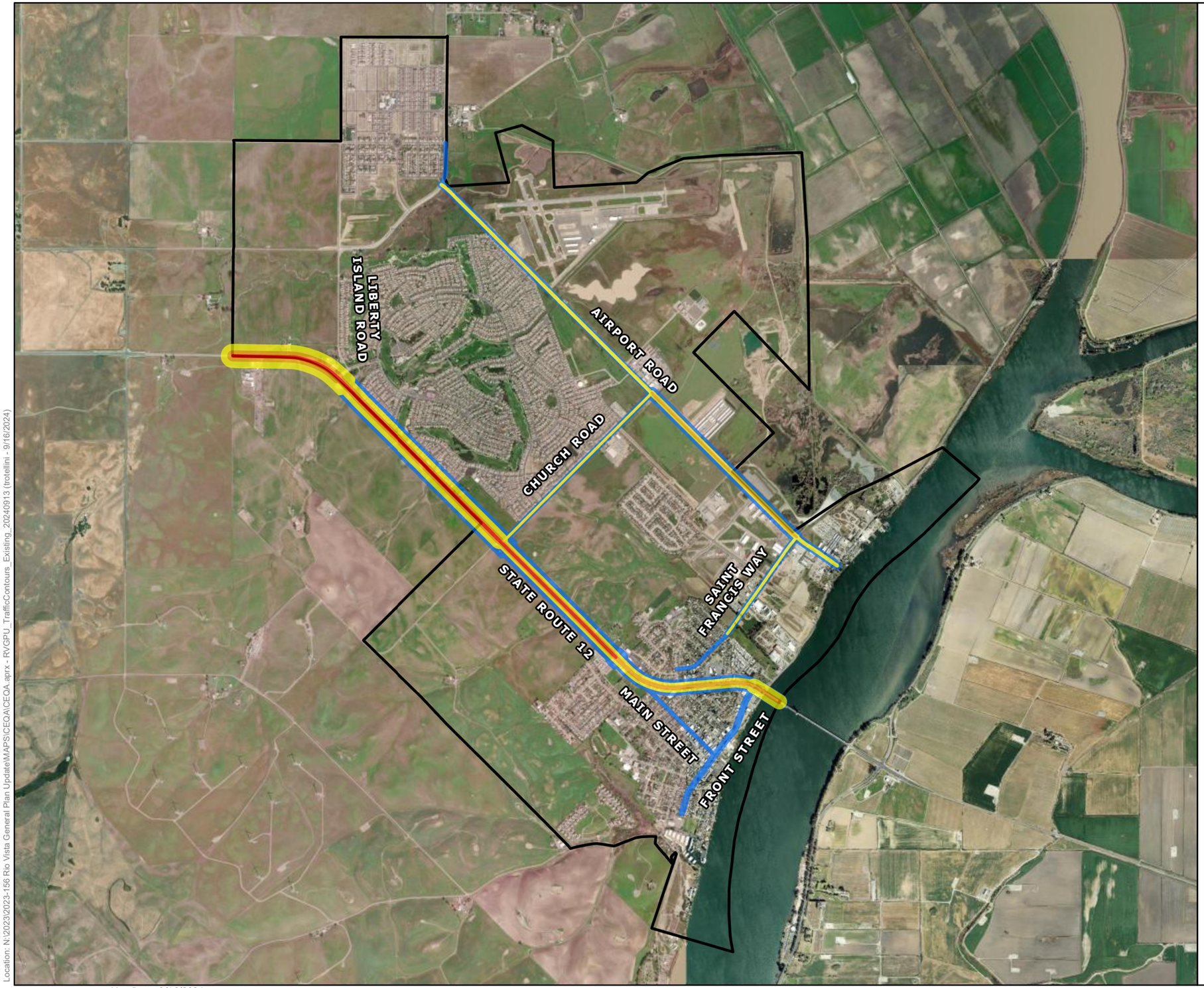
Table 4-2. Existing Roadway Noise Levels					
Roadway Segment	**L_{dn} at 50 Feet**	**Distance to L_{dn} Contour (feet)[1, 2]**			
		70 dBA	**65 dBA**	**60 dBA**	**55 dBA**
State Route 12					
East of Front Street	**65.8**	-	60	188	+200
Between Front Stret and Drouin Drive	**65.9**	-	61	193	+200
Between Drouin Drive and Amerada Road	**68.2**	38	82	177	+300
Between Amerada Road and Summerset Road	**69.3**	45	97	210	+300
West of Summerset Road	**69.4**	46	98	212	+300
Front Street					
Between State Route 84 and Main Street	**57.3**	-	-	-	86
Between Main Street and Hamilton Avenue	**57.2**	-	-	-	84
Main Street					
Between State Route 12 and South Front Street	**55.7**	-	-	-	59
Saint Francis Way					
Northeast of Rolling Green Drive	**58.0**	-	-	37	79
Southwest of Rolling Green Drive	**55.5**	-	-	-	56
Airport Road					
North of Liberty Island Road	**55.5**	-	-	-	54
Between Liberty Island Road and Palisades Drive	**59.2**	-	-	44	95
Between Palisades Drive and Baumann Road	**59.2**	-	-	44	95
Between Baumann Road and Church Road	**59.2**	-	-	44	95
Between Church Road and Norman Richards Drive	**62.3**	-	33	71	154
Between Norman Richards Drive and Saint Francis Way	**62.3**	-	33	71	154
Between St Francis Way and Highway 84	**60.0**	-	-	50	108
Church Road					
Between State Route 12 and Airport Road	**57.7**	-	-	35	75
Liberty Island Road					
Between Summerset Road and Canright Road	**51.2**	-	-	-	-
East of Canright Road	**51.2**	-	-	-	-

Source: Traffic noise levels were calculated using the FHWA Highway Noise Prediction Model in conjunction with the trip generation rate identified by Fehr & Peers. Refer to Attachment B for traffic noise modeling assumptions and results.

[1]Distance to L_{dn} contours do not account for the noise attenuation attributable to intervening structures.

[2] All contour distances from fully developed areas are capped at 200 feet from roadway centerlines. All contour distances from areas with undeveloped land are capped at 300 feet from roadway centerlines.

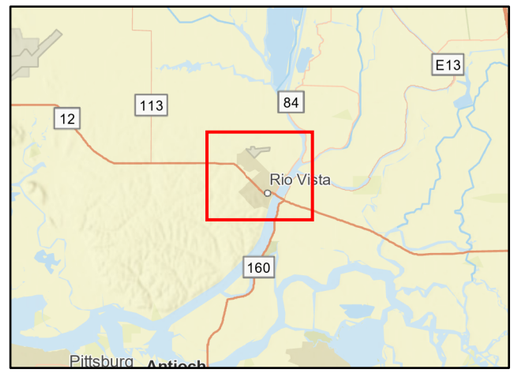
Existing noise contours for Highway 12 and major arterials within the city are presented in Figure 4-2, *Traffic Noise Contours: Existing*. The noise contours shown in Figure 4-2 represent the predicted noise level based on roadway volumes, the percent of trucks, speed, and other factors.



Map Contents

- City of Rio Vista
- 55 db Ldn
- 60 db Ldn
- 65 db Ldn
- 70 db Ldn

Sources: ESRI, Maxar (2022)



Location: N:\2023\2023-156 Rio Vista General Plan Update\MAPS\CEQA\CEQA aprx - RVGPU_TrafficContours_Existing_20240913 (trotellini - 9/16/2024)

Map Date: 9/16/2024

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Scale in Feet
0 1,250 2,500

Figure 4-2. Traffic Noise Contours Existing
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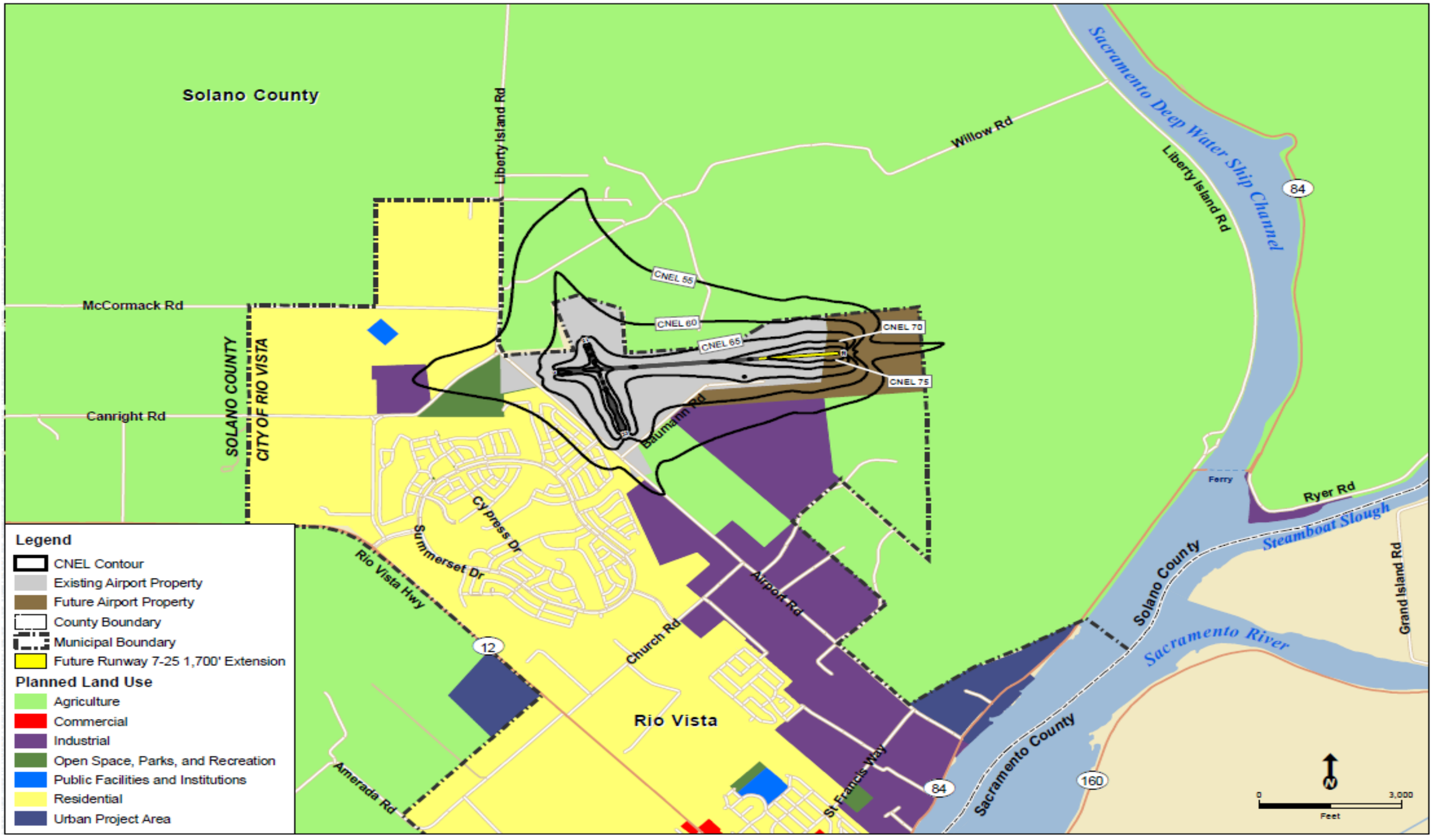
4.2.3 Existing Aircraft Noise

A notable source of noise in Rio Vista is the aircraft operations associated with the Rio Vista Municipal Airport located in the north-central portion of the city. High levels of noise on airport land as well as in surrounding neighborhoods can result when aircraft takeoff and land. Although the Rio Vista Municipal Airport is located within the City of Rio Vista and aircraft noise affects Rio Vista residents, Rio Vista is not authorized to regulate aircraft noise. As discussed in Section 3.0, *Regulatory Framework*, above, aircraft noise is regulated, managed, and mitigated primarily by the Federal Aviation Administration, which works in conjunction with other federal agencies, such as the U.S. Environmental Protection Agency, to address noise issues related to aviation. The regulation of noise emanating from airports in the United States involves multiple entities at different levels of government, including federal, state, and local authorities. However, the primary responsibility for regulating the noise generated at airports typically lies with local airport authorities, which are often governed by airport commissions or boards. The Solano County Airport Land Use Commission is responsible for promoting land use compatibility around the Rio Vista Municipal Airport in order to minimize public exposure to excessive noise and safety hazards. Their airport land use compatibility plan (ALUCP) identifies noise compatibility zones in the form of airport noise contour graphics that are intended to prevent development that is incompatible with airport operations.

Figure 4-3, *Rio Vista Municipal Airport Noise Contours*, depicts year 2035 Rio Vista Municipal Airport noise contours from the ALUCP, reflecting forecast aircraft activity level of approximately 26,305 annual operations. As shown, no portion of the airport's 65 dBA CNEL contour extends beyond the airport boundary. Only a small portion of the airport's 60 dBA CNEL contour extends beyond the airport boundary and into Rio Vista, specifically overlaying the eastern terminus of Palisades Drive and several hundred feet of Airport Road. The 55 dBA CNEL contour extends beyond 60 dBA CNEL contour in relatively the same pattern.



NOTE: CNEL = Community Noise Equivalent Level.

Map Date: *09/6/2024*
Photo (or Base) Source: *Solano County Airport Land Use Commission 2018*

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Figure 4-3. Rio Vista Municipal Airport Noise Contours

5.0 Impact Assessment

5.1 Standards of Significance

The proposed General Plan Update would result in a significant noise impact if it would:

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

2) Generation of excessive groundborne vibration or groundborne noise levels.

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

4) In combination with past, present, and reasonably foreseeable projects, result in cumulative noise impacts in the area.

A project might have a significant effect on the environment if it would substantially increase the ambient noise levels in the area or expose people to severe noise levels. As previously described, a change in level of at least 5 dBA is required before any noticeable change in community response is expected. Based on this fact, a significant increase in traffic noise is considered to be an increase in the existing ambient noise environment of at least 5 dBA $L_{dn.}$ Based on Section 17.52.050 of the City Municipal Code, an individual project would also be considered to have a significant impact if its on-site noise sources generate noise levels above the standards identified in Table 3-2 above.

5.2 Methodology

This is a program-level analysis that considers the potential impacts from adoption of the proposed 2045 General Plan Update by assessing proposed policies contained within, and development and activities that may occur under it. Impacts relative to noise and vibration are evaluated using the thresholds of significance identified in Section 5.1 above and based on information included in the proposed 2045 General Plan Update and existing and future traffic volumes provided by Fehr & Peers Transportation Consultants (2024). The proposed 2045 General Plan Update does not propose specific development projects but, for the purposes of environmental review, establishes the potential buildout of the proposed 2045 General Plan Update. This represents the maximum feasible development that the City has projected can reasonably be expected to occur throughout the proposed General Plan horizon. To capture the potential impact of future development under the proposed General Plan Update, this analysis utilizes the baseline existing conditions described above and analyzes the impacts of urban development through the projection period. Roadside noise levels were calculated for the same roadways analyzed under existing conditions. The street segments selected for analysis are those forecast to experience the greatest percentage increase in traffic generated by future development under the proposed 2045 General Plan Update and are therefore expected to be most directly impacted. Transportation-source noise levels have been calculated using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with traffic counts provided by Fehr & Peers Transportation

Consultants (2024). The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by Caltrans. The Caltrans data shows that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels.

5.3 Impact Analysis

5.3.1 The proposed 2045 General Plan Update would result in the generation of substantial temporary and 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.

Noise/Land Use Compatibility

The proposed 2045 General Plan Update's Noise Element provides policy guidance to minimize noise impacts within the community and establishes noise control measures for the operational phases of land use projects. By identifying noise-sensitive areas and setting compatibility guidelines (as detailed in Table 10-1 of the proposed Noise Element), noise considerations will help shape the distribution, location, and intensity of future land uses. This approach ensures that effective land use planning and project design can mitigate most noise-related issues.

A fundamental planning strategy to minimize noise impacts on new developments is avoiding the placement of noise-sensitive land uses—such as schools, hospitals, residential areas, and recreational facilities—in locations where noise levels are expected to exceed acceptable thresholds. These areas are subject to the Maximum Allowable Exterior and Interior Noise Level standards, as established in Table 10-1 of the 2045 General Plan Noise Element. If noise-sensitive uses are proposed in such locations, appropriate noise mitigation measures (e.g., site and architectural design, sound walls) must be implemented in accordance with Policies NE-1, NE-3, NE-4, NE-5, NE-6, NE-7, Program NE-1, and Program NE-3. The noise standards provided in Table 10-1 serve as a basis for evaluating land use compatibility with surrounding noise levels.

As outlined in Section 1.1, *Project Location and Description* and Section 4.2, *Existing Noise Environment*, the primary noise sources in Rio Vista are vehicle traffic on Highway 12 and major arterial streets. The noise levels associated with these sources, compared to the standards in Table 10-1, will guide the assessment of future projects. Should noise levels at a proposed project site fall within the acceptable ranges, the project will be considered compatible with the noise environment. If noise levels exceed the standards, noise attenuation measures will be required.

All projects subject to discretionary review under the 2045 General Plan Update will be assessed for noise/land use compatibility. The Noise Element provides specific policy provisions to ensure that excessive noise exposure is mitigated, and these include:

- **Policy NE-1:** New development shall be evaluated for compliance standards provided in Table 10-1 [of the 2045 General Plan]. Where existing noise levels would exceed acceptable levels, it shall be the obligation of the applicant proposing the project to ensure noise levels are reduced to acceptable levels.

- **Policy NE-3:** Where noise attenuation is required to meet the standards of this element, an emphasis shall be placed on site planning and project design, including, but are not limited to, building orientation, setbacks and building construction practices.

- **Policy NE-4:** The use of sound walls will be allowed only if these other measures cannot achieve compliance with the noise standards of this General Plan. Where sound walls are required, the walls shall be designed to ensure the wall is visually attractive and compatible with the design of the proposed project and surrounding development.

- **Policy NE-5.** When noise sensitive development is proposed in proximity to existing gas extraction facilities, the developer of the proposed project shall be responsible for meeting applicable noise standards within the proposed project.

- **Policy NE-6.** Ensure that noise sensitive uses do not encroach into areas needed by noise generating uses.

- **Policy NE-7.** Projects located within the CNEL 55 dB contour of the Rio Vista Municipal Airport, as depicted in the Airport Land Use Compatibility Plan (ALUCP), shall be reviewed for noise sensitivity and consistency with City and ALUCP noise standards.

- **Program NE-1.** Within any entitlement review, the project applicant shall provide a description of project operations and shall provide information as required, potentially including a noise study, to determine the project's consistency with City noise standards, as established in Tables 10-1 and 10-2 [of the 2045 General Plan].

- **Program NE-2:** Maintain a map of locations of existing and proposed natural gas well sites for reference when reviewing land use entitlements.

Under Policy NE-1, new development projects will require an acoustical analysis to assess compliance with the noise standards in Table 10-1. This analysis will typically involve baseline noise measurements using a sound level meter yet may also use General Plan noise contours (Figures 4-2, *Traffic Noise Contours: Existing* and 5-1, *Traffic Noise Contours: Buildout*, of this report) or Table 5-3, *Future (General Plan Buildout) Roadway Noise Levels*, of this report. The analysis will determine whether the noise environment is compatible with the proposed development and will guide the implementation of necessary noise attenuation measures, such as site design, building orientation, building construction methods and the use of noise barriers. The need for such measures will be determined on a project-by-project basis. Policies NE-3 and NE-5 further ensure that noise mitigation measures are integrated into the design of both noise-generating and noise-sensitive land uses.

In summary, the 2045 General Plan's approach to noise/land use compatibility will result in a less than significant impact on noise-sensitive land uses.

Temporary Construction Noise

Under the proposed 2045 General Plan Update, the primary source of temporary noise within the city would be demolition and construction activities associated with development projects and activities. Construction activities would involve both off-road construction equipment (e.g., excavators, dozers, cranes, etc.) and transport of workers and equipment to and from construction sites. Table 5-1, *Reference Construction Equipment Noise Levels (50 Feet from Source)*, shows typical noise levels produced by the types of off-road equipment that would likely be used during future construction within Rio Vista. It is noted that future development under the 2045 General Plan Update could potentially require installation of pile foundations that may utilize impact pile drivers or similar equipment that may be expected to generate high noise levels.

Construction noise is currently an intermittent source of temporary noise within Rio Vista and will continue to be so regardless of whether the 2045 General Plan Update is adopted. Noise levels near individual construction sites associated with development and activities under the proposed 2045 General Plan Update would not be substantially different from what they would be under the existing City of Rio Vista General Plan 2001. Since specific future projects within the city are unknown at this time, it is conservatively assumed that the construction areas associated with these future projects could be located within 50 feet of sensitive land uses. As depicted in Table 5-1, noise levels generated by individual pieces of construction equipment typically range from approximately 74 dBA to 101.3 dBA L_{max} at 50 feet and 67.7 dBA to 94.3 dBA L_{eq} at 50 feet. Average hourly noise levels associated with construction projects can vary, depending on the activities performed. Short-term increases in vehicle traffic, including worker commute trips and haul truck trips, may also result in temporary increases in ambient noise levels at nearby receptors. During each stage of construction, a different mix of equipment would operate, and noise levels would vary based on the amount of equipment on-site and the location of the activity. Construction noise levels drop off at a rate of about 6 dBA per doubling of distance between the noise source and the receptor. Intervening structures or terrain would result in lower noise levels at distant receivers.

Table 5-1. Reference Construction Equipment Noise Levels (50 feet from source)		
Equipment	**Typical Noise Level (dBA) at 50 Feet from Source**	
	L_{max}	**L_{eq}**
Aerial Lift	74.7	67.7
Air Compressor	77.7	73.7
Backhoe	77.6	73.6
Blasting	94.0	73.0
Boring Jack (Power Unit)	83.0	80.0
Boring Jack (Horizontal)	82.0	76.0
Chain Saw	83.7	76.7
Compactor (Ground)	83.2	76.2
Concrete Mixer Truck	78.8	74.8
Concrete Mixer (Vibratory)	80.0	73.0
Concrete Pump Truck	81.4	79.4
Concrete Saw	89.9	82.6
Crane	80.6	72.6
Dozer	81.7	77.7
Drill Rig	84.4	77.4
Drill Rig Truck	79.1	72.2
Drum Mixer	80.0	77.0
Dump Truck	76.5	72.5
Excavator	80.7	76.7
Front End Loader	79.1	75.1
Generator	80.6	77.6
Gradall	83.4	79.4
Grader	85.0	81.0

Table 5-1. Reference Construction Equipment Noise Levels (50 feet from source)		
Hydraulic Break Ram	90.0	80.0
Impact Hammer/Hoe Ram (Mounted)	90.3	83.3
Jackhammer	88.9	81.9
Other Equipment	85.0	82.0
Pavement Scarifier	89.5	82.5
Paver	77.2	74.2
Pile Driver (Impact)	101.3	94.3
Pile Driver (Vibratory)	100.8	93.8
Pneumatic Tools	85.2	82.2
Pumps	80.9	77.9
Rock Drill	81.0	74.0
Roller	80.0	73.0
Scraper	83.6	79.6
Tractor	84.0	80.0
Truck (Flat Bed)	74.3	70.3
Truck (Pick Up)	75.0	71.0
Vacuum Street Sweeper	81.6	71.6
Welder	74.0	70.0

Source: FHWA 2006

The City of Rio Vista Municipal Code Section 17.52.060 exempts private construction projects located one-quarter of a mile or less from an inhabited dwelling from City noise standards provided that construction occurs between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and 8:00 a.m. and 7:00 p.m. on Saturdays and Sundays. This standard effectively allows construction to occur throughout the day and night, with only activities outside of these hours subject to City noise standards. However, as Table 5-1 illustrates, typical construction noise levels range from 67.7 dBA to 94.3 dBA L_{eq} at 50 feet, which generally exceed the City's allowable noise thresholds during the non-exempted hours, which are generally 60 – 65 dBA L_{eq} during the non-exempted construction hours depending on the receiving land use, making compliance during the non-exempted hours impractical for most construction activities.

The proposed 2045 General Plan Update Noise Element Policy NE-8 would introduce more stringent regulations to provide greater noise protection for city residents. Instead of only exempting construction noise from City noise standards when it occurs between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and 8:00 a.m. and 7:00 p.m. on Saturdays and Sundays, proposed Policy NE-8 would restrict all construction activity to the hours between 7:00 a.m. and 5:00 p.m. (unless an exemption is granted in the City's review of the project's entitlement or permit). Compared to the current standard, this policy reduces the allowable construction window by two hours and entirely prohibits evening and nighttime construction. Additionally, proposed Policy NE-8 would require all internal combustion engines used in conjunction with construction activities to be muffled according to the equipment manufacturer's requirements.

Construction noise within Rio Vista would continue to be an intermittent source of temporary noise regardless of whether the 2045 General Plan Update is adopted, and noise levels near individual construction sites associated with development and activities under the proposed 2045 General Plan Update would not be substantially different from what they would be under the existing City of Rio Vista General Plan 2001. However, the proposed 2045 General Plan Update Noise Element Policy NE-8 would introduce more stringent regulations to provide greater noise protection for city residents by reducing the allowable construction window by two hours and entirely prohibiting evening and nighttime construction. For this reason, construction noise impacts under the 2045 General Plan Update would be less compared with current conditions and this impact would be less than significant.

Stationary Source Noise

The development of residential, automotive, industrial, or other uses and activities under the proposed 2045 General Plan Update could generate substantial stationary noise. Such sources could generate noise from heating, ventilation, and air conditioning (HVAC) mechanical equipment, back-up diesel generators in some cases, parking lot activity, backup beepers from internal truck and equipment maneuvering, and other sources. Table 5-2*, Reference Stationary Source Noise Levels (At the Source)*, identifies noise levels generally associated with common stationary noise sources.

Table 5-2. Reference Stationary Noise Levels (at the Source)

Stationary Noise Source	L_{eq}
Commercial Car Wash[a]	79.1 dBA
Drive Thru Activity (speaker) [b]	89.1 dBA
Gasoline Dispensing Station [c]	64.7 dBA
Generators [d]	75.0 dBA
HVAC Mechanical Equipment [e]	56.8 dBA
Parking Garage [f]	52.6 dBA
Regional Shopping Center Parking Lot [g]	61.1 dBA
Small Parking Lot [h]	53.2 dBA
Tire and Lube Service Station [i]	62.3 dBA
Truck Backup Beeper [j]	79.0 dBA
Truck Yard/Warehouse [k]	62.4 dBA

Notes:
a. The average of two noise measurements conducted at commercial carwashes in 2019 and 2022.
b. The average of six noise measurements conducted within fast food restaurant drive thru while drive thru speaker in use.
c. The average of five noise measurements conducted within the fuel canopy of gasoline dispensing stations in 2019 and 2021.
d. Generac Mobile Diesel Generator Set Specification Sheet 2020.
e. One noise measurement conducted at an operating HVAC unit in 2017.
f. One noise measurement conducted within a parking garage in 2019.
g. One noise measurement conducted within a Safeway parking lot in 2019.
h. The average of three noise measurements conducted within a strip mall parking lot in 2022, hotel parking lot in 2021, and medical facility parking lot in 2020.
i. The average of two noise measurements conducted at a Big O Tires in 2019 and a Jiffy Lube in 2022.
j. City of San Jose 2014 Midpoint at 237 Loading Dock Noise Study.
k. The average of five noise measurements conducted at four truck yards and one distribution center in 2021.

Stationary source noise is currently a notable source of noise within Rio Vista and would continue to be so regardless of whether the proposed 2045 General Plan Update is adopted. Noise levels near individual sources under the proposed 2045 General Plan Update would not be substantially different from what they would be under the existing City of Rio Vista General Plan 2001. The Noise Element of the proposed 2045 General Plan addresses stationary noise as follows:

- **Policy NE-1:** New development shall be evaluated for compliance standards provided in Table 10-1 [of the 2045 General Plan]. Where existing noise levels would exceed acceptable levels, it shall be

the obligation of the applicant proposing the project to ensure noise levels are reduced to acceptable levels.

- **Policy NE-2:** New development shall not generate operational noise levels that exceed the noise standards in Tables 10-2 [of the 2045 General Plan] on surrounding properties.
- **Policy NE-3:** Where noise attenuation is required to meet the standards of this element, an emphasis shall be placed on site planning and project design, including, but are not limited to, building orientation, setbacks and building construction practices.
- **Policy NE-5.** When noise sensitive development is proposed in proximity to existing gas extraction facilities, the developer of the proposed project shall be responsible for meeting applicable noise standards within the proposed project.
- **Policy NE-6.** Ensure that noise sensitive uses do not encroach into areas needed by noise generating uses.
- **Program NE-1.** Within any entitlement review, the project applicant shall provide a description of project operations and shall provide information as required, potentially including a noise study, to determine the project's consistency with City noise standards, as established in Tables 10-1 and 10-2 [of the 2045 General Plan].
- **Program NE-2:** Maintain a map of locations of existing and proposed natural gas well sites for reference when reviewing land use entitlements.

Proposed General Plan Policies NE-1 and NE-2, and Program NE-1 would require the integration of noise considerations into land use planning decisions to minimize new noise impacts, including noise impacts from stationary sources, to or from new development. These policy provisions would require an acoustical analysis for most new projects and consideration of noise-reducing measures. Policy NE-6 would prohibit noise-sensitive uses like residential neighborhoods from encroaching into areas planned for noise-generating uses such as industrial facilities.

With implementation of the proposed General Plan policies identified above, future development and activities under the proposed 2045 General Plan Update would result in a less than significant impact related to stationary noise sources.

Traffic Noise

Future development and activities under the proposed 2045 General Plan Update are expected to affect the community noise environment mainly by generating additional traffic. Transportation-source noise levels were calculated using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with traffic counts provided by Fehr & Peers Transportation Consultants (2024). The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (energy rates) used in the FHWA model have been modified to

reflect average vehicle noise rates identified for California by Caltrans. The Caltrans data shows that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. Future traffic noise contours are mapped in Figure 5-1, *Future Traffic Noise Contours*. Table 5-3, *Future (General Plan Buildout) Roadway Noise Levels*, shows the calculated off-site roadway noise levels under existing traffic levels compared to future buildout under the proposed 2045 General Plan Update.

As previously described in Section 2.1.3, *Human Response to Noise*, a 5-dBA change is required before any noticeable change in community response is expected. Based on this fact, a significant increase in traffic noise is considered to be an increase in the existing ambient noise environment of at least 5 dBA L_{dn}. As reflected in Table 5-3, this analysis included a large sample of local roadways segments but did not include all roadways within Rio Vista. The analyzed segments were selected to illustrate potential changes in roadway noise throughout Rio Vista. Therefore, additional roadways segments in Rio Vista may experience increased traffic noise.

Table 5-3. Future (General Plan Buildout) Roadway Noise Levels								
Roadway Segment	**L_{dn} at 50 Feet**		**Difference**	**Significant Increase**	**Distance to L_{dn} Contour (feet)[1, 2]**			
	Existing	**Existing plus Project**			**70 dBA**	**65 dBA**	**60 dBA**	**55 dBA**
State Route 12								
East of Front Street	65.8	68.0	+2.2	**No**	-	100	+200	-
Between Front Street and Drouin Drive	65.9	68.1	+2.2	**No**	-	103	+200	-
Between Drouin Drive and Amerada Road	68.2	70.5	+2.3	**No**	38	82	177	+300
Between Amerada Road and Summerset Road	69.3	71.6	+2.3	**No**	45	97	210	+300
West of Summerset Road	69.4	71.7	+2.3	**No**	46	98	212	+300
Front Street								
Between State Route 84 and Main Street	57.3	59.0	+1.7	**No**	-	-	40	127
Between Main Street and Hamilton Avenue	57.2	58.9	+1.7	**No**	-	-	39	124
Main Street								
Between State Route 12 and South Front Street	55.7	58.8	+3.8	**No**	-	-	38	120
Saint Francis Way								
Northeast of Rolling Green Drive	58.0	59.3	+1.3	**No**	-	-	45	96
Southwest of Rolling Green Drive	55.5	56.8	+1.3	**No**	-	-	-	76
Airport Road								
North of Liberty Island Road	55.5	60.0	+4.5	**No**	-	-	50	107
Between Liberty Island Road and Palisades Drive	59.2	63.6	+4.4	**No**	-	40	87	186
Between Palisades Drive and Baumann Road	59.2	63.6	+4.4	**No**	-	41	87	188
Between Baumann Road and Church Road	59.2	63.6	+4.4	**No**	-	40	87	186
Between Church Road and Norman Richards Drive	62.3	65.3	+3.0	**No**	-	53	113	244
Between Norman Richards Drive and Saint Francis Way	62.3	65.3	+3.0	**No**	-	53	113	244

Table 5-3. Future (General Plan Buildout) Roadway Noise Levels								
Between St Francis Way and Highway 84	60.0	63.0	+3.0	**No**	-	37	80	172
Church Road								
Between State Route 12 and Airport Road	57.7	62.5	+4.8	**No**	-	34	73	157
Liberty Island Road								
Between Summerset Road and Canright Road	51.2	60.0	+8.8	**Yes**	-	-	50	107
East of Canright Road	51.2	60.0	+8.8	**Yes**	-	-	50	108

Notes: Traffic noise levels were calculated using the FHWA Highway Noise Prediction Model in conjunction with the trip generation rate identified by Fehr & Peers. Refer to Attachment B for traffic noise modeling assumptions and results.

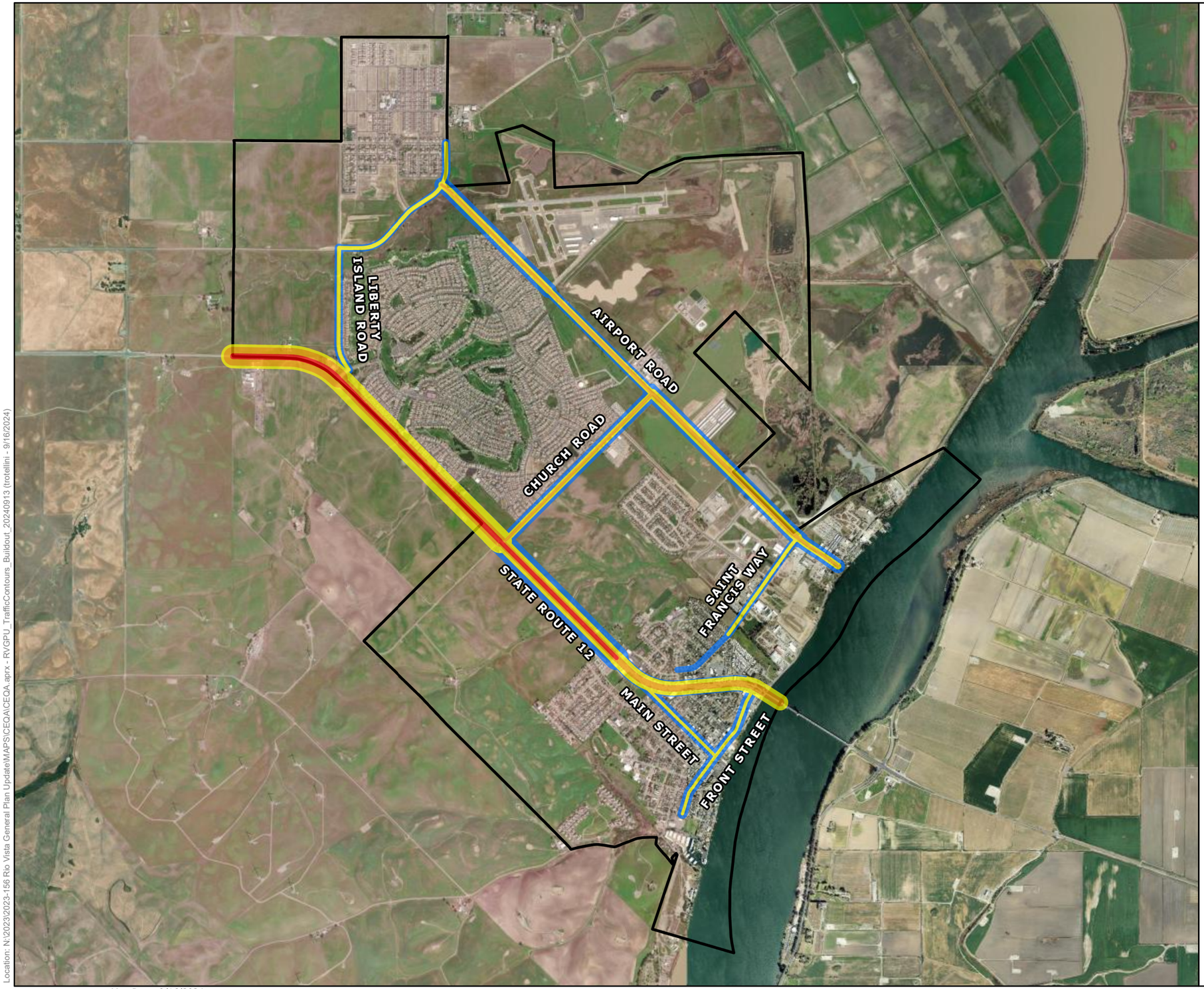
[1]Distance to L_{dn} contours do not account for the noise attenuation attributable to intervening structures.

[2]All contour distances from developed areas are capped at 200 feet from roadway centerlines. All contour distances from areas with undeveloped land are capped at 300 feet from roadway centerlines.

As shown in Table 5-3, the only roadway that would experience an increase of more than 5.0 dBA L_{dn} over existing conditions is Liberty Island Road. As previously described, a 5-dBA change is required before any noticeable change in community response is expected. Based on this fact, a significant increase in traffic noise is considered to be an increase in the existing ambient noise environment of at least 5 dBA L_{dn}.

Proposed General Plan Policies NE-1 and NE-2, and Program NE-1 would require the integration of noise considerations into land use planning decisions to minimize new noise impacts, including noise impacts from traffic sources, to or from new development. These policy provisions would require an acoustical analysis for most new projects and consideration of noise-reducing measures. Nonetheless, Liberty Island Road would experience an increase of more than 5.0 dBA L_{dn} over existing conditions with implementation of the 2045 General Plan, and traffic noise would be a significant impact.

Lead agencies have limited remedies at their disposal to effectively reduce traffic-related noise. Addressing traffic noise at the receiver rather than the source usually takes the form of noise barriers (i.e., sound walls). While constructing noise barriers along streets would reduce noise, the placement of sound walls between existing residences/businesses and local roadways would not be desirable as it would conflict with the community's aesthetic, design and character and is therefore deemed infeasible. Furthermore, such barriers would likely require property owner approval, which cannot be ensured. While measures such as encouraging ridesharing, carpooling, and alternative modes of transportation could reduce vehicle volumes, such measures can neither be mandated of residents nor have been shown to reduce vehicle trips to the extent needed to reduce vehicle noise levels below established thresholds. Therefore, no feasible mitigation measures exist to reduce the identified significant impact.



Map Contents

- City of Rio Vista
- 55 db Ldn
- 60 db Ldn
- 65 db Ldn
- 70 db Ldn

Sources: ESRI, Maxar (2022)

Location: N:\2023\2023-156 Rio Vista General Plan Update\MAPS\CEQA\CEQA.aprx - RVGPU_TrafficContours_Buildout_20240913 (trotellini - 9/16/2024)

Map Date: 9/16/2024

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 1,250 2,500

Figure 5-1. Traffic Noise Contours Buildout
2023-156 Rio Vista General Plan Update

5.3.2 The proposed 2045 General Plan Update would not result in the generation of excessive groundborne vibration or groundborne noise levels.

Construction vibration is a potential occurrence within Rio Vista and would continue to be so regardless of whether the 2045 General Plan Update is adopted. Construction-related vibration near individual construction sites associated with development and activities under the proposed 2045 General Plan Update would not be substantially different from what they would be under the existing City of Rio Vista General Plan 2001. Construction activities will occur in a variety of locations throughout Rio Vista and will most likely require the use of off-road equipment known to generate some degree of vibration. Construction activities that generate excessive vibration, such as blasting, would not be expected to occur from future development due to the topography of Rio Vista, which is relatively flat and devoid of rock outcroppings. Receptors sensitive to vibration include structures (especially older masonry structures), people (especially residents, the elderly, and the sick), and equipment (e.g., magnetic resonance imaging equipment, high resolution lithographic, optical and electron microscopes). Regarding the potential effects of groundborne vibration to people, except for long-term occupational exposure, vibration levels rarely affect human health.

The majority of construction equipment is not situated at any one location during construction activities, but rather spread throughout a construction site and at various distances from sensitive receptors. Since specific future projects under the proposed 2045 General Plan Update are unknown at this time, it is conservatively assumed that the construction areas associated with these future projects could be located within 50 feet of sensitive structures. The primary vibration-generating activities would occur during grading, placement of underground utilities, and construction of foundations. Table 5-4, *Representative Vibration Source Levels for Construction Equipment*, shows the typical vibration levels produced by construction equipment at 50 feet.

Table 5-4. Representative Vibration Source Levels for Construction Equipment		
Equipment	**Peak Particle Velocity at 50 Feet (inches per second)**	**Vibration Level Vibration Velocity at 50 Feet (VdB)**
Pile Driver (Impact)	0.225	95
Pile Driver (Sonic)	0.059	84
Vibratory Roller	0.073	85
Hoe Ram	0.031	78
Large Bulldozer	0.031	78
Caisson Drilling	0.031	78
Loaded Trucks	0.026	77
Jackhammer	0.012	70
Small Bulldozer	0.001	49

Source: Caltrans 2020c

As previously described, the proposed 2045 General Plan Update Noise Element Policy NE-8 would introduce more stringent regulations surrounding the timing of construction to provide greater protection for city residents. Instead of only exempting construction from City noise standards when it occurs between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and 8:00 a.m. and 7:00 p.m. on Saturdays and Sundays, proposed Policy NE-8 would restrict all construction activity to the hours between 7:00 a.m. and 5:00 p.m. (unless an exemption is granted in the City's review of the project's entitlement or permit). Compared to the current standard, this policy reduces the allowable construction window by two hours and entirely prohibits evening and nighttime construction. Adherence to proposed Policy NE-8 would ensure that vibration reduction is being provided to minimize temporary construction-related vibration impacts. Construction vibration under the proposed 2045 General Plan Update would be less than significant.

Additionally, in terms of the generation of groundborne vibration from sources other than construction, City Municipal Code Sections 17.28.040 and 17.29.040 prohibit any commercial or industrial use constituting or resulting in public or private nuisance because of vibration. Vibration from operations under the proposed 2045 General Plan Update would not be any greater than what they are under the existing City of Rio Vista General Plan 2001.

5.3.3 The proposed 2045 General Plan Update would not expose people residing or working in the project area to excessive noise levels within the vicinity of a private airstrip or an airport land use plan.

A significant source of noise in Rio Vista is the aircraft operations at the Rio Vista Municipal Airport, located in the north-central part of the city. High noise levels can occur both on airport property and in nearby neighborhoods when aircraft take off and land. The Solano County Airport Land Use Commission promotes land use compatibility around the Rio Vista Municipal Airport to minimize public exposure to excessive

noise and safety hazards. The Solano County Airport Land Use Commission's ALUCP includes airport noise contour graphics, which help prevent the development of incompatible land uses near the airport.

Figure 4-3 shows the projected noise contours for 2035, reflecting an estimated 26,305 annual aircraft operations. Notably, the 65 dBA CNEL contour remains entirely within the airport boundary, and only a small portion of the 60 dBA CNEL contour extends beyond the airport, specifically near Palisades Drive and Airport Road. The 55 dBA CNEL contour extends further but follows a similar pattern. These contours guide future development decisions, ensuring that sensitive land uses are protected from excessive noise levels associated with airport operations.

The proposed 2045 General Plan Update's Noise Element establishes policy guidance to minimize noise impacts within the community and sets noise control measures for the operational phases of land use projects. By identifying noise-sensitive areas and establishing compatibility guidelines (outlined in Table 10-1 of the Noise Element), this approach helps shape the distribution, location, and intensity of future land uses, ensuring that noise-related issues can be effectively mitigated through careful planning and project design. A key policy, Policy NE-7, focuses on protecting new development within the 55 dBA CNEL contour of the Rio Vista Municipal Airport, as depicted in Figure 4-3. Projects within this contour will be reviewed for noise sensitivity and consistency with both City and ALUCP noise standards.

A fundamental strategy to minimize noise impacts is to avoid placing noise-sensitive land uses—such as schools, hospitals, residential areas, and recreational facilities—in areas where noise levels exceed acceptable thresholds. These land uses must comply with the Maximum Allowable Exterior and Interior Noise Level standards in Table 10-1 of the 2045 General Plan Noise Element. Policy NE-1 and Policy NE-7 require new developments within the 55 dBA CNEL contour of the airport to conduct an acoustical analysis to assess compliance with the noise standards in Table 10-1. This analysis, typically involving baseline noise measurements with sound level meters, will determine whether the existing noise environment is compatible with the proposed development. The analysis will also guide the implementation of necessary noise mitigation measures, including advanced building construction methods and other design solutions to ensure adequate noise attenuation for sensitive land uses.

5.3.4 The proposed 2045 General Plan Update, in combination with past, present, and reasonably foreseeable projects, would not result in cumulative traffic noise impacts in the area.

Cumulative Construction Noise and Vibration

Construction noise impacts primarily affect the areas immediately adjacent to the construction site. Development that could occur with implementation of the proposed 2045 General Plan Update could be constructed contemporaneously and could result in construction high noise levels. As discussed above, noise levels generated by individual pieces of construction equipment typically range from approximately 74 dBA to 101.3 dBA L_{max} at 50 feet and 67.7 dBA to 94.3 dBA L_{eq} at 50 feet. The City of Rio Vista has established and enforces noise standards for construction activity including the establishment of hours for construction activity that are exempted from City noise standards. The proposed 2045 General Plan Update

Noise Element Policy NE-8 would introduce more stringent regulations to provide greater noise protection for city residents. Instead of only exempting construction noise from City noise standards when it occurs between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and 8:00 a.m. and 7:00 p.m. on Saturdays and Sundays, proposed Policy NE-8 would restrict all construction activity to the hours between 7:00 a.m. and 5:00 p.m. (unless an exemption is granted in the City's review of the project's entitlement or permit). Compared to the current standard, this policy reduces the allowable construction window by two hours and entirely prohibits evening and nighttime construction. Additionally, proposed Policy NE-8 would require all internal combustion engines used in conjunction with construction activities to be muffled according to the equipment manufacturer's requirements. Therefore, although the potential exists for construction projects under the proposed 2045 General Plan Update and other foreseeable development to occur simultaneously and in proximity to one another, construction equipment operations would operate within the constraints of the City of Rio Vista Municipal Code. Additionally, cumulative construction noise is currently an intermittent source of temporary noise within Rio Vista and will continue to be so regardless of whether the 2045 General Plan Update is adopted. Noise levels near multiple construction sites associated with development and activities under the proposed 2045 General Plan Update would not be substantially different from what they would be under the existing City of Rio Vista General Plan 2001 and therefore the impact is less than significant.

The potential for a cumulative vibration-related damage impact is minimal as vibration impacts are based on approximate VdB levels. Thus, worst-case groundborne vibration levels from construction are determined by whichever individual piece of equipment generates the highest vibration levels. Unlike the analysis for average noise levels, in which noise levels of multiple pieces of equipment can be combined to generate a maximum combined noise level, approximate vibration levels do not combine in this manner. Vibration from multiple construction sites, even if they are located close to one another, would not combine to raise the maximum VdB. Therefore, vibration impacts resulting from construction of future development under the proposed 2045 General Plan Update would not combine with vibration effects from cumulative projects in the vicinity and the impact would be less than significant.

Cumulative Stationary Source Noise

Long-term stationary noise sources associated with the development and activities under the proposed 2045 General Plan Update, combined with other cumulative projects, could cause local noise level increases. Noise levels associated with the proposed 2045 General Plan Update and cumulative development combined could result in higher noise levels than considered separately. However, as described above, proposed General Plan Policies NE-1, NE-2, NE-3, NE-5, NE-6, as well as Programs NE-1 and NE-2 would protect the inhabitants of the city against all forms of noise, including stationary source noise. With implementation and adherence to the previously listed proposed policies, future development under the proposed 2045 General Plan Update and cumulative development combined would not create cumulatively considerable stationary noise sources and the impact would be less than significant.

Cumulative Traffic Noise

The discussion of cumulative operational traffic noise impacts assesses whether future development under the proposed 2045 General Plan, in conjunction with overall citywide growth and other cumulative projects, would significantly affect the roadway noise and, if so, whether it's contribution to the cumulative impact would be considerable. The analysis contained in Impact 5.3.1 above is largely a cumulative analysis in that the transportation modeling also includes the citywide and regional changes in housing units and employment that would occur through the General Plan horizon. Thus, Impact 5.3.1 considers the changes in travel demand projected to occur through the 2045 General Plan horizon due to land use growth, and the cumulative transportation and infrastructure projects anticipated to be completed both inside and outside Rio Vista. As identified in Impact 5.3.1, the 2045 General Plan would result in a significant traffic noise impact to Liberty Island Road; therefore, the 2045 General Plan would result in a cumulatively considerable and significant noise impact associated with cumulative traffic noise.

6.0 REFERENCES

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Rio Vista, City of. 2021. Municipal Code Chapter 17.52, Noise Standards.

Solano County Airport Land Use Commission. 2018. Rio Vista Airport Land Use Compatibility Plan.

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LIST OF ATTACHMENTS

ATTACHMENT A

Baseline (Existing) Noise Measurements

Site Number: 1	
Recorded By: Rosey Worden	
Job Number: 2023-156	
Date: 10/16/2023 – 10/17/2023	
Time: 11:46 a.m. – 11:46 a.m.	
Location: On Airport Road adjacent to the Airport Road Self Storage approximately 42 feet from the center of the roadway.	
Source of Peak Noise: Vehicles on Airport Road.	

Noise Data			
L_{dn} (dB)	**Leq (dB)**	**Lmin (dB)**	**Lmax (dB)**
65.9	63.4	28.2	87.8

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0006133**	**05/25/2023**	
	Microphone	**Larson Davis**	**377B02**	**346688**	**05/23/2023**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**069947**	**05/25/2023**	
	Calibrator	**Larson Davis**	**CAL200**	**17325**	**05/12/2023**	

Weather Data			
Est.	**Duration:** 24 hr.	**Sky:** Clear	
	Note: dBA Offset = 0.01	**Sensor Height (ft):** 4	
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	7	68	30.24

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.041.s	Computer's File Name	LxT_0006133-20231016 114650-LxT_Data.041.ldbin
Meter	LxT1 0006133	Firmware	2.404
User		Location	
Job Description			
Note			

Start Time	2023-10-16 11:46:50	Duration	24:00:00.0		
End Time	2023-10-17 11:46:50	Run Time	24:00:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-10-16 11:40:45	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	63.4 dB		
LAE	112.8 dB	SEA	--- dB
EA	21.0 mPa²h		
EA8	7.0 mPa²h		
EA40	35.0 mPa²h		
LZS_{peak}	114.4 dB	2023-10-16 16:15:04	
LAS_{max}	87.8 dB	2023-10-16 14:31:28	
LAS_{min}	28.2 dB	2023-10-17 05:41:12	
LA_{eq}	63.4 dB		
LC_{eq}	70.2 dB	LC_{eq} - LA_{eq}	6.8 dB
LAI_{eq}	66.2 dB	LAI_{eq} - LA_{eq}	2.8 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	2	0:00:03.8
LAS > 115.0 dB	0	0:00:00.0
LZSpk > 135.0 dB	0	0:00:00.0
LZSpk > 137.0 dB	0	0:00:00.0
LZSpk > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
65.9 dB	65.1 dB	0.0 dB

LDEN	LDay	LEve	LNight
66.1 dB	65.9 dB	57.8 dB	56.9 dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	63.4 dB		--- dB		--- dB	
$LS_{(max)}$	87.8 dB	2023-10-16 14:31:28	--- dB	None	--- dB	None
$LS_{(min)}$	28.2 dB	2023-10-17 05:41:12	--- dB	None	--- dB	None
$L_{Peak(max)}$	--- dB	None	--- dB	None	114.4 dB	2023-10-16 16:15:04

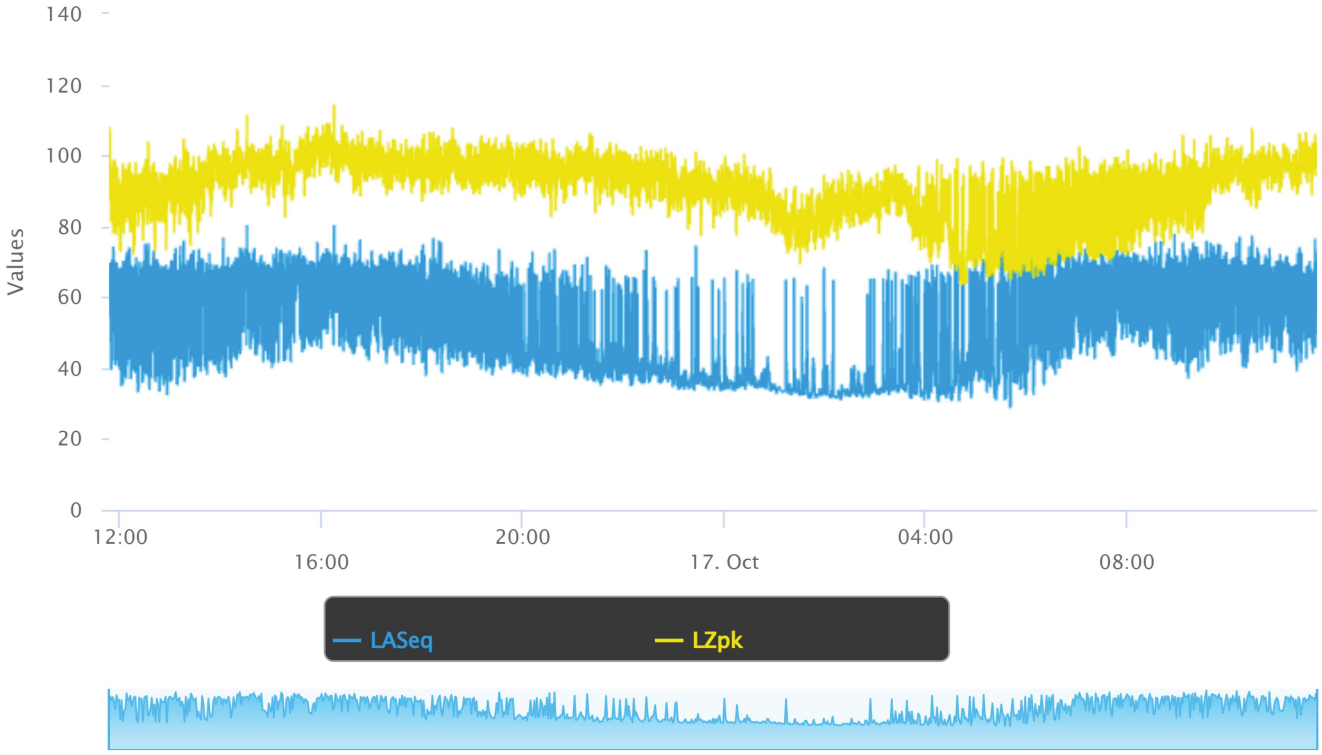
Overloads

Count	Duration
0	0:00:00.0

Statistics

LAS 5.0	71.0 dB
LAS 10.0	68.5 dB
LAS 33.3	54.6 dB
LAS 50.0	46.9 dB
LAS 66.6	41.1 dB
LAS 90.0	34.1 dB

Time History



Site Number: 2	
Recorded By: Rosey Worden	
Job Number: 2023-156	
Date: 10/17/2023 – 10/18/2023	
Time: 12:05 p.m. – 12:05 p.m.	
Location: Second Street and Main Street intersection approximately two blocks north of City Hall.	
Source of Peak Noise: Vehicles on Second Street and Main Street.	

Noise Data			
L_{dn} (dB)	**Leq (dB)**	**Lmin (dB)**	**Lmax (dB)**
64.3	62.0	35.6	102.0

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0006133**	**05/25/2023**	
	Microphone	**Larson Davis**	**377B02**	**346688**	**05/23/2023**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**069947**	**05/25/2023**	
	Calibrator	**Larson Davis**	**CAL200**	**17325**	**05/12/2023**	

Weather Data			
Est.	**Duration:** 24 hr.	**Sky:** Clear	
	Note: dBA Offset = 0.01	**Sensor Height (ft):** 4	
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	5	70	30.24

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.042.s	Computer's File Name	LxT_0006133-20231017 120505-LxT_Data.042.ldbin
Meter	LxT1 0006133	Firmware	2.404
User		Location	
Job Description			
Note			

Start Time	2023-10-17 12:05:05	Duration	24:00:00.0		
End Time	2023-10-18 12:05:05	Run Time	24:00:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-10-16 11:40:44	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	62.0 dB		
LAE	111.4 dB	SEA	--- dB
EA	15.2 mPa²h		
EA8	5.1 mPa²h		
EA40	25.4 mPa²h		
LZS_{peak}	115.3 dB	2023-10-17 14:12:56	
LAS_{max}	102.0 dB	2023-10-18 09:52:05	
LAS_{min}	35.6 dB	2023-10-18 02:04:32	
LA_{eq}	62.0 dB		
LC_{eq}	70.4 dB	LC_{eq} - LA_{eq}	8.4 dB
LAI_{eq}	66.5 dB	LAI_{eq} - LA_{eq}	4.5 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	21	0:01:08.8
LAS > 115.0 dB	0	0:00:00.0
LZSpk > 135.0 dB	0	0:00:00.0
LZSpk > 137.0 dB	0	0:00:00.0
LZSpk > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
64.3 dB	63.7 dB	0.0 dB

LDEN	LDay	LEve	LNight
64.6 dB	64.5 dB	57.6 dB	55.2 dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	62.0 dB		--- dB		--- dB	
$LS_{(max)}$	102.0 dB	2023-10-18 09:52:05	--- dB	None	--- dB	None
$LS_{(min)}$	35.6 dB	2023-10-18 02:04:32	--- dB	None	--- dB	None
$L_{Peak(max)}$	--- dB	None	--- dB	None	115.3 dB	2023-10-17 14:12:56

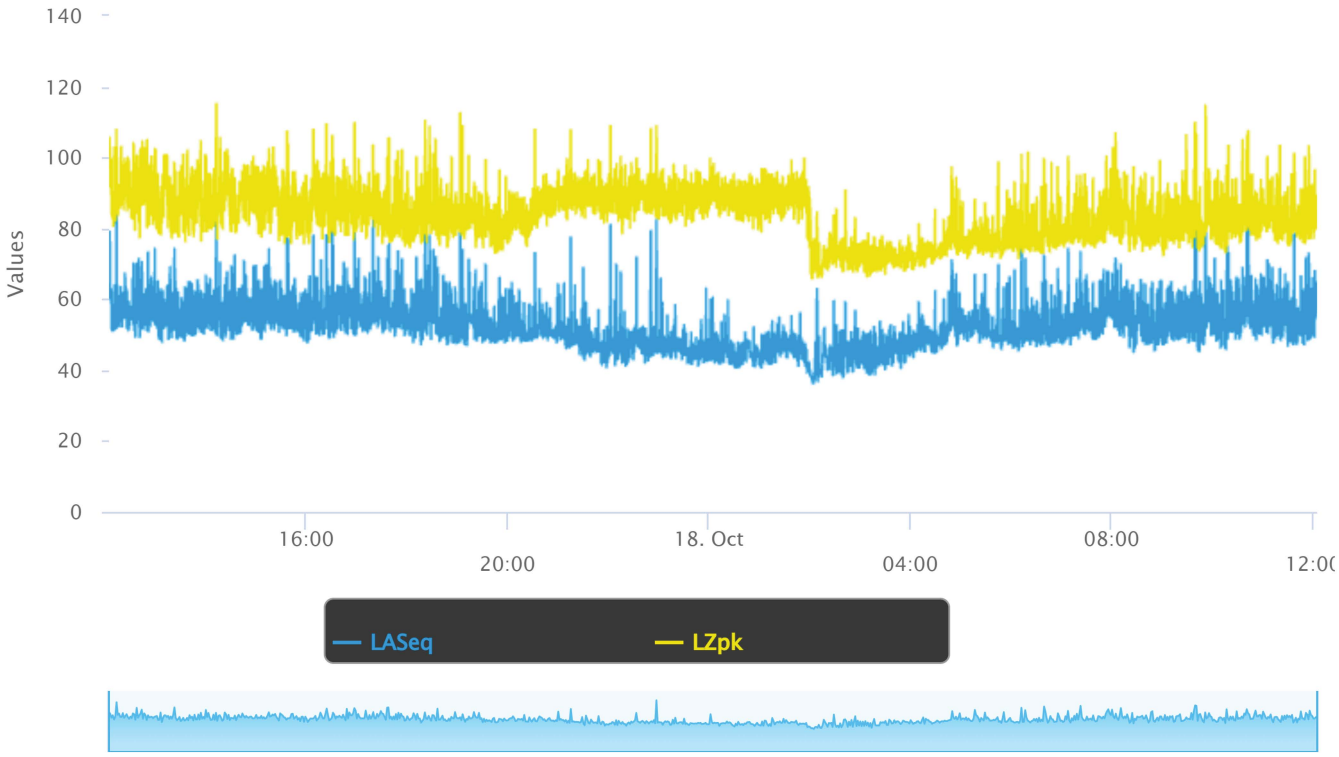
Overloads

Count	Duration
0	0:00:00.0

Statistics

LAS 5.0	62.7 dB
LAS 10.0	59.5 dB
LAS 33.3	53.8 dB
LAS 50.0	51.3 dB
LAS 66.6	48.9 dB
LAS 90.0	44.1 dB

Time History



Site Number: 3			
Recorded By: Rosey Worden			
Job Number: 2023-156			
Date: 11/30/2023 – 12/1/2023			
Time: 2:48 p.m. – 2:48 p.m.			
Location: In Drouin Drive Park approximately 200 feet from park entrance.			
Source of Peak Noise: Yard maintenance equipment and vehicles on adjacent roadways.			
Noise Data			
L_{dn} (dB)	**Leq (dB)**	**Lmin (dB)**	**Lmax (dB)**
59.6	55.3	28.3	88.9

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0006133**	**05/25/2023**	
	Microphone	**Larson Davis**	**377B02**	**346688**	**05/23/2023**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**069947**	**05/25/2023**	
	Calibrator	**Larson Davis**	**CAL200**	**17325**	**05/12/2023**	

Weather Data			
Est.	**Duration:** 24 hr.	**Sky:** Clear	
	Note: dBA Offset = 0.01	**Sensor Height (ft):** 4	
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	5	51	30.24

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.050.s	Computer's File Name	LxT_0006133-20231130 144828-LxT_Data.050.ldbin
Meter	LxT1 0006133	Firmware	2.404
User		Location	
Job Description			
Note			

Start Time	2023-11-30 14:48:28	Duration	24:00:00.0		
End Time	2023-12-01 14:48:28	Run Time	24:00:00.0	Pause Time	0:00:00.0
Pre-Calibration	2023-11-29 13:47:39	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	55.3 dB		
LAE	104.7 dB	SEA	152.1 dB
EA	3.3 mPa²h		
EA8	1.1 mPa²h		
EA40	5.4 mPa²h		
LZS_{peak}	122.1 dB	2023-12-01 14:41:40	
LAS_{max}	88.9 dB	2023-12-01 07:21:40	
LAS_{min}	28.3 dB	2023-12-01 09:30:44	
LA_{eq}	55.3 dB		
LC_{eq}	77.5 dB	LC_{eq} - LA_{eq}	22.2 dB
LAI_{eq}	63.3 dB	LAI_{eq} - LA_{eq}	8.0 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	5	0:00:06.4
LAS > 115.0 dB	0	0:00:00.0
LZSpk > 135.0 dB	0	0:00:00.0
LZSpk > 137.0 dB	0	0:00:00.0
LZSpk > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
59.6 dB	56.5 dB	0.0 dB

LDEN	LDay	LEve	LNight
59.7 dB	57.3 dB	47.1 dB	52.3 dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	55.3 dB		--- dB		--- dB	
$LS_{(max)}$	88.9 dB	2023-12-01 07:21:40	--- dB	None	--- dB	None
$LS_{(min)}$	28.3 dB	2023-12-01 09:30:44	--- dB	None	--- dB	None
$L_{Peak(max)}$	--- dB	None	--- dB	None	122.1 dB	2023-12-01 14:41:40

Overloads

Count	Duration
9	0:01:36.10

Statistics

LAS 5.0	56.9 dB
LAS 10.0	51.7 dB
LAS 33.3	44.7 dB
LAS 50.0	42.3 dB
LAS 66.6	40.3 dB
LAS 90.0	36.7 dB

ATTACHMENT B

FHWA Highway Traffic Noise Prediction Model

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 2023-156
Project Name: Rio Vista General Plan- Existing Traffic Volumes

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: County Traffic Studies
Community Noise Descriptor: L_{dn}: x CNEL:

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Existing Conditions				Design		Vehicle Mix		Distance from Centerline of Roadway					
		Median	ADT	Speed	Alpha	Medium	Heavy	Ldn at	Distance to Contour				Calc
Roadway, Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	50 Feet	70 Ldn	65 Ldn	60 Ldn	55 Ldn	Dist
State Route 12													
East of Front Street	2	0	20,410	35	0	1.8%	0.7%	**65.8**	-	60	188	596	50
Between Front Stret and Drouin Drive	2	12	20,410	35	0	1.8%	0.7%	**65.9**	-	61	193	609	50
Between Drouin Drive and Amerada Road	2	0	20,410	45	0.5	1.8%	0.7%	**68.2**	38	82	177	382	50
Between Amerada Road and Summerset Road	2	0	20,410	50	0.5	1.8%	0.7%	**69.3**	45	97	210	453	50
West of Summerset Road	2	5	20,410	50	0.5	1.8%	0.7%	**69.4**	46	98	212	456	50
Front Street													
Between State Route 84 and Main Street	2	12	5,070	25	0	1.8%	0.7%	**57.3**	-	-	-	86	50
Between Main Street and Hamilton Avenue	2	0	5,070	25	0	1.8%	0.7%	**57.2**	-	-	-	84	50
Main Street													
Between State Route 12 and South Front Street	2	0	3,580	25	0	1.8%	0.7%	**55.7**	-	-	-	59	50
Saint Francis Way													
Northeast of Rolling Green Drive	2	0	3,400	35	0.5	1.8%	0.7%	**58.0**	-	-	37	79	50
Southwest of Rolling Green Drive	2	0	3,400	25	0	1.8%	0.7%	**55.5**	-	-	-	56	50

Airport Road													
North of Liberty Island Road	2	0	1,950	35	0.5	1.8%	0.7%	**55.5**	-	-	-	54	50
Between Liberty Island Road and Palisades Drive	2	0	1,950	50	0.5	1.8%	0.7%	**59.2**	-	-	44	95	50
Between Palisades Drive and Baumann Road	2	6	1,950	50	0.5	1.8%	0.7%	**59.2**	-	-	44	95	50
Between Baumann Road and Church Road	2	0	1,950	50	0.5	1.8%	0.7%	**59.2**	-	-	44	95	50
Between Church Road and Norman Richards Drive	2	0	4,050	50	0.5	1.8%	0.7%	**62.3**	-	33	71	154	50
Between Norman Richards Dr and St Francis Way	2	0	4,050	50	0.5	1.8%	0.7%	**62.3**	-	33	71	154	50
Between St Francis Way and Highway 84	2	0	4,050	40	0.5	1.8%	0.7%	**60.0**	-	-	50	108	50
Church Road													
Between State Route 12 and Airport Road	2	0	2,360	40	0.5	1.8%	0.7%	**57.7**	-	-	35	75	50
Liberty Island Road													
Between Summerset Road and Canright Road	2	0	710	35	0.5	1.8%	0.7%	**51.2**	-	-	-	-	50
East of Canright Road	2	5	710	35	0.5	1.8%	0.7%	**51.2**	-	-	-	-	50

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 2023-156
Project Name: Rio Vista General Plan- 2045 Forecasts

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: County Traffic Studies
Community Noise Descriptor: L_{dn}: x CNEL:

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

2045 Forecasts				Design		Vehicle Mix		Distance from Centerline of Roadway					
Roadway, Segment	Lanes	Median Width	ADT Volume	Speed (mph)	Alpha Factor	Medium Trucks	Heavy Trucks	Ldn at 50 Feet	Distance to Contour 70 Ldn	65 Ldn	60 Ldn	55 Ldn	Calc Dist
State Route 12													
East of Front Street	2	0	34,400	35	0	1.8%	0.7%	**68.0**	-	100	318	1,004	50
Between Front Stret and Drouin Drive	2	12	34,400	35	0	1.8%	0.7%	**68.1**	-	103	325	1,027	50
Between Drouin Drive and Amerada Road	2	0	34,400	45	0.5	1.8%	0.7%	**70.5**	54	117	251	541	50
Between Amerada Road and Summerset Road	2	0	34,400	50	0.5	1.8%	0.7%	**71.6**	64	138	297	641	50
West of Summerset Road	2	5	34,400	50	0.5	1.8%	0.7%	**71.7**	65	139	300	646	50
Front Street													
Between State Route 84 and Main Street	2	12	7,500	25	0	1.8%	0.7%	**59.0**	-	-	40	127	50
Between Main Street and Hamilton Avenue	2	0	7,500	25	0	1.8%	0.7%	**58.9**	-	-	39	124	50
Main Street													
Between State Route 12 and South Front Street	2	0	7,300	25	0	1.8%	0.7%	**58.8**	-	-	38	120	50
Saint Francis Way													
Northeast of Rolling Green Drive	2	0	4,600	35	0.5	1.8%	0.7%	**59.3**	-	-	45	96	50
Southwest of Rolling Green Drive	2	0	4,600	25	0	1.8%	0.7%	**56.8**	-	-	-	76	50

Airport Road													
North of Liberty Island Road	2	0	5,400	35	0.5	1.8%	0.7%	**60.0**	-	-	50	107	50
Between Liberty Island Road and Palisades Drive	2	0	5,400	50	0.5	1.8%	0.7%	**63.6**	-	40	87	186	50
Between Palisades Drive and Baumann Road	2	6	5,400	50	0.5	1.8%	0.7%	**63.6**	-	41	87	188	50
Between Baumann Road and Church Road	2	0	5,400	50	0.5	1.8%	0.7%	**63.6**	-	40	87	186	50
Between Church Road and Norman Richards Drive	2	0	8,100	50	0.5	1.8%	0.7%	**65.3**	-	53	113	244	50
Between Norman Richards Dr and St Francis Way	2	0	8,100	50	0.5	1.8%	0.7%	**65.3**	-	53	113	244	50
Between St Francis Way and Highway 84	2	0	8,100	40	0.5	1.8%	0.7%	**63.0**	-	37	80	172	50
Church Road													
Between State Route 12 and Airport Road	2	0	7,100	40	0.5	1.8%	0.7%	**62.5**	-	34	73	157	50
Liberty Island Road													
Between Summerset Road and Canright Road	2	0	5,400	35	0.5	1.8%	0.7%	**60.0**	-	-	50	107	50
East of Canright Road	2	5	5,400	35	0.5	1.8%	0.7%	**60.0**	-	-	50	108	50