NAPA RENEWABLE RESOURCES PROJECT 2.0

Draft Environmental Impact Report: Appendices

SCH No. 2023110393

January 2026



Prepared for:

City of Napa
Utilities Department
Solid Waste and Recycling Division
P.O. Box 660
Napa, CA 94559

Prepared by:

RCH Group, Inc.
PO Box 516
Rancho Murieta, CA 95683

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RCH Group, Inc.
PO Box 516
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APPENDIX A

NOTICE OF PREPARATION (NOP)

POSTED
RECEIVED 11-15-23 BY: 4
COMPLETED. BY:
NAPA COUNTY CLERK

Notice of Preparation

TO: Interested Parties, Responsible & Trustee Agencies and Community Members

FROM: Chris Jones, City of Napa, Associate Engineer, Utilities Department

DATE: November 15, 2023

SUBJECT: Notice of Preparation (Notice) of an Environmental Impact Report (EIR) and Notice of Zoom Scoping Meeting for Napa Renewable Resources Project 2.0 (NRRP 2.0)

Summary

The City of Napa (City) is issuing this notice to advise other agencies and the public that the City will be preparing an Environmental Impact Report (EIR) for the Napa Renewable Resources Project 2.0 (NRRP 2.0). NRRP 2.0 (the "Project") will be on and adjacent to the existing Napa Material Diversion Facility at 820 Levitin Way, unincorporated Napa County. The EIR will be prepared in compliance with the California Environmental Quality Act (CEQA) and relevant state and Federal laws. The City will serve as the CEQA lead agency for preparation of the EIR.

The City is issuing this Notice to alert interested parties and solicit agency and public input regarding the scope and content of the environmental analysis. Input received will be considered in the preparation of the EIR.

Dates for Comments and Public Scoping Meeting

Written comments on the scope of the EIR, including the Project objectives, impacts to be evaluated, methodologies to be used in the evaluations, and the alternatives to be considered, should be provided to the City by December 15, 2023. A scoping meeting Zoom Webinar will be held on December 6, 2023, at 9 a.m.

The Webinar information is below:

https://us02web.zoom.us/j/86264052636

Or join the webinar by Phone (669) 444-9171 or 669 900 6833 Webinar ID: 862 6405 2636

This notice with details of the webinar will also be posted on the City's Utility Department website:

Recycling & Solid Waste Division | Napa, CA (cityofnapa.org)

The Project objectives, description of the proposed Project and alternatives currently under consideration will be presented in the scoping meeting with a PowerPoint slide presentation.

Contact Address

Written comments on the Project scope should be sent to:

City of Napa Utilities Department
ATTN: Chris Jones, P.E.
RE: NRRP 2.0 EIR
P.O. Box 660
Napa, CA 94559-0660

Or, via email with the subject line "NRRP 2.0 EIR" to: chrisjones@cityofnapa.org

For Further Information Contact: Chris Jones at (707) 257-9460

Supplemental Information

EIR Scoping

The City invites all interested individuals, organizations, public agencies, and Native American Tribes to comment on the scope of the EIR, including the Project objectives, the alternatives to be studied, the impacts to be evaluated and the evaluation methods to be used. Comments should focus on alternatives that may have fewer environmental impacts while achieving similar objectives and the identification of any significant social, economic, or environmental issues related to alternatives.

Project Location and Setting

The proposed Project site is located at 820 Levitin Way and adjacent parcels (see **Figure 1**). The Napa Materials Diversion Facility (NMDF) is located at 820 Levitin Way and currently receives and processes all solid waste, compostable and recyclable materials generated within the City that are collected by the City's authorized operator Napa Recycling & Waste Services (NRWS). The NMDF also receives, and processes materials delivered by haulers servicing surrounding jurisdictions (such as unincorporated Napa County) and by private (self-haul) customers.



Source: RCH Group; Google Earth Pro, 2023

Figure 1
Regional Site Location

RCH GROUP
planning & environmental consulting

Current operations on the Project site include receiving, storing, processing, recycling, and composting waste materials from residential, commercial, and industrial sectors. The site operates under Solid Waste Facility Permit 28-AA-0030.

The Project would include a portion of the adjacent parcel to the south (APN 057-090-060). The parcel will be split into a separate parcel upon purchase and subsequently annexed into the City of Napa. The EIR will evaluate the southern parcel area as the location for the proposed biomass gasification facility and potentially other NMDF operations.

The Project would also add a portion of the parcel to the north that is owned by 600 Tower Road Holdings, LLC, an LLC with the same owners as NRWS. The Tower Road Parcel may be used for inert materials processing and storage and equipment storage.

The current Napa Renewable Resources Project 1.0 (NRRP 1.0) at the NMDF was approved in 2014 (with later amendments). The City plans to increase its resource recovery capabilities at the NMDF to meet evolving state regulations for solid waste, compostable and recyclable materials. The proposed changes will be evaluated in the NRRP 2.0 EIR. The NRRP 2.0 EIR will evaluate resource recovery improvements on and adjacent to the existing NMDF operations at 820 Levitin Way.

The proposed major improvements consist of the following:

- Increase NMDF permitted maximum incoming daily tonnage from to 760 to 1,000 tons per day;
- Add a Biomass Gasification Facility on adjacent property to be annexed into City of Napa or on the existing NMDF site;
- Add an Anaerobic Digestion Facility on the existing NMDF site or on the adjacent property to be annexed into the City; and
- Add solar panels over the parking and materials storage areas along the eastern property border from the covered aerated static piles (CASP) to the property boundary.

Increase daily Tonnage Limits

To meet evolving state regulations for solid waste, compostable and recyclable materials, and the resulting increases in demand for processing capabilities, the Project would increase the tonnage limit for the facility from 760 to 1,000 tons per day. The increase would acknowledge the increased processing capacity of the facility from the anaerobic digester (AD), the biomass gasification facility (BGF), equipment upgrades, and potentially increased hours of operation for some of the existing operations. The increase in tonnage limits would assist in accommodating increased demands from new state regulations such as SB 1383[1], the innovative technologies, as well as seasonal fluctuations in materials received (i.e., agricultural materials [e.g., grape pomace], and the seasonal increase from autumn leaves).

[1] California Department of Resources Recycling and Recovery (CalRecycle), https://calrecycle.ca.gov/organics/slcp/, accessed Sept. 26, 2023.

Biomass Gasification Facility

The Biomass Gasification Facility (BGF) could be developed on the undeveloped, adjacent property (APN: 057-090-060) to the south of the NMDF or on the existing NMDF site. The property to the south is owned by Napa-Vallejo Waste Management Authority, and it is proposed to be purchased by the City and then annexed into the City subject to approval by Local Agency Formation Commission (LAFCO) of Napa County. After the proposed purchase of the adjacent property, the existing parcel (APN: 057-090-060) will create a smaller 2.87-acre parcel. The resulting 2.87-acre parcel would exclude the wetlands on APN: 057-090-060 that have been identified in previous studies. The adjacent property is located on the westerly side of Devlin Road between NMDF to the north and Devlin Road Transfer Station to the south.

NRWS plans to engage a design-build contractor for the design and construction of a biomass gasification facility (Facility) at the Napa Material Diversion Facility (NMDF). A large impetus for this effort was the closure of many conventional biomass energy facilities that considerably increased the cost of diverting wood waste, particularly compost overs, from landfill disposal. Operation of a BGF at the NMDF will mitigate those cost increases as well as avoid the need for off-site shipment of these materials (avoiding potentially 900 – 1900 truck shipments annually). The facility may produce electric power, renewable transportation fuel, biochar, other products, or a combination thereof.

The Biomass Gasification Facility (BGF) could be constructed on the above-mentioned property and is anticipated to have the capacity to generate 3 to 5 megawatts (MW) of electricity. A BGF Request for Proposals (RFP) was issued July 26, 2023, for experienced companies to, at a minimum, design and build the BGF. Following the selection of a preferred candidate for development of the BGF, this EIR will include information provided by the selected Project developer, and analysis of environmental impacts.

In California, there are about two dozen active biomass to energy plants in operation. These plants are fueled primarily by wood waste and agricultural residues. Gasification typically refers to conversion in an oxygen- or air-deficient environment to produce fuel gases (e.g., synthesis gas, also known as “syngas”). The fuel gases are principally carbon monoxide, hydrogen, methane, and lighter hydrocarbons, but depending on the process used, can contain significant amounts of carbon dioxide and nitrogen, the latter mostly from air. Gasification also produces liquids (tars, oils, and other condensates) and solids (char, ash) from solid feedstocks.[2]

Anaerobic Digester

The existing NMDF site was approved for an Anaerobic Digester (AD) in the 2014 CEQA Mitigated Negative Declaration (MND). However, the AD has not been constructed. In May 2023, the City of Napa applied for a $10,000,000 grant with the Department of Resources Recycling and Recovery (CalRecycle) for funds to develop AD on the existing NMDF property. The details for the technology in the CalRecycle grant will be evaluated in the EIR, identifying any impacts from the AD operations that were not addressed in the 2014 MND and addendums.

[2] California Department of Resources Recycling and Recovery (CalRecycle), https://calrecycle.ca.gov/organics/conversion/pathways/thermochem/, accessed Sept. 26, 2023.

The AD would have a comparable footprint to the facility included in the second Technical Addendum to the 2014 MND, with incoming feedstock and residuals of up to 44,000 tons per year (TPY). However, the AD process would be different than the facility described in the original 2014 MND, but generally consistent with the second Technical Addendum to the 2014 MND.

The grant application plan is to construct an AD with high biomethane potential material such as food waste supplemented with green waste to maintain a solid matrix that is suitable for a plug flow system. The AD technology selected by the city is provided by Zero Waste Energy, LLC (ZWE), and uses a continuous plug-flow system to produce biogas and digestate. The biogas is cleaned and compressed to generate carbon negative renewable natural gas (RNG) that will fuel trucks owned by NRWS or affiliated companies. Since the supply of RNG is projected to meet the demand of the vehicle fleet, there should be no need for expensive PUC pipeline injection that takes millions of dollars and many years. The pathogen-free digestate will be composted on site in the CASP unit, but can also be dried, screened and sold as fertilizer. At peak capacity, the AD and its gas cleanup and compression system would produce 350,000 diesel gallon equivalents of RNG.

Organic material for this Project could be sourced from within the City and County of Napa, from the Upper Valley Waste Management Agency with disposal at the Clover Flat Landfill, from several cities in San Mateo County transferred by the Blue Line Transfer and disposed of at Ox Mountain; and from various Alameda County jurisdictions transferred from the Alameda County Industries Transfer Facility that have been disposed at Vasco Landfill. The facility could accommodate other jurisdictions, particularly as the amount of organic materials captured increases as a result of SB 1383.

The AD will utilize high biomethane potential material such as food waste supplemented with green waste to maintain a solid matrix that is suitable for a plug flow system. The food waste will come from commercial, multi-family dwellings (MFD), residential and self-haul (RSH) sources and industrial sources. The green waste will be from commercial, MFD, and RSH sources. The AD will be permitted for incoming feedstock and residuals of up to 44,000 TPY. The amount of tonnage processed through the AD is ultimately determined by the ratio of high methane producing food waste compared to green waste.

Solar

The project includes the construction, operation, and maintenance of approximately 2,500 solar panels that would be installed on canopies with a minimum height of 18 feet along the eastern boundary of the site. The canopies and solar panels will provide cover over parking and material storage areas. The solar panel system would be approximately 1 MW and was sized to offset approximately 80 percent of NMDF power consumption. Use of the solar panels would produce approximately 36,000 megawatts-hours of power over the 20-year life of the project. The solar panels would generate net cost savings for the facility and generate renewable energy credits.

Key Environmental Issues

Air Quality

The EIR will evaluate dust, odor, construction, and operational air emissions, resulting from the proposed Project including potential for conflict with existing air quality plans, standards, and requirements.

Biological Resources

The EIR will evaluate the potential of the Project to result in significant impacts on biological resources, including potential impacts on wetlands, special status species and sensitive habitats, and potential conflicts with biological resource protection plans and policies.

Cultural Resources

The EIR will evaluate the potential of the Project to result in impacts to sensitive cultural and archeological resources that may be present on the Project site.

Energy

The EIR will evaluate the potential of the Project to result in wasteful, inefficient, or unnecessary consumption of energy resources.

Geology and Soils

The EIR will evaluate geologic hazards relevant to the Project due to seismic shaking, seismic related ground instability, soil erosion, expansive soils, and unstable geology.

Greenhouse Gas Emissions

The EIR will evaluate the potential of the Project to result in impacts related to greenhouse gas emissions and any conflict with greenhouse gas emission control plans and policies.

Hazards and Hazardous Materials

The EIR will evaluate whether hazardous materials on the project site could create a significant hazard to the public or environment.

Hydrology and Water Quality

The EIR will evaluate Project impacts to hydrology, water quality, and groundwater resources.

Land Use and Planning

The EIR will analyze whether the Project would conflict with land use plans, policies, or regulations.

Noise

The EIR will analyze noise impacts from construction and long-term operation of the Project.

Traffic and Transportation

The EIR will describe the transportation and circulation impacts of the Project and evaluate the potential for significant impacts. This section of the EIR will identify conflicts with programs, plans or policies addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. The EIR will also evaluate any increased hazards due to geometric design features (e.g., sharp curves or dangerous intersections) and inadequate emergency access. Also, the EIR will evaluate passenger vehicle miles traveled (VMT) in accordance with senate bill (SB) 743.

Cumulative Impacts

The EIR will analyze whether the proposed project would result in cumulative and long-term effects that would adversely affect the environment.

Alternatives

The EIR will consider the proposed Project and a reasonable range of alternatives including possible alternatives such as a Reduced Project Alternative, and the required No Project Alternative. The City welcomes comments from the public on alternatives that should be considered.

The EIR Process and Role of Participating Agencies and the Public

The City encourages participation in the EIR process during scoping and review of the resulting environmental documents. Comments and suggestions are invited from all interested agencies and the public at large so that the full range of issues related to the proposed Project and all reasonable feasible alternatives are addressed, and that all potentially significant issues are identified. In particular, the City is interested in learning whether there are areas of environmental concern and whether there might be a potential for significant impacts. For all potentially significant impacts, the EIR will identify mitigation measures, where feasible, to reduce the impacts to a level below significance.

Public agencies with jurisdiction are requested to advise the City of their applicable permit and environmental review requirements, and the scope and content of the environmental information that is germane to the agency's statutory responsibilities in connection to the proposed Project. Public agencies are requested to advise the City if they anticipate taking major action in connection with the proposed Project and if they wish to cooperate in the preparation of the EIR.

A public scoping meeting (Zoom Webinar) has been scheduled as a key component of the scoping process. Details of the scoping meeting are provided on Pages 1 and 2 of this Notice.

Due to time limits mandated by state law, public agencies are requested to send their responses to this Notice to the City at the address provided above at the earliest possible date, but no later than December 15, 2023. Members of the public should also provide scoping comments by that date.

APPENDIX B

NOTICE OF PREPARATION (NOP) COMMENT LETTERS

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Reginald Pagaling
Chumash

VICE-CHAIRPERSON
Buffy McQuillen
Yokayo Pomo, Yuki, Nomlaki

SECRETARY
Sara Dutschke
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November 16, 2023

Governor's Office of Planning & Research

Nov 17 2023

STATE CLEARINGHOUSE

Chris Jones
City of Napa
P.O. Box 660
Napa, CA 94559

Re: 2023110393, Napa Renewable Resources Project 2.0, Napa County

Dear Mr. Jones:

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: Cameron.Vela@nahc.ca.gov.

Sincerely,

Cameron Vela

Cameron Vela
Cultural Resources Analyst

cc: State Clearinghouse

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State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Bay Delta Region
2825 Cordelia Road, Suite 100
Fairfield, CA 94534
(707) 428-2002
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

December 12, 2023

Chris Jones, Associate Engineer
City of Napa
Postal Office Box 660
Napa, CA 94559
ChrisJones@cityofnapa.org

Subject: Napa Renewable Resources Project 2.0, Notice of Preparation of a Draft Environmental Impact Report, SCH No. 2023110393, City and County of Napa

Dear Mr. Jones:

The California Department of Fish and Wildlife (CDFW) reviewed the Notice of Preparation (NOP) of a Draft Environmental Impact Report (EIR) for the Napa Renewable Resources Project 2.0 (Project).

CDFW is providing the City of Napa (City) as the Lead Agency, with specific detail about the scope and content of the environmental information related to CDFW's area of statutory responsibility that must be included in the EIR (Cal. Code Regs., tit. 14, § 15082, subd. (b)).

CDFW ROLE

CDFW is a **Trustee Agency** with responsibility under the California Environmental Quality Act (CEQA) for commenting on projects that could impact fish, plant, and wildlife resources (Pub. Resources Code, § 21000 et seq.; Cal. Code Regs., tit. 14, § 15386). CDFW is also considered a **Responsible Agency** if a project would require discretionary approval, such as a permit pursuant to the California Endangered Species Act (CESA) or Native Plant Protection Act (NPPA), Lake and Streambed Alteration (LSA) Program, and other provisions of the Fish and Game Code that afford protection to the state's fish and wildlife trust resources. Pursuant to our authority, CDFW has the following concerns, comments, and recommendations regarding the Project.

REGULATORY REQUIREMENTS

California Endangered Species Act and Native Plant Protection Act

Please be advised that a CESA Incidental Take Permit (ITP) must be obtained if the Project has the potential to result in "take" of plants or animals listed under CESA or NPPA, either during construction or over the life of the Project. Issuance of a CESA ITP is subject to CEQA documentation; the CEQA document must specify impacts,

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mitigation measures, and a mitigation monitoring and reporting program. If the Project will impact CESA listed species, such as those identified in **Attachment 1**, early consultation is encouraged, as significant modification to the Project and mitigation measures may be required in order to obtain a CESA ITP.

CEQA requires a Mandatory Finding of Significance if a project is likely to substantially restrict the range or reduce the population of a threatened or endangered species (Pub. Resources Code, §§ 21001, subd. (c) & 21083; CEQA Guidelines, §§ 15380, 15064, and 15065). Impacts must be avoided or mitigated to less-than-significant levels unless the CEQA Lead Agency makes and supports Findings of Overriding Consideration (FOC). The CEQA Lead Agency's FOC does not eliminate the Project proponent's obligation to comply with CESA.

Lake and Streambed Alteration

An LSA Notification, pursuant to Fish and Game Code section 1600 et. seq. is required for project activities affecting lakes or streams and associated riparian habitat. Notification is required for any activity that may substantially divert or obstruct the natural flow; change or use material from the bed, channel, or bank including associated riparian or wetland resources; or deposit or dispose of material where it may pass into a river, lake or stream. Work within ephemeral streams, washes, watercourses with a subsurface flow, and floodplains are subject to LSA Notification requirements. CDFW, as a Responsible Agency under CEQA, would consider the CEQA document for the Project and may issue an LSA Agreement. CDFW may not execute the final LSA Agreement until it has complied with CEQA as a Responsible Agency.

Nesting Birds

CDFW has authority over actions that may disturb or destroy active nest sites or take birds. Fish and Game Code sections 3503, 3503.5, and 3513 protect birds, their eggs, and nests. Migratory birds are also protected under the federal Migratory Bird Treaty Act.

Fully Protected Species

Fully Protected species, including those listed in **Attachment 1,** may not be taken or possessed at any time (Fish & G. Code, §§ 3511, 4700, 5050, & 5515) except for 1) collecting these species for necessary scientific research, including efforts to recover fully protected species; 2) relocation of the bird species for the protection of livestock; 3) if they are a covered species whose conservation and management is provided for in a Natural Community Conservation Plan, or 4) certain projects pursuant to Fish and Game Code, §§ 3511, 4700, 5050, & 5515 section 2081.15.

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PROJECT DESCRIPTION AND LOCATION

The Project objective is the updates and expansions of the Napa Materials Diversion Facility (NMDF) which receives and processes solid waste as well as compostable and recyclable materials produced within the City of Napa. The Project includes the acquisition of parcels directly north and south of the existing facility. The parcel to the north is in current use for materials storage and covers approximately two acres; the southern parcel is undeveloped and currently not in use. The southern parcel would be subdivided, with approximately 2.87 acres annexed into the NMDF for the potential use of a biomass gasification facility. The Project also proposes to: 1) increase the NMDF permitted capacity from 760 to 1,000 tons per day; 2) construct a biomass gasification facility on existing or annexed adjacent property; 3) add an anaerobic digestion facility on the existing NMDF facility or adjacent annexed property; and 4) add approximately 2,500 solar panels over parking and storage areas along the eastern property border. The Project site is located at 820 Levitin Way near the City of American Canyon, Napa County; Latitude 38.210833° North, Longitude -122.265556° West; and encompasses approximately 25 acres.

The CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 et seq.) require that the EIR incorporate a full Project description, including reasonably foreseeable future phases of the Project, that contains sufficient information to evaluate and review the Project's environmental impact (CEQA Guidelines, §§ 15124 & 15378). Please include a complete description of the following Project components in the Project description:

- Footprints of permanent Project features and temporarily impacted areas, such as staging areas and access routes;
- Area and plans for any proposed buildings/structures, ground-disturbing activities, fencing, paving, stationary machinery, landscaping, and stormwater systems;
- Operational features of the Project, including level of anticipated human presence (describe seasonal or daily peaks in activity, if relevant), artificial lighting/light reflection, noise, traffic generation, and other features; and
- Construction schedule, activities, equipment, and crew sizes.

ENVIRONMENTAL SETTING

The EIR should provide sufficient information regarding the environmental setting ("baseline") to understand the Project, and its alternative's (if applicable), potentially significant impacts on the environment (CEQA Guidelines, §§ 15125 & 15360).

CDFW recommends that the CEQA document prepared for the Project provide baseline habitat assessments for special-status plant, fish and wildlife species located and

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potentially located within the Project area and surrounding lands, including, but not limited to, all rare, threatened, or endangered species (CEQA Guidelines, § 15380). The EIR should describe aquatic habitats, such as wetlands or waters of the U.S. or state, and any sensitive natural communities or riparian habitat occurring on or adjacent to the Project site (for sensitive natural communities see: https://wildlife.ca.gov/Data/VegCAMP/NaturalCommunities#sensitive%20natural%20communities), and any stream or wetland set back distances the City may require. Fully protected, threatened or endangered, candidate, and other special-status species and sensitive natural communities that are known to occur, or have the potential to occur in or near the Project site, include, but are not limited to those listed in **Attachment 1**.

Habitat descriptions and the potential for species occurrence should include information from multiple sources: aerial imagery, historical and recent survey data, field reconnaissance, scientific literature and reports, U.S. Fish and Wildlife Service's (USFWS) Information, Planning, and Consultation System, and findings from "positive occurrence" databases such as California Natural Diversity Database (CNDDB). Based on the data and information from the habitat assessment, the EIR should adequately assess which special-status species are likely to occur on or near the Project site, and whether they could be impacted by the Project.

CDFW recommends surveys be conducted for special-status species with potential to occur, following recommended survey protocols if available. Survey and monitoring protocols and guidelines are available at: https://www.wildlife.ca.gov/Conservation/Survey-Protocol.

Botanical surveys for special-status plant species, including those with a California Rare Plant Rank (http://www.cnps.org/cnps/rareplants/inventory/), must be conducted during the blooming period within the Project area and adjacent habitats that may be indirectly impacted by, for example, changes to hydrological conditions, and require the identification of reference populations[1]. More than one year of surveys may be necessary based on environmental conditions. Please refer to CDFW protocols for surveying and evaluating impacts to special status plants available at: https://www.wildlife.ca.gov/Conservation/Plants.

IMPACT ANALYSIS AND MITIGATION MEASURES

The EIR should discuss all direct and indirect impacts (temporary and permanent) that may occur with implementation of the Project (CEQA Guidelines, § 15126.2). This

[1] CRPR 1B plants are considered rare, threatened, or endangered in California and elsewhere. Further information on CRPR ranks is available in CDFW's Special Vascular Plants, Bryophytes, and Lichens List (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109383&inline) and on the California Native Plant Society website (https://www.cnps.org/rare-plants/california-rare-plant-ranks).

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includes evaluating and describing impacts such as:

- Encroachments into riparian habitats, wetlands or other sensitive areas;
- Potential for impacts to special-status species;
- Loss or modification of breeding, nesting, dispersal and foraging habitat, including vegetation removal, alternation of soils and hydrology, and removal of habitat structural features (e.g., snags, roosts, vegetation overhanging banks);
- Permanent and temporary habitat disturbances associated with ground disturbance, noise, lighting, reflection, air pollution, traffic or human presence; and
- Obstruction of movement corridors, fish passage, or access to water sources and other core habitat features.

The CEQA document should also identify reasonably foreseeable future projects in the Project vicinity, disclose any cumulative impacts associated with these projects, determine the significance of each cumulative impact, and assess the significance of the Project's contribution to the impact (CEQA Guidelines, §15355). Although a project's impacts may be insignificant individually, its contributions to a cumulative impact may be considerable; a contribution to a significant cumulative impact – e.g., reduction of available habitat for a special status species – should be considered cumulatively considerable without mitigation to minimize or avoid the impact.

Based on the comprehensive analysis of the direct, indirect, and cumulative impacts of the Project, the CEQA Guidelines direct the Lead Agency to consider and describe all feasible mitigation measures to avoid potentially significant impacts in the EIR, and/or mitigate significant impacts of the Project on the environment (CEQA Guidelines, §§ 15021, 15063, 15071, 15126.2, 15126.4 & 15370). This includes a discussion of impact avoidance and minimization measures for special-status species, which are recommended to be developed in early consultation with CDFW, USFWS, and the National Marine Fisheries Service. These measures can then be incorporated as enforceable Project conditions to reduce potential impacts to biological resources to less-than-significant levels.

ENVIRONMENTAL DATA

CEQA requires that information developed in EIRs and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code, § 21003, subd. (e)). Accordingly, please report any special-status species and natural communities detected during Project surveys to CNDDB. The CNDDB online field survey form and other methods for

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submitting data can be found at the following link: https://wildlife.ca.gov/Data/CNDDB/Submitting-Data. The types of information reported to CNDDB can be found at the following link: https://wildlife.ca.gov/Data/CNDDB/Plantsand-Animals.

FILING FEES

CDFW anticipates that the Project will have an impact on fish and/or wildlife, and assessment of filing fees is necessary (Fish & G. Code, § 711.4; Pub. Resources Code, § 21089). Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW.

If you have any questions, please contact Melanie Day, Senior Environmental Scientist (Supervisory), at (707) 210-4415 or Melanie.Day@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Erin Chappell
B77E9A6211EF486...

Erin Chappell
Regional Manager
Bay Delta Region

Attachment 1: Special-Status Species and Sensitive Natural Communities

ec: Office of Planning and Research, State Clearinghouse (SCH No. 2023110393)

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Attachment 1: Special-Status Species and Sensitive Natural Communities

Scientific Name	Common Name	Status
Amphibians & Reptiles		
Rana draytonii	California red-legged frog	FT, SSC
Rana boylii pop. 1	foothill yellow-legged frog - north coast DPS	SSC
Emys marmorata	western pond turtle	SSC
Birds		
Buteo swainsoni	Swainson's hawk	ST
Agelaius tricolor	tricolored blackbird	ST, SSC
Circus hudsonius	northern harrier	SSC
Athene cunicularia	burrowing owl	SSC
Elanus leucurus	white-tailed kite	FP
Buteo regalis	ferruginous hawk	WL
Fishes (potential downstream impacts)		
Oncorhynchus tshawytscha	Chinook salmon - winter-run	SE, FE
Hypomesus transpacificus	Delta smelt	SE, FT
Oncorhynchus tshawytscha	Chinook salmon - spring-run	ST, FT
Spirinchus thaleichthys	longfin smelt	ST, FC
Oncorhynchus mykiss irideus	steelhead - central California coast DPS	FT
Acipenser medirostris	green sturgeon - southern DPS	FT
Acipenser transmontanus	white sturgeon	SSC
Lampetra richardsoni	western brook lamprey	SSC
Entosphenus tridentata	Pacific lamprey	SSC
Pogonichthys macrolepidotus	Sacramento splittail	SSC

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Invertebrates		
Branchinecta lynchi	vernal pool fairy shrimp	FT
Mammals		
Reithrodontomys raviventris	salt marsh harvest mouse	FE, SE, FP
Antrozous pallidus	pallid bat	SSC
Plants		
Lasthenia conjugens	Contra Costa goldfields	FE, CRPR 1B.1
Trifolium amoenum	two-fork clover	FE, CRPR 1B.1
Lilaeopsis masonii	Mason's lilaeopsis	SR, CRPR 1B.1
Legenere limosa	legenere	CRPR 1B.1
Trifolium hydrophilum	saline clover	CRPR 1B.2
Carex lyngbyei	Lyngbye's sedge	CRPR 2B.2
Astragalus tener var. *tener*	alkali milk-vetch	CRPR 1B.2
Symphyotrichum lentum	Suisun Marsh aster	CRPR 1B.2
Extriplex joaquinana	San Joaquin spearscale	CRPR 1B.2
Lathyrus jepsonii var. jepsonii	Delta tule pea	CRPR 1B.2
Carex lyngbyei	Lyngbye's sedge	CRPR 2B.2
Downingia pusilla	dwarf downingia	CRPR 2B.2
Sensitive Natural Communities		
Vernal pool (review CDFW's list of sensitive natural communities to determine if any vernal pool or other sensitive natural community may occur, at https://wildlife.ca.gov/Data/VegCAMP/NaturalCommunities#sensitive%20natural%20communities)		

FE = federally listed as endangered under ESA; FT = federally listed as threatened under ESA; FC = federally listed as candidate; SE = state listed as endangered under CESA; ST = state listed as threatened under CESA; SR = state listed as rare; SSC = state Species of Special Concern; FP = fully protected; WL = state listed on Watch List; CRPR = California Rare Plant Rank; DPS = distinct population segment

December 14, 2023

Chris Jones
City of Napa Utilities Department
P.O. Box 660
Napa, CA 94559-0660

Subject: **SCH No. 2023110393** – Notice of Preparation of an Environmental Impact Report (EIR)

Dear Mr. Jones:

Thank you for allowing the Department of Resources Recycling and Recovery (CalRecycle) staff to provide comments on the proposed project and for your agency's consideration of these comments as part of the California Environmental Quality Act (CEQA) process.

Project Description

The City of Napa, acting as Lead Agency, has prepared and circulated a Notice of Preparation (NOP) for City of Napa Material Diversion Facility (NMDF) for preparing an Environment Impact Report (EIR) in order to comply with CEQA and to provide information to, and solicit consultation with, Responsible Agencies in the approval of the proposed project.

The NMDF is a transfer/processing and composting facility located at 820 Levitin Way, American Canyon, CA. The NMDF is owned by the City of Napa and operated by Napa Recycling & Waste Services, LLC; it has been in operation since 1996. The facility is open seven days per week, accepting solid waste, compostable and recyclable materials generated within the City of Napa. NMDF is permitted to accept up to 760 tons per day of waste.

The site covers 18.6 acres, 12 of the acres are permitted for organic materials management, 2.4 of the acres are for transfer/processing activities (recyclables, construction and demolition debris, inert debris), and the rest are for support operations and storage. The material recovery facility and composting facility—including green waste chipping and grinding operations and food material composting—are permitted to accept up to a combined 760 tons per day of recyclables, food material, yard waste and wood waste.

The proposed changes that will be evaluated in the EIR include: an increase in daily permitted tonnage from 760 to 1,000 tons per day; the addition of a biomass gasification

facility on adjacent property to be annexed into City of Napa or on the existing NMDF site; the addition of an anerobic digestion facility on the existing NMDF site or on the adjacent property to be annexed into the City; and the addition of solar panels over the parking and materials storage areas along the eastern property border from the covered aerated static piles to the property boundary. The project would include a portion of the adjacent parcel to the south (APN 057-090-060). The parcel will be split into a separate parcel upon purchase and subsequently annexed into the City of Napa. The EIR will evaluate the southern parcel area as the location for the proposed biomass gasification facility and potentially other NMDF operations. The project would also add a portion of the parcel to the north that is owned by 600 Tower Road Holdings, LLC, an LLC with the same owners as NRWS. The Tower Road Parcel may be used for inert materials processing and storage and equipment storage.

Comments

Increase daily tonnage limits

The NOP states that the project would increase the tonnage limit for the facility from 760 to 1,000 tons per day. The current Solid Waste Facilities Permit (SWFP) allows 760 tons per day with limitations of 500 tons per day of organic material and 360 tons per day of recyclables and construction and demolition waste. The DEIR should specify whether the 1,000 tons per day limit includes all waste types or if there will be limitations for specific waste types. It is staff's understanding the 1,000 ton per day limit will include all material received at the NMDF, the anaerobic digester, and the biomass gasification facility (BGF).

Biomass Gasification Facility

The BGF may or may not be subject to Solid Waste Facility Permitting requirements depending on whether or not it will meet the definition of biomass conversion, pursuant to California PRC 40106.

Additionally, when preparing the DEIR, please make an effort to use terminology that is consistent with definitions in the applicable sections of the California Code of Regulations, Titles 14 and 27, respectively.

Solid Waste Regulatory Oversight

The County of Napa, Planning Building and Environmental Services, Local Enforcement Agency (LEA), and CalRecycle are responsible for providing regulatory oversight of solid waste handling activities, including permitting and inspections.

Please contact Peter Ex from the Napa County Local Enforcement Agency, at (707)253.4419 or by email at peter.ex@countyofnapa.org to discuss the regulatory requirements for the proposed project.

Conclusion

CalRecycle staff thanks the Lead Agency for the opportunity to review and comment on the environmental document and hopes that this comment letter will be useful to the Lead Agency preparing the EIR and in carrying out their responsibilities in the CEQA process. Staff also thank the Lead Agency for making the public scoping meeting available online.

CalRecycle staff request copies of any subsequent environmental documents, copies of public notices and any Notices of Determination for this proposed project. If the environmental document is certified during a public hearing, CalRecycle staff requests 10 days advance notice of this hearing.

If you have any questions regarding these comments, please contact me at (916)341.6477 or by e-mail at Kate.Whitney@calrecycle.ca.gov.

Sincerely,

Kate Whitney, Environmental Scientist
Permitting & Assistance Branch – Central Unit
Waste Permitting, Compliance & Mitigation Division
CalRecycle

cc: Patrick Snider, Supervisor, Permitting & Assistance Branch – Central Unit
Peter Ex, Napa County LEA

APPENDIX C

AIR QUALITY SUPPORTING INFORMATION

Napa Recycling and Waste Services
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Napa, CA 94559

December 2025

Prepared by:

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Napa Renewable Resource Project Baseline and Project Emissions

Napa Renewable Resource Project Baseline and Project Emissions

Prepared for:
Napa Recycling and Waste Services
820 Levitin Road
Napa, CA 94559

December 2025

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ATTACHMENT 2 – MOBILE SOURCE EMISSION CALCULATION WORKSHEETS

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ATTACHMENT 5 – BASELINE AND PROJECT COMPOSTING EMISSION WORKSHEETS

ATTACHMENT 6 – WOODCHIP MANAGEMENT GHG EMISSIONS

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List of Acronyms and Abbreviations

AD	Anaerobic Digester
ADC	Alternate Daily Cover
AER	Annual Emissions Report
APN	Assessor's Parcel Number
AR5	Assessment Report 5
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
bf	Board Feet
BHp	Brake Horsepower
BMP	Best Management Practice
BSFC	Brake Specific Fuel Consumption
Btu	British Thermal Unit
CA	California
CalEEMod	California Emissions Estimator Model®
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAS No.	Chemical Abstract Service Number
CASP	Covered Aerated Static Pile
CDI	Construction Debris and Inerts
Cf	Rain Correction factor
CH_4	Methane
C:N	Carbon to Nitrogen Ratio
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
dscf	Dry Standard Cubic Foot
EF	Emission Factor
EPA	[United States] Environmental Protection Agency
°F	Degrees Fahrenheit
ft^3	Cubic Feet
g	Gram
GHG	Greenhouse Gas
GWP	Global Warming Potential
H_2	Hydrogen
H_2S	Hydrogen Sulfide
HHV	Higher Heating Value
hp	Horsepower
hr	Hour
IC	Internal Combustion

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in^3	Cubic Inch
IPCC	Intergovernmental Panel for Climate Change
k	Particle Size Multiplier
kW	Kilowatt
lb	Pound
lbmol	Pound-mole
LDA	Light Duty Automobile
LFG	Landfill Gas
LHD2	Light Heavy Duty (Truck)
M	Material Moisture Content
m^2	Square Meter
m^3	Cubic Meter
mbf	Thousand Board Feet
MDAQMD	Mojave Desert Air Quality Management District
mg	Milligrams
MM	Million
MMBtu	Million British Thermal Units
MMgal	Million gallons
MMscf	Million Standard Cubic Feet
MRF	Material Recovery Facility
MT	Metric Ton
MW	Megawatt
N_2O	Nitrous Oxide
No.	Number
NO_x	Nitrogen Oxides
NRRP	Napa Renewable Resource Project
NMDF	Napa Material Diversion Facility
NRWS	Napa Recycling and Waste Services
O_2	Oxygen
ODEQ	Oregon Department of Environmental Quality
$PM_{2.5}$	Fine Particulate Matter
PM_{10}	Respirable Particulate Matter
POC	Particulate Organic Carbon
ppmv	Parts per Million By Volume
RNG	Renewable Natural Gas
SCAQMD	South Coast Air Quality Management District
scf	Standard Cubic Feet
sL	Silt Load
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides

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Sq. ft.	Square foot
SWCV	Solid Waste Collection Vehicle
TAC	Toxic Air Contaminant
TPD	Tons per Day
TPM	Total Particulate Matter
TPY	Tons per Year
TSP	Total Suspended Particulate
U	Windspeed
VMT	Vehicle Mile Traveled
VOC	Volatile Organic Compound
W	Average roadway fleet weight
WARM	Waste Reduction Model
yr	Year

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Napa Renewable Resource Project Baseline and Project Emissions

1.0 INTRODUCTION

1.1 Overview

Emissions estimates have been prepared for the Napa Renewable Resource Project (NRRP) 2.0, and estimates have been prepared for the current facility operations (i.e., the baseline conditions). NRRP 2.0 is proposed in order to expand the existing Napa Recycling and Waste Services (NRWS) facility in Napa County (Napa Materials Diversion Facility or NMDF). The NRRP 2.0 includes a permitted tonnage increase, a biomass conversion facility, and an anaerobic digestion (AD) facility The biomass conversion facility will be constructed on a portion of an undeveloped parcel to the south (APN 057-090-060) and the anaerobic digestion facility will be constructed on the existing NMDF site. Criteria pollutant[1] and toxic air contaminant (TAC) emissions estimates have been prepared for the following source categories:

Construction Emissions

Mobile Source Emissions

- Vehicle and Equipment Exhaust Emissions; and
- Fugitive Dust from Travel on On-site and Off-site Paved Roads;

Biomass Conversion

- Material Handling;
- Grinding;
- Biomass Drying;
- Internal Combustion Engines;
- Flare Pilot and Flares; and
- Biochar Sequestration;

Anaerobic Digestion

- Material Handling;
- Digestate Dewatering;
- Boiler;
- Flare; and
- Emergency engine;

[1] Criteria pollutants include nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), particulate matter (PM_{10} and $PM_{2.5}$), and precursor organic compounds (POC). POC is also referred to a volatile organic compounds (VOC). In most instances POC will be used in this report, as POC is the preferred nomenclature of the Bay Area Air District. VOC may be used when that is the nomenclature used in a specific reference or citation.

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Composting Facility Emissions

- Dust/Particulate Emissions:
  - Grinding and Screening;
  - Material Handling; and
  - Wind Erosion;
- Composting Operations;
- Toxic Air Contaminant (TAC) Emissions:
  - Screening, grinding, material handling, wind erosion,
  - Composting TAC Emissions; and

Woodchip Management Emissions

- Landfill (avoided) emissions.

For each category of emissions, the calculation methodology is explained, and the data and assumptions used in the calculations are provided. Emission calculation worksheets are provided in the attachments for each category of emission sources: 1) construction activities, 2) mobile sources, 3) biomass conversion, 4) anaerobic digestion, 5) composting, and 6) woodchip management.

1.2 NRRP 2.0 Project Throughput

NRRP 2.0 will increase the permitted waste tonnage limit at NMDF by 240 tons per day or a total of approximately 86,600 tons per year (TPY) (referred to as "Additional Capacity"). This additional waste would be processed in the existing material recovery facility (MRF) and construction, demolition, and inerts (CDI) operations. The Additional Capacity increases the emissions associated with trucking the wastes in and out of the facility. However, due to the nature of the materials managed in the MRF, including plastic bottles, glass, lumber, and aluminum and steel cans, emissions from the MRF operations onsite are assumed to be negligible and are not estimated.

The biomass conversion process will consume woody biomass as the feedstock with a maximum throughput of 15,960 TPY. The woody biomass is a byproduct of the existing composting operations at NMDF, either as ground woodchips, or as compost "overs" separated from finished compost by screening. Woody biomass has a moisture content of up to 30% when received and must be dried to a moisture content of approximately 5 to 10% prior to introduction into the conversion process. Biochar, a byproduct of conversion, is produced at a rate of approximately 20% of the feedstock y weight.

The AD process will use food waste, green waste, and grape pomace as feedstocks. These materials will either be diverted from existing composting feedstocks, or diverted from the materials currently transferred offsite (a.k.a., "Transfer Tons"). Digestate, a byproduct of the AD process, is about 60 to 80% by weight of the initial feedstock and will be composted in the existing covered aerated static pile (CASP).

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1.3 Baseline and Proposed Project Throughput

Baseline and proposed Project throughputs are summarized in Table 1-1.

Table 1-1: Baseline and NRRP 2.0 Project Throughput

Processing Step	Baseline 2-Year Annual Average (TPY)	Baseline 2-Year Daily Average (TPD)	Proposed Project (TPY)	Proposed Project (TPD)
Feedstock Inbound	105,510	291	105,510	291
Finished Compost Outbound	43,671	121	43,671	121
Woodchips Outbound to Landfill	16,502	46	0	0
Transfer Tons Outbound	25,908	72	0	0
MRF Inbound	179,215	495	266,095	735
MRF Outbound	127,048	351	213,928	591
Conversion Feedstock	0	0	15,960	62
AD Feedstock	0	0	32,000	88
Conversion Biochar	0	0	3,273	9
Digestate Management	0	0	19,200	53

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2.0 CONSTRUCTION EMISSIONS

The construction emissions analysis was performed using the California Emissions Estimator Model® (CalEEMod) version 2022.1.1.29 (CAPCOA 2025), the official statewide land use computer model designed to provide a uniform platform for estimating potential criteria pollutant and greenhouse gas (GHG)[2] emissions associated with construction of a land use project. The model quantifies direct emissions from construction, including vehicle use, as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use. The mobile source emission factors used in the model include the Pavley standards and Low Carbon Fuel Standards. The model allows the user to incorporate project design features, regulatory measures, and mitigation measures to reduce criteria pollutant and GHG emissions and calculates the benefits achieved from selected measures. CalEEMod was developed by the California Air Pollution Control Officers Association (CAPCOA) in collaboration with the South Coast Air Quality Management District (SCAQMD), Bay Area Air Quality Management District (BAAQMD), San Joaquin Valley Air Pollution Control District (SJVAPCD), and other California air districts. Default land use data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) were provided by the various California air districts to account for local requirements and conditions. As the official assessment methodology for land use projects in California, CalEEMod is relied upon for construction emissions quantification for this project.

A project's construction phase produces many types of emissions, but PM_{10} (including $PM_{2.5}$) in fugitive dust and diesel engine exhaust are the pollutants of greatest concern. Fugitive dust emissions can result from a variety of construction activities, including excavation, grading, demolition, vehicle travel on paved and unpaved surfaces, and vehicle exhaust. Construction-related emissions can cause substantial increases in localized concentrations of PM_{10}, as well as affecting PM_{10} compliance with ambient air quality standards on a regional basis. Particulate emissions from construction activities can lead to adverse health effects and nuisance concerns, such as reduced visibility and soiling of exposed surfaces. The use of diesel-fueled construction equipment emits the ozone precursors nitrogen oxides (NO_x) and Precursor Organic Compounds (POC). Use of architectural coatings and other materials associated with finishing buildings may also emit POCs.

2.1 CalEEMod Model Input Data and Assumptions

The information used to develop the construction emissions estimates for the proposed Project is discussed in this section. Not all CalEEMod defaults used are listed/discussed, but the default assumptions that have particularly important impacts on the construction emissions are listed.

- Defined in Project Description for NRRP 2.0:
  - Basic project design features, including project vicinity, site plan, building sizes, constructions phasing, etc. (see Attachment 1); and
  - Approximate start of September 2025[3] and approximate duration of 60 weeks.

[2] GHGs include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O).

[3] Actual start date is unknown at this time. September 2025 was selected as the start date for construction to ensure that emissions are not underestimated. Emissions from construction equipment and vehicles tend to decrease over time as new, lower emitting engines are integrated into the equipment inventory.

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- Assumptions:
  - Concrete trucks can carry 10 cubic yards of concrete per trip;
  - Ready-mix concrete will be brought to the facility from the nearest ready-mix vendor, Crown Hill Ready Mix in American Canyon, CA, located approximately 2 miles from the facility;
  - Concrete trucks will deliver ready-mix concrete for 120 days;
  - 12 one-way concrete truck trips per day will be required to supply concrete for the project;
  - Offroad equipment used in construction includes cranes, forklifts, generator sets, graders, concrete pumps, rubber-tired dozers, tractors, loaders, backhoes, and welders;
  - Offroad equipment used for construction is assumed to operate with Tier 4 engines; and
  - During construction, exposed soil will be watered two times per day.
- CalEEMod defaults were used for:
  - Construction equipment load factor, usage hours;
  - Architectural coating areas (i.e., square footage);
  - Vehicle emission profiles and calculations related to traffic and mobile source emissions aside from trip counts, and trip rates for concrete hauling and export material hauling; and
  - Other data not specifically listed as assumptions.

PM_{10} emitted during construction can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors, making quantification difficult. Despite this variability in emissions, experience has shown that there are several feasible control measures that can be reasonably implemented to significantly reduce fugitive dust emissions from construction. For larger projects, a dust control plan would be implemented, including Best Management Practices (BMPs) such as frequent water application to exposed surfaces. A dust control plan is usually sufficient mitigation to reduce PM_{10} impacts to a level considered less than significant. For these emissions estimates, standard (i.e., CalEEMod default) construction mitigation measures are assumed.

CalEEMod inputs for facility construction included data from the project description, the assumptions listed above, and the land use information listed in Table 2-1. Additional data inputs are provided in Attachment 1.

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Table 2-1: NRRP 2.0 Facility Land Use Data

Project Element	Land Use Type	Land Use Subtype	Estimated Area	
			sq. ft.	acres
Biomass Processing Buildings	Industrial	General Light Industry	18,200	0.418
Other Non-Asphalt Surfaces	Parking	Other Non-Asphalt Surfaces	98,265	2.256
Parking Lot	Parking	Parking Lot	3,877	0.09
Total			120,342	2.76

2.2 Project Construction Emissions

Emissions associated with construction will occur from the equipment used for construction, trucks delivering equipment and supplies (e.g., concrete), and workers commuting. Construction activities are estimated to take approximately 60 weeks beginning in late-2025.

Daily and total annual construction criteria pollutant emissions[4] are summarized in Table 2-2. CalEEMod output reports are provided in Attachment 1.

Table 2-2: Construction Emissions Summary

Pollutant	Daily Emissions (lb/day)	Annual Emissions[5] (TPY)
POC	6.46	0.26
NO_x	22.60	1.17
CO	26.2	1.64
SO_x	0.05	0.0025
PM_{10}	4.05	0.14
$PM_{2.5}$	2.11	0.07

GHGs – collectively reported as carbon dioxide equivalents (CO_2e) – are directly emitted from mobile sources such as onroad vehicles and offroad construction equipment burning fuels such as gasoline, diesel, biodiesel, propane, or natural gas. GHG emissions in metric tons (MT) were estimated for construction of the proposed Project using CalEEMod; the results are summarized in Table 2-3. CalEEMod output reports are provided in Attachment 1.

[4] Emissions are based on the "mitigated" option in CalEEMod. CalEEMod's mitigated option includes the use of Tier 4 engines in construction equipment and regular watering of roadways and disturbed surfaces. Tier 4 engines and regular watering are standard project features, thus are not considered mitigation under CEQA. Consequently, emissions are not reported as mitigated.

[5] Annual emissions are the maximum annual emissions during the 60-week construction period.

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Table 2-3: Construction Greenhouse Gas Emissions Summary

GHG	Emissions (MT CO_2e)
CO_2	269
CH_4	0.01
N_2O	0.01
CO_2e	270

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3.0 PROJECT AND BASELINE MOBILE SOURCE EMISSIONS

Transportation emissions associated with the proposed Project, including the future operation of the composting facility, Additional Capacity, Biomass Conversion Facility, and Anaerobic Digestion Facility, along with transportation emissions associated with the existing compost facility (Baseline) are discussed in this section. The methodology used to calculate mobile source emissions is the same for the proposed Project and the baseline. The differences between the proposed Project and the baseline are summarized as follows:

- Woodchips are landfilled during baseline period (offsite transportation required). Woodchips are the feedstock to biomass conversion process for proposed Project (no offsite transportation required, but onsite transport is required).
- Transfer tons shipped offsite during baseline period (transportation required). Transfer tons fed to the CASP or AD for proposed Project (no transportation required).
- The transportation requirements for the Additional Capacity are summarized as follows:

  100 tpd / (20 tons/truck) = 5 transport trucks (daily)

  140 tpd / (10 tons/truck) = 14 collection trucks (daily)

  240 tpd = 19 heavy trucks (daily)

  The same ratio of small to large trucks is assumed for the current (baseline) MRF capacity. Of the fourteen 10-ton collection trucks, 47% are assumed to be diesel, 53% are assumed to be natural gas-fueled. This ratio is applied to the baseline and to the proposed Project throughput (not just the increase).
- MRF recyclables and CDI are assumed to ship outbound in 20-ton loads.
- AD Feedstock is diverted from existing compost facility feedstock via conveyor, i.e., no new onsite or offsite transport.
- Biochar is derived from woodchips that would otherwise have been disposed offsite (e.g., landfill). Woodchip disposal transportation will be eliminated, biochar shipment will occur.
- Digestate is blended with compost feedstock and processed through the CASP. Digestate will be transported onsite from the AD to the CASP. Because the compost derived from the AD feedstock and digestate was compost facility feedstock, there will be no new transportation associated with offsite digestate shipment. Onsite transport of digestate from the AD to the CASP is required.
- One additional loader and one additional forklift are required for the biomass conversion process, and one additional loader is required for the AD process.

3.1 Onroad Vehicle Exhaust Emissions

Employee travel, routine business travel, and the transport of raw materials to the existing facility and the NRRP 2.0 operations, as well as shipping finished product, result in onroad vehicle emissions. Trucking requirements are summarized in Table 3-1. The derivation of the trucking requirements is provided in Table 1 of Attachments 2a and 2b for the proposed Project and Baseline, respectively.

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Table 3-1: Summary of Trucking Requirements

Processing Step	Baseline Truck Count		Proposed Project Truck Count	
	truck/year	truck/day	truck/year	truck/day
Feedstock Inbound - self haul	24,254	67	24,254	67
Feedstock Inbound - Collection Route	26,064	72	26,064	72
Feedstock Inbound - Transfer	9,050	25	9,050	25
Finished Compost Outbound	5,459	16	5,459	16
Woodchips Outbound to Landfill	1,376	4	0	0
Transfer Tons Outbound	2,591	8	0	0
MRF Inbound	14,188	41	21,066	60
MRF Outbound	6,352	18	10,697	30
Conversion Feedstock	0	0	1,330	6
AD Feedstock	0	0	0	0
Conversion Biochar	0	0	273	1
Digestate Management	0	0	2,400	7

3.1.1 Methodology

Emissions from motor vehicles are estimated using factors that relate emissions of a given air contaminant to vehicle miles traveled (VMT) and the number of engine starts expected to occur. Emissions from motor vehicles are typically determined using emission factors that are representative of a given vehicle category (e.g., passenger car, light-duty truck) and fuel type that reflect the characteristics of the population of the vehicle type in a given vehicle fleet[6]. The fleet emission factors reflect the characteristics of the vehicles in the fleet, such as the type of vehicle, the age of the vehicle, the weight of the vehicle, fuel efficiency, etc. The emission factors also reflect the demographics of the region(s) in which the vehicles are operated and the regulatory requirements applicable to the types of vehicles that comprise the fleet.

The emission factors change on an annual basis as older vehicles are replaced by new vehicles and as regulatory requirements that mandate lower standards become effective. Consequently, the computer models used to generate these emission factors are complex. In California, the recommended model for calculating emissions from onroad mobile sources is EMFAC2021 (CARB 2021), developed and maintained by the California Air Resources Board (CARB). The EMFAC2021 model was used to generate the emission factors used for estimating the onroad emissions from the vehicle fleet required for the existing and future composting and MRF operations, Additional Capacity, and operation of the proposed biomass conversion and AD facilities.

[6] "Fleet" in this context means a group of vehicles operated in a specific area or region, such as a county or air district. Fleet does not mean a collection of vehicles owned/operated by a single company or business.

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Onroad vehicles will be used to transport raw material, personnel, and supplies to the facility and conduct other routine business activities. Offsite one-way mileage for material transport is assumed to be 20 miles. Off-site mileage for the workers assumes that workers live within 20 miles of the facility. Onsite travel distance is assumed to be 850 feet (0.16 miles) for all vehicles. Feedstock to the biomass conversion facility assumes that all feedstock materials are supplied by truck from the adjacent NMDF composting facility, a distance of 850 feet.

While transport of digestate (byproduct of AD process) to end users is required, this transport simply replaces the current management practices for finished compost delivery; therefore, transport emissions for digestate are not calculated.

Onroad emissions include running exhaust, idling exhaust, and startup exhaust. Fugitive particulate emissions include tire wear and brake wear. Fugitive hydrocarbon emissions include running loss, hot soak, and diurnal emissions. The on-site and off-site mileage estimates are used to calculate fugitive dust emissions from travel on paved roads.

Emissions are calculated for each vehicle category and fuel type using the total VMT (or other information, depending on the emission factor being calculated) for calendar year 2025. This approach will yield a conservative emission estimate because exhaust emissions tend to decrease over time, and it is unlikely that the proposed Project would be operational in 2025. Calculation procedures are summarized in Table 3-2.

Table 3-2: EMFAC2021 Components Included in Onroad Vehicle Emission Calculations

EMFAC2021 Component		Calculation Procedure
g/VMT	Running Exhaust	Calculated using annual VMT
	Tire & Brake Wear	Calculated using annual VMT
g/Trip	Startup	Calculated from number of trips
	Hot Soak	Calculated from number of trips
	Running Loss	Calculated from number of trips
g/Vehicle-Day	Idle Exhaust	Emission Factor (EF) converted to g/trip and emissions calculated based on the number of trips
	Resting Loss	EF converted to g/trip and emissions calculated based on the number of trips
	Diurnal Loss	EF converted to g/trip and emissions calculated based on the number of trips

3.1.2 Vehicle Activity

The daily operation of the composting, MRF, biomass conversion and AD facilities will require the use of onroad mobile sources for personnel transport, conducting routine business, the transport of feedstock, and the transport of finished product. Operational activities are listed in Table 3-3.

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Table 3-3: Operational Activities

Activity	Required Vehicles
Employee commute	Light-duty cars or trucks for employee commute
Misc. business activity	Light-duty truck for routine business (third party)
Feedstock Inbound	T7 SWCV Class 8 (Diesel)
Finished Compost Outbound	T7 SWCV Class 8 (Diesel)
Woodchips Outbound to Landfill	T7 SWCV Class 8 (Diesel)
Transfer Tons Outbound	T7 SWCV Class 8 (Diesel)
MRF Inbound, 20-ton	T7 SWCV Class 8 (Diesel)
MRF Inbound, 10-ton	T7 SWCV Class 8 (Diesel)
MRF Inbound, 10-ton	T7 SWCV Class 8 (NG)
MRF Outbound	T7 SWCV Class 8 (Diesel)
Conversion Feedstock	T7 Tractor Class 8
AD Feedstock	T7 SWCV Class 8 (Diesel)
Conversion Biochar	T7 SWCV Class 8 (Diesel)
Digestate Management	T7 Tractor Class 8

The EMFAC2021 model was run to derive emission factors for the T7 Tractor Class 8, Light Duty Automobile (LDA), Light Heavy Duty Truck (LHD2), and T6 Public Class 6 vehicles. The EMFAC2021 factors used for calculating emissions from the onroad mobile sources are listed in Table 3 of Attachments 2a and 2b for the proposed Project and Baseline, respectively.

3.1.3 Onroad Vehicle Exhaust Emissions

The annual emissions were calculated for 2025. The emission estimates are provided in Table 3 of Attachments 2a and 2b for the proposed Project and Baseline, respectively.

3.2 Offroad Equipment Exhaust Emissions

The offroad equipment currently used at the facility (baseline) and the equipment proposed for use with the implementation of the NRRP 2.0 project is shown in Table 3-4.

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Table 3-4: Offroad Equipment

Offroad Equipment	Project Element	Typical Model (or Equivalent)	Baseline	NRRP 2.0
Front-end Loader	Compost Facility Ops	John Deere 624 P	X	X
Front-end Loader	Compost Facility Ops	John Deere 624 P	X	X
Front-end Loader	Compost Facility Ops	John Deere 624 P	X	X
Front-end Loader	Compost Facility Ops	John Deere 624 P	X	X
Front-end Loader	Compost Facility Ops	John Deere 624 P	X	X
Front-end Loader	Compost Facility Ops	John Deere 624 P	X	X
Excavator	Compost Facility Ops	Linkbelt 210x4	X	X
Forklift	Compost Facility Ops	Cat DP30N	X	X
Loader	Biomass Conversion	Volvo 2016 L90H Wheel Loader		X
Forklift	Biomass Conversion	Hyster Electric		X
Loader	AD	Volvo 2016 L90H Wheel Loader		X

3.2.1 Methodology

Exhaust emissions from offroad equipment depend on the type of engine used to power the equipment, the size of the engine [i.e., brake horsepower (BHp)], the engine load, engine tier, and the equipment operating hours. Some of this information is derived from the project description. In cases where information was not available from the project description, the information was obtained from the equipment manufacturer or determined using published factors or data. For offroad equipment, the emissions of a given air contaminant were calculated using Equation 3-1.

$$E\ (lb/day) = (g/BHp)*(BHp)*(Load)*(hr/day)*(lb/453.6\ g) \qquad \text{(Eq. 3-1)}$$

Where:

E (lb/day) is the daily emissions of a given pollutant

g/BHp is the emission factor for the pollutant for the Environmental Protection Agency (EPA) tier of the given engine. All engines are assumed to be Tier 4 final

BHp is the engine's maximum brake horsepower rating

Load is the engine load, obtained from the literature (CAPCOA 2021a)

hr/day is the operating hours of the equipment, assumed to be 8.5 hours per day for the loaders and 1.5 hours per day for the forklifts

The criteria pollutant and GHG emission factors for the offroad equipment are summarized in Attachment 2, Table 4.

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3.2.2 Offroad Equipment List and Operating Requirements

The offroad equipment and operating parameters required for the processing of organic feedstock at the existing composting facility and proposed NRRP 2.0 facilities are summarized in Table 4 of Attachments 2a and 2b for the proposed Project and Baseline, respectively.

3.2.3 Offroad Equipment Exhaust Emissions

The exhaust emissions from the equipment are calculated from the operating hours, horsepower, engine load, and EPA Tier 4 emission factors for the engines. The criteria pollutant emissions resulting from operation of the offroad equipment are calculated in Table 4 of Attachments 2a and 2b for the proposed Project and Baseline, respectively.

3.3 Fugitive Dust from Travel on Paved Roads

Operations that involve the movement of material or that expose or disturb erodible surfaces may generate fugitive dust. Operation of offroad equipment at the existing facility (baseline) and the proposed Project may result in fugitive dust generation due to transport of material on paved surfaces/roads.

Fugitive dust emissions were calculated using EPA-recommended equations that generate predictive emission factors that are specific to the given activity. The calculations generally take into account the silt and moisture content of the material. The calculation methodologies are presented in the following sections; detailed emission calculations are provided in Tables 5 (offsite emissions) and 6 (onsite emissions) of Attachments 2a (proposed Project) and 2b (Baseline).

3.3.1 Methodology

Particulate emissions may occur whenever a vehicle travels on a paved roadway surface due to the resuspension of silt that accumulates on the roadway surface. Emissions from travel on paved roads are calculated using Equation 3-2, which is reproduced from EPA AP-42, Chapter 13.2.1, Paved Roads (EPA 2011).

$$EF = k \times (sL)^{0.91} \times W^{1.02} \times Cf \qquad \text{(Eq. 3-2)}$$

Where:

EF	=	Emission factor (grams/VMT)
k	=	Particle size multiplier (dimensionless)
sL	=	Roadway silt loading (g/m^2)
W	=	Average roadway fleet weight (tons)
Cf	=	Rain correction factor (Cf = 1-P/4N, where P is the number of days with at least 0.01 inch rain and N is the number of days in the period, i.e., 365)

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Table 3-5: Paved Road Emission Factor Data

Variable	Value
k (PM_{10})	1.00 g/VMT
k ($PM_{2.5}$)	0.25 g/VMT
Rain Days[1]	38.4 days/year

Notes:
1. CAPCOA 2021b.

It is important to note that Equation 3-2 calls for the average weight of all vehicles traveling on the road. For example, if 99% of traffic on the road consists of 2-ton cars/trucks while the remaining 1% consists of 20-ton trucks, then the mean weight "W" is 2.2 tons. Equation 3-2 is not intended to be used to calculate a separate emission factor for each vehicle weight class. Instead, only one emission factor should be calculated to represent the average weight of all fleet vehicles traveling the road (EPA 2011). According to CARB, the average fleet weight in California is 2.4 tons; this value is used for off-site vehicle travel. A value of 16.39 tons per vehicle is used for on-site travel for the Baseline period and 17.72 tons per vehicle based on a weighted average vehicle weight, as the haul trucks and loaders are the primary vehicles used on-site, and they are considerably heavier than the average vehicle in use on public roadways.

Emissions from paved roads depend on the roadway silt loading, which in turn depends on the volume of traffic experienced by a given type of roadway. The roadway silt content used in the calculations was obtained from the area source methodology used by the SJVAPCD for calculating fugitive dust emissions from paved roads. The SJVAPCD-recommended silt loading factors by road type are listed in Table 3-6. The calculated respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$) emission factors for each road type are shown in Table 3-7.

Table 3-6: Paved Road Silt Loading[1]

Freeway (g/m^2)	Major (g/m^2)	Collector (g/m^2)	Local (g/m^2)	On-Site[2] (g/m^2)
0.020	0.035	0.035	0.320	7.4

Notes:
1. SJVAPCD 2005.
2. On-site surfaces are assumed to be paved with asphalt or concrete. Silt loading is based on AP-42, Section 13.2.1, Table 3 for a municipal solid waste landfill.

Table 3-7: Paved Road Particulate Emission Factors

Pollutant	Freeway (lb/VMT)	Major (lb/VMT)	Collector (lb/VMT)	Local (lb/VMT)	Baseline Rural/ On-Site (lb/VMT)	Project Rural/ On-Site (lb/VMT)
PM_{10}	1.49E-04	2.48E-04	2.48E-04	1.86E-03	2.30E-01	2.49E-01
$PM_{2.5}$	3.72E-05	6.20E-05	6.20E-05	4.64E-04	5.74E-02	6.22E-02

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3.3.2 Paved Road VMT

The VMT on a given type of roadway segment was determined by multiplying the total VMT for the activity by the "segment fraction of total travel" on the types of paved roadways in California; the distribution is summarized in Table 3-8. On-site travel distances are shown in Table 5 of Attachments 2a and 2b for the proposed Project and Baseline, respectively. The off-site travel distances broken down by vehicle type and road type are summarized in Table 6 of Attachment 2a and 2b for the proposed Project and Baseline, respectively.

Table 3-8: Distribution of VMT by Roadway Type[1]

Freeway	Major	Collector	Local	Rural/ On-Site
33.25%	38.97%	27.59%	0.19%	Calculated[2]

Notes:
1. SJVAPCD 2005.
2. On-site distances are calculated based on the distance from the access gate to the furthest point of the processing areas for all vehicles and feedstock delivery trucks, and from the access gate to the finished processing area for the product shipping trucks. Offroad equipment travel distances are estimated based on operating hours and estimated vehicle speed.

3.3.3 Paved Roads Particulate Emissions

The fugitive dust emissions from motor vehicle travel on paved public roads were calculated from the VMT on a given type of roadway segment (Table 3-8) and the emission factor corresponding to the roadway segment type (Table 3-7). The onroad offsite fugitive road dust emissions are calculated in Table 5 of Attachments 2a and 2b for the proposed Project and Baseline, respectively.

Fugitive dust emissions from motor vehicle and offroad equipment travel on onsite paved areas were calculated from the estimated travel distances for each type of vehicle or equipment and the facility-specific emission factor based on average vehicle weight. The onroad on-site fugitive road dust emissions are calculated in Table 6 of Attachments 2a and 2b for the proposed Project and Baseline, respectively.

3.3.4 Vehicle Exhaust Greenhouse Gas Emissions

Onroad vehicle GHG emissions are estimated using EMFAC2021 emission factors appropriate for the vehicle type, fuel type, and vehicle mileage. Onroad GHG emission calculations are provided in Table 3e of Attachments 2a and 2b for the proposed Project and Baseline, respectively.

Offroad equipment GHG emissions are estimated based on fuel use and EPA emission factors that are specific to the fuel. Fuel use is estimated based on engine size (Hp), hours of operation, average engine load, and brake-specific fuel consumption (BSFC). Offroad GHG emission calculations are provided in Table 4d of Attachments 2a and 2b for the proposed Project and Baseline, respectively.

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3.4 Summary of Mobile Source Criteria Pollutant and GHG Emissions

The predicted mobile source emissions from the existing facility, Additional Capacity, and proposed biomass conversion and AD facilities are summarized in Table 7 of Attachments 2a and 2b for the proposed Project and Baseline, respectively.

3.5 Vehicle and Equipment Exhaust TAC Emissions

The emissions of TACs were calculated either using process information for a given activity and an appropriate emission factor, or by "speciating" the PM_{10} and POC emissions using a profile that identifies the weight fraction of the TAC constituent in the parent compound.

3.5.1 Diesel Exhaust Emissions

TAC emissions from diesel combustion are based on PM_{10} emissions, assuming that 100% of the PM_{10} emissions are DPM. The DPM emissions are summarized for on-site travel in Table 8 of Attachments 2a and 2b for the proposed Project and Baseline, respectively.

3.5.2 Paved Road Dust TAC Emissions

TAC emissions from paved road fugitive dust emissions are estimated by speciating the PM_{10} emissions according to the speciation profile provided by CARB per Particulate Speciation Profile #471 (Paved Road Dust) (CARB 2021b). The paved road dust TAC emission factors (weight %) are summarized in Table 3-9. Paved road dust TAC emission calculations are provided in Table 9 of Attachments 2a and 2b for the proposed Project and Baseline, respectively.

Table 3-9: Paved Road Dust TAC Emissions

Pollutant	CAS No.	Wt. Fraction
Arsenic	7440-38-2	0.000013
Cadmium	7440-43-9	0.000003
Hexavalent Chromium	18540-29-9	0.00000085
Cobalt	7440-48-4	0.000023
Copper	7440-50-8	0.000148
Lead	7439-92-1	0.000124
Manganese	7439-96-5	0.0008
Nickel	7440-02-0	0.000012
Mercury	7439-97-6	0.000009
Selenium	7782-49-2	0.000002
Vanadium	7440-62-2	0.000071

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4.0 BIOMASS CONVERSION STATIONARY SOURCE EMISSIONS

The Biomass Conversion system includes feed hoppers, gasifiers, biochar handling equipment, gas clean-up equipment, syngas-fueled engines, and flares. The methodologies used to calculate emissions from each component of the Biomass Conversion system are explained in this section. The Biomass Conversion system is a feature of the NRRP 2.0, and does not operate during the baseline period. The emissions from the Biomass Conversion are expected to include:

- PM_{10} and $PM_{2.5}$ emissions from material handling, including truck unloading and material transfers;
- POC, PM_{10}, and $PM_{2.5}$ emissions from grinding;
- POC and PM_{10} emissions from the feedstock drying;
- Criteria pollutants from the combustion of syngas in generator engines; and
- Criteria pollutants from the combustion of natural gas in the flare pilot and syngas gas in the flares.

The emission calculation methodology is explained in the following sections. Emission calculations are provided in the spreadsheet included as Attachment 3.

4.1 Material Handling

Material handling operations, including the transfer of feedstock to the grinder, loading the dryer, and handling and loadout of the biochar will produce fugitive emissions of particulate matter.

4.1.1 Methodology

PM_{10} and $PM_{2.5}$ emissions are estimated using the equation for material transfer from Chapter 13.2.4 of EPA AP-42, Aggregate Handling and Storage Piles (EPA 2006). $PM_{2.5}$ is assumed to be 15% of PM_{10} per the particle size multipliers in the equation. The emission factors were calculated according to Equation 4-1.

$$EF\ (lb/ton) = k(0.0032) \times (U/5)^{1.3} / (M/2)^{1.4} \qquad \text{(Eq. 4-1)}$$

Where:

EF = emission factor (lb/ton)

k = particle size multiplier (k = 0.35 for PM_{10}, and k = 0.053 for $PM_{2.5}$)

U = mean wind speed (miles per hour)

M = material moisture content

For these emission factor calculations, an average local windspeed of 3.6 miles per hour is used (CAPCOA 2021). A moisture content of 4.8% is assumed.[7] Emission factors are summarized in Table 4-1.

[7] The range of moisture content for which this equation is valid is 0.25% to 4.8%. Because the woody biomass that will be directed to biomass conversion process typically has moisture content of 20 to 30%, the use of 4.8% in the emission calculations is expected to be extremely conservative (i.e., will overestimate emissions).

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Table 4-1: Material Handling $PM_{10}/PM_{2.5}$ Emission Factors

Emission Mechanism	PM_{10} Emission Factor (lb/ton/transfer point)	$PM_{2.5}$ Emission Factor (lb/ton/transfer point)
Material Transfer	2.15 E-04	3.25 E-05

4.1.2 Material Handling Particulate Emissions

Material handling emissions are assumed to be uncontrolled, as the biomass conversion process requires dry (< 10% moisture content) feedstock, and thus cannot be watered for emissions control as is common for reducing material handling particulate emissions. Operational fugitive dust emissions from material handling are calculated in Attachment 3, Table 2.

4.2 Grinding

In preparation for the biomass conversion, feedstock materials may be pre-processed by grinding. While some feedstock will not require grinding, all material is assumed to be ground to ensure emissions are not underestimated. Grinding the feedstock helps to provide a uniform mixture of material and particle size and facilitates efficient drying.

4.2.1 Particulate Matter Methodology

The emission factor for grinding is based on guidance provided in the Bay Area Air District Permit Handbook for tub grinders (BAAQMD 2024), which is derived from the since de-listed EPA emission factor for "log debarking" (EPA 1985).[8] PM_{10} is assumed to be 60% of Total Suspended Particulate (TSP). $PM_{2.5}$ emissions are assumed to be 15% of the PM_{10}, consistent with the $PM_{2.5}$ to PM_{10} ratio from AP-42, Chapter 13.2.4 (= 0.053 / 0.35) (EPA 2006).

EF_{TSP} = 0.024 lb TSP/ton processed

EF_{PM10} = 0.60 x E_{TSP} = 0.60 x 0.024 = 0.0144 lb PM_{10}/ton processed

$EF_{PM2.5}$ = 0.0144 x 0.15 = 0.002 lb $PM_{2.5}$/ton processed

A water spray is assumed to apply to grinding activities, providing 50% control for PM10, per MDAQMD guidance (MDAQMD 2000).

4.2.2 POC Methodology

POC emissions from grinding operations are based on a POC emission factor of 0.005 pounds per ton from AP-42, Section 10.6.4, Hardboard and Fiberboard Manufacturing (EPA 2002).

4.2.3 Process Rate Information

The process rate information for grinding is presented in Table 4-2. Maximum daily throughput is estimated as 120% of average daily throughput to allow for fluctuations in daily operations.

[8] EPA Chapter 10.9 currently lists debarking as "non-detect"; however, emission factors from previous versions, such as cited in Section 4.2.1, are still available in EPA's online archive.

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Table 4-2: Grinding Throughput

Operation	Annual Throughput (TPY)	Peak Daily Throughput (TPD)
Grinding	15,960	53

4.2.4 Grinding Emissions

Grinding emissions are provided in Attachment 3, Table 3.

4.3 Drying

The biomass conversion process starts with drying the woody biomass to a specified moisture content. This step is conducted in drying bunkers, which are heated using waste heat from the IC engines and gasifier as the heat sources. There are multiple bunkers (three are anticipated in the current design); material is loaded into each bunker using front-end loaders, and hot, dry air is blown up from underneath. The drying continues until the final moisture content is less than 10% by weight. Drying is a low-temperature process; the design operating temperature is 176°F during the drying cycle. The drying process may result in the release of naturally occurring hydrocarbons from the wood, which are regulated as POC, and particulate matter present in the biomass may be entrained in the airstream.

4.3.1 POC Methodology

Dryer POC emissions are estimated using an emission factor calculated per the Oregon Department of Environmental Quality (ODEQ) equation for Western Red Cedar, reproduced as Equation 4-2 (ODEQ 2021):

$$EF = 0.0107(T)-1.3789 = \text{lb POC per mbf} \qquad \text{(Eq. 4-2)}$$

Where:

1 board foot (bf)	= 144 in^3
Density of fir	= 25 lb/ft^3
Drying temperature (T)	= 176°F

Using these parameters, the POC emission factor for drying is 0.4936 lb/ton.

4.3.2 Particulate Matter Methodology

The dryer is a custom-designed bunker-style system. Up to 300 tons of woodchips are loaded into the bunker and warm air is blown up from beneath the pile. The airflow required for drying is 30,000 cubic meters per hour (m^3/hr) for each of the three bunkers. The supplier tested the system for total particulate matter (TPM) emissions during a drying cycle; the measured concentration ranged from 0.42 milligrams per cubic meter (mg/m^3) to 0.97 mg/m^3, with an average of 0.64 mg/m^3 used in the emission estimates. PM_{10} emissions are estimated using AP-42 Table 10.5, which indicates that 52.9% of TPM is PM_{10}. Due to the nature of the process, it is assumed that no $PM_{2.5}$ would be emitted from the dryer. Emission estimates are based on operation 24 hours per day and 8,760 hours per year.

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4.3.3 Drying Emissions

Feedstock drying POC, PM_{10}, and $PM_{2.5}$ emissions are calculated in Attachment 3, Tables 4a and 4b.

4.4 Biomass Conversion

The gasifiers (three total for the Project) have no emissions directly to atmosphere. They are heated by the partial combustion of the woody biomass in one of the reaction zones of the devices. The gasifier produces syngas,[9] which is captured in a closed vent system (100% capture efficiency) for use as fuel in generator engines. Syngas that cannot be combusted in the IC engines would be disposed in a limited-use flare.

4.5 Engines

Three identical 500-kilowatt (kW) (output) IC engines are planned for the project (one associated with each of the gasifiers).

4.5.1 Syngas Properties

The F-factor (dry standard cubic foot/million British thermal units [dscf/MMBtu]) and higher heating value (HHV) of the syngas are calculated based on EPA Method 19, using the gas composition provided by the gasifier supplier. The F-factor and HHV are used in various combustion emission calculations associated with the engines and flare. Syngas properties are calculated in Attachment 3, Table 5.

4.5.2 Methodology

The engine emissions were estimated based on emission factors published by the SJVAPCD in a recent application for similar equipment with similar fuel (SJVAPCD 2019). The emission factors during normal operations are summarized in Table 4-3.

Table 4-3: Syngas-Fired IC Engine Emission Factors – Normal Operations

Pollutant	Emission Factor (ppm)	Emission Factor (g/BHp-hr)	Emission Factor (lb/MMBtu)
NO_x	9	0.18	0.074
SO_x	5	0.221	0.057
CO	100	1.20	0.502
POC	25	0.17	0.072
PM_{10}	–	0.03	0.008
$PM_{2.5}$	–	0.03	0.008

During the first year of operation, the engines will require commissioning, a period during which the engines would be tuned and tested without the add-on emissions controls. Following the tune and test period, the add-on emissions controls will be installed, tuned, and tested. Emissions during the commissioning period are expected to be higher than normal operations.

[9] Typically, syngas is 30 to 60% carbon monoxide (CO), 25 to 30% hydrogen (H_2), 0 to 5% methane (CH_4), 5 to 15% carbon dioxide (CO_2), plus a small amount of water vapor and smaller amount of sulfur compounds, depending on feedstock.

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The emission factors used to estimate commissioning period emissions are taken from the same SJVAPCD document used to generate Table 4-3; commissioning period emission factors are summarized in Table 4-4.

Table 4-4: Syngas-Fired IC Engine Emission Factors – Commissioning

Pollutant	Concentration (ppm)	Emission Factor (g/BHp-hr)	Emission Factor (lb/MMBtu)
NO_x	32	1.00	0.264
SO_x	5	0.0003	0.057
CO	763	14.50	3.829
POC	40	0.43	0.114
PM_{10}	–	0.03	0.008
$PM_{2.5}$	–	0.03	0.008

4.5.3 Process Information

Each of the three engines will be permitted to operate 8,760 hours per year at full load; however, normal operation is expected to be less than full time due to downtime, maintenance, etc. The engines are expected to operate 80 to 90% of the available hours.

For planning purposes, it is assumed that the engines would be commissioned 12 hours per day for approximately 25 days or a total of 300 hours per engine. For the remainder of each commissioning day, the gasifier would be shut down or operated at a substantially reduced load and any syngas produced would be routed to the flare for disposal.

Process information is summarized in Table 4-5.

Table 4-5: IC Engine Process Parameters

Parameter	Value / UOM
Number of Engines	3 each
Engine Output	500 kW
Syngas Flow (one engine)	4.56 MMBtu/hr
Syngas Flow (one engine)	109.46 MMBtu/day
Syngas Flow (one engine)	39,952 MMBtu/yr

4.5.4 Engine Emissions

Engine emissions for normal operations are summarized in Attachment 3, Table 6. Emissions for the first year of operation, including 300 hours of commissioning per engine, 300 hours of non-operation during the commissioning period, and 8,160 hours of normal operation are summarized in Attachment 3, Table 7.

4.6 Flare Pilot and Flares

Three flares are provided for syngas disposal during periods when the engines cannot use all of the gas produced (e.g., commissioning, and periods of unplanned engine shutdown). The flares would not operate when the engines are operating normally.

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4.6.1 Methodology

Criteria pollutant emissions from the natural gas pilot flame are based on SCAQMD Annual Emission Report (AER) default emissions factors for natural gas combustion, 50 standard cubic feet per hour per pilot, and 500 hours per year of operation. Flare pilot GHG emissions are estimated based on GHG emission factors from EPA (EPA 2015).

The flare emissions when combusting syngas are estimated based on a NOx emission factor provided by the vendor, and emission factors for other pollutants published by the SJVAPCD in a recent application for similar equipment with similar fuel (SJVAPCD 2019). The emission factors are summarized in Table 4-6.

Table 4-6: Flare Pilot and Flare Emission Factors

Pollutant	Flare Pilot Emission Factor (lb/MMscf)	Flare Emission Factor (lb/MMBtu)
NO_x	100	0.200
SO_x	0.6	0.0574
CO	84	0.310
POC	5.5	0.063
PM_{10}	7.6	0.008
$PM_{2.5}$	7.6	0.008

4.6.2 Process Information

The flares are sized for 100% of the syngas output of the gasifiers, a maximum of 4.56 MMBtu per hour (per gasifier/flare). During conversion process start-up (cold start), the flare operates at partial load, a little less than 50% capacity for up to 45 hours per event. Flare operation will be limited to 500 hours per year, per flare.

4.6.3 Flare Pilot and Flare Emissions

Flare pilot emissions are summarized in Attachment 3, Table 8, and emissions from syngas combustion in the flares are provided in Attachment 3, Table 9.

4.7 GHG Emissions

4.7.1 Syngas Combustion

GHG emissions are calculated based on the syngas fuel properties. The GHG emission factors are calculated in Table 5 in Attachment 3, and shown in Table 4-7.

Table 4-7: Calculated GHG Emission Factor (CO_2e)

Pollutant	Emission Factor	Unit of Measure
CO_2	190.80	lb CO_2/MMBtu
CH_4	0.00705	lb CH_4/MMBtu
N_2O	0.00139	lb N_2O/MMBtu
CO_{2e}	191.37	lb CO_2e/MMBtu

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4.7.2 Electricity and Water Usage

The proposed biomass conversion system generates electricity. Any electrical load to operate the gasifier, fans, blowers, lighting, and control systems would be parasitic load on the system, reducing net output of electricity. Since the system generates electricity from biomass, the system would not cause indirect GHG emissions due to electricity consumption.

Water usage results in indirect GHG emissions because it takes energy to pump water, treat water, and treat wastewater. The GHG intensity factors were taken from CalEEMod Appendix G-32 for San Francisco (CAPCOA 2021). The predicted energy requirements to supply 2,400 gallons per day to the gasifier system are summarized in Table 4-8.

Table 4-8: Energy Requirements for Water Supply

Category	Intensity Factor (kWh/MMgal)	Energy Requirement (kWh/yr)
Supply	1,182	1,035
Treat	754	661
Distribute	2,998	2,626
Wastewater	1,542	1,351
Total	---	5,673

Indirect GHG emissions were estimated using the GHG intensity factors for PG&E 2019-2050 from CalEEMod, Appendix G-3 (CAPCOA 2021). Indirect GHG emissions due to electricity usage for water supply are summarized in Table 4-9. Emission calculations are provided in Attachment 3, Table 11.

Table 4-9: Indirect GHG Emissions from Electricity Usage for Water Supply

Greenhouse Gas	Global Warming Potential	Intensity Factor (lb/MWh)	Electric Power Load (MW-hr/yr)	Indirect GHG Emissions (MT/yr)
CO_2	1	203.98	6	0.5
CH_4	30	0.033		0.0
N_2O	265	0.004		0.0
CO_2e	–	206		0.5

4.7.3 Biochar Carbon Sequestration

Biochar generated during the conversion process will be used as a soil supplement which provides long-term sequestration of carbon. According to publicly available biochar project records from Puro.earth, the number of carbon sequestration credits per ton of biochar produced varies by biochar type and company. One carbon credit is equivalent to one ton of CO_2. For wood feedstocks, the range of carbon credits per ton of biochar is 2.57 to 3.26, with an average of 2.83. (USBI 2025)

For the annual biomass conversion process throughput of 15,960 TPY, approximately 3,273 TPY (short tons) of biochar will be produced. Using the average carbon credit value of 2.83 tons of credit per ton of biochar, the GHG reduction associated with biochar production is 9,262.59 TPY (= 8,403 MT CO2e/yr).

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4.8 Summary of Biomass Conversion Criteria Pollutant and GHG Emissions

The predicted emissions from the proposed biomass conversion facility are summarized in Attachment 3, Table 12.

4.9 Toxic Air Contaminant Emissions

The TAC emissions were calculated either using process information for a given activity and an appropriate emission factor, or by "speciating" the POC or PM_{10} emissions using a profile that identifies the weight fraction of the TAC constituent in the parent compound.

4.9.1 Particulate TAC from Material Handling, Grinding, and Drying

TAC emissions from material handling, grinding, and drying were estimated using a speciation profile for woodchips published by the New York State Energy Research and Development Authority (NYSERDA 2013); the median values from that report are used in calculations. The weight fraction of TAC is summarized in Table 4-10. Emission calculations are provided in Attachment 3, Table 13.

Table 4-10: Material Handling TAC Emission Factors

Pollutant	Emission Factor (lb TAC/lb PM_{10})
Chlorine	2.47E-05
Mercury	7.92E-10
Vanadium	2.20E-08
Hexavalent Chromium	1.20E-09
Manganese	7.06E-05
Cobalt	2.90E-08
Nickel	3.62E-07
Copper	1.32E-06
Zinc	5.93E-06
Arsenic	5.00E-08
Selenium	4.30E-08
Cadmium	4.80E-09
Lead	2.49E-07

4.9.2 Drying

Volatile organic TAC emissions from the drying process were estimated using the State of Oregon Department of Environmental Quality (ODEQ) - Profile for Western True Firs and Western Red Cedar (ODEQ 2021). Dryer TAC emissions are listed in Table 4-11. Volatile organic TAC emissions from the dryer are provided in Attachment 3, Table 14.

Table 4-11: Dryer Organic TAC Emission Factors

Pollutant	Emission Factor (lb TAC/ton)
Acetaldehyde	5.28E-02
Formaldehyde	2.02E-03
Methanol	1.10E-01

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4.9.3 IC Engine TAC Emissions

With the exception of ammonia, TAC emissions from the IC engines are based on SJVAPCD AB 2588 emission factors for a four-stroke lean-burn engine combusting natural gas (SJVAPCD 2017a). Because TACs are typically byproducts of combustion, and natural gas has a higher heat content and lower inert gas content than syngas, the SJVAPCD TAC emission factors were adjusted by a ratio of the HHV of the syngas [154 Btu/standard cubic foot (scf)] to the HHV of natural gas (1,020 Btu/scf).

Ammonia emissions are based on an ammonia slip rate of 10 parts per million (ppm), consistent with the ammonia slip Best Available Control Technology (BACT) published by the SJVAPCD in a recent application for similar equipment with similar fuel (SJVAPCD 2019).

The TAC emission factors are presented in Table 4-12. The TAC emissions from the engines are presented in Attachment 3, Table 15.

Table 4-12: Syngas Engine TAC Emission Factors

Pollutant	CAS No.	Emission Factor (lb/MMBtu)
1,1,2,2-Tetrachloroethane	79345	1.40E-06
1,1,2-Trichloroethane	79005	1.12E-06
1,1-Dichloroethane	75343	8.28E-07
1,2,4-Trimethylbenzene	95636	5.01E-07
1,3-Butadiene	106990	9.37E-06
2,2,4-Trimethylpentane	540841	8.77E-06
2-Methyl naphthalene	91576	1.17E-06
Acenaphthene	83329	4.39E-08
Acenaphthylene	208968	1.94E-07
Acetaldehyde	75070	2.94E-04
Acrolein	107028	1.80E-04
Benzene	71432	1.55E-05
Benzo[b]fluoranthene	205992	5.82E-09
Benzo[e]pyrene	192972	1.46E-08
Benzo[g,h,i]perylene	191242	1.45E-08
Biphenyl	92524	7.44E-06
Carbon tetrachloride	56235	1.29E-06
Chlorobenzene	108907	1.07E-06
Chloroform	67663	1.00E-06
Chrysene	218019	2.43E-08
Ethyl benzene	100414	1.39E-06
Ethylene dibromide {EDB}	106934	1.55E-06
Ethylene dichloride {EDC}	107062	8.28E-07
Fluoranthene	206440	3.89E-08
Fluorene	86737	1.99E-07

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Pollutant	CAS No.	Emission Factor (lb/MMBtu)
Formaldehyde	50000	1.86E-03
Hexane	110543	3.89E-05
Methanol	67561	8.77E-05
Methylene chloride {Dichloromethane}	75092	7.02E-07
Naphthalene	91203	2.62E-06
PAHs, total, w/o individ. components reported	1151	2.72E-07
Phenanthrene	85018	3.66E-07
Phenol	108952	8.42E-07
Pyrene	129000	4.77E-08
Styrene	100425	8.28E-07
Toluene	108883	1.43E-05
Vinyl chloride	75014	5.23E-07
Xylenes (mixed)	1330207	6.46E-06

4.9.4 Flare TAC Emissions

TAC emissions from the natural gas pilot flame are based on SCAQMD AER default emissions factors for natural gas combustion, 50 standard cubic feet per hour per pilot, and 500 hours per year of operation.

TAC emissions from the flare were based on SJVAPCD AB 2588 emission factors for biogas combustion in a flare (SJVAPCD 2017b). Because TACs are typically byproducts of combustion, and biogas has more heat content and lower inert gas content than syngas, the SJVAPCD TAC emission factors were adjusted by a ratio of the HHV of the syngas (152 Btu/scf) to the HHV of typical biogas (600 Btu/scf).

The TAC emission factors for the flare when combusting syngas are presented in Table 4-13. Flare TAC emissions are provided in Attachment 3, Table 16.

Table 4-13: Syngas Flare TAC Emissions

Pollutant	CAS No.	Emission Factor (lb/MMBtu)
Ammonia	7664417	1.57E-06
Benzene	71432	5.62E-07
Chlorobenzene	108907	1.30E-07
Ethyl Benzene	100414	1.10E-05
Formaldehyde	50000	6.17E-04
Hydrogen Sulfide	7783064	4.94E-04
Methyl Chloroform	71556	1.77E-06
Methylene Chloride	75092	3.66E-05
Perchloroethylene	127184	1.03E-06
Toluene	108883	4.05E-06
Vinyl Chloride	75014	5.58E-07
Vinylidene Chloride	75354	1.30E-07

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Pollutant	CAS No.	Emission Factor (lb/MMBtu)
Xylenes	1330207	2.35E-05

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5.0 ANAEROBIC DIGESTER STATIONARY SOURCE EMISSIONS

The AD system includes conveyors, receiving hoppers, and a digestate dewatering sieve, in addition to the digester itself. The methodology used to calculate emissions from each component of the AD system are explained in this section. The AD system is a feature of the NRRP 2.0, and does not operate during the baseline period. The emissions from the AD are expected to include:

- PM_{10} and $PM_{2.5}$ emissions from material handling, including truck unloading and conveyor transfers;
- POC emissions from the dewatering of digestate using a sieve;
- Criteria pollutants from the combustion of natural gas in a small boiler;
- Criteria pollutants from the combustion of natural gas in the flare pilot and biogas in the flare; and
- Criteria pollutants from the combustion of natural gas in a small emergency generator engine.

The emission calculation methodology is explained in the following sections. Emission calculations are provided in the spreadsheet included as Attachment 4.

5.1 Material Handling

5.1.1 Particulate Matter Emissions

The receiving hopper and conveyance portion of this process may emit PM_{10} during material handling activities, such as conveyor loading and AD loading.

To estimate the emissions from the material receiving and transfer, emission factors are borrowed from AP-42, Section 13.2.4, Aggregate Handling and Storage Piles (EPA 2006). An emission factor for material transfer is calculated assuming a windspeed of 3.6 miles per hour (CAPCOA 2021) and a moisture content of 4.8%. Because the moisture content of food waste, green waste, and grape pomace are expected to be substantially higher than 4.8%, and the conveyors will be covered and not exposed to the wind, the calculated emission factor is expected to be conservative (i.e., will tend to overestimate emissions). The feed hopper is enclosed and is not expected to emit PM_{10} because it is closed to atmosphere. The calculated emission factors are 2.15 E-04 pounds of PM_{10} emissions per ton and 3.25 E-05 pounds of $PM_{2.5}$ emissions per ton (see Table 4-1). Emission calculations are included in Attachment 4, Table 2.

5.1.2 TAC Emissions

TAC emissions associated with organic waste loading are estimated by speciating the PM10 emissions into toxic components. The toxic emission factors are from a SJVAPCD document: "PM10 Based Emissions from Operations Generating Dust from Greenwaste Composting" (SJVAPCD 2016). The emission factors are shown in Table 5-1.

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Table 5-1: Material Handling TAC Emission Factors

Pollutant	Concentration (lb TAC /lb Dust)
Arsenic	6.20E-06
Cadmium	2.00E-06
Hexavalent Chrome	8.80E-06
Cobalt	8.80E-06
Copper	6.90E-05
Lead	2.00E-04
Manganese	4.40E-04
Mercury	1.00E-06
Nickel	9.50E-05
Selenium	1.00E-06

5.2 Anaerobic Digester

The AD has no emissions directly to atmosphere. The AD produces biogas, which is captured in a closed vent system (100% capture efficiency) for use as fuel. Biogas that cannot be collected for use as fuel would be disposed in a limited-use flare. Emission estimates for the AD are not provided.

5.3 Digestate Management

5.3.1 POC Emissions

Digestate is anaerobically digested green waste and food waste. Emission factors are not generally available for many aspects of digestate management. Raw digestate shares many properties with compost; therefore, compost management emission factors are used as surrogates for digestate management. The approach, along with the proposed emission factors, are illustrated in Table 5-2.

Table 5-2: Digestate Management POC Emission Factors

Pollutant	Digestate Management Step	Equivalent Composting Process Step	Emission Factor (lb/ton)
POC	Digestate Dewatering	Composting	0.22
POC	Curing	Curing	0.022
POC	Cured Digestate Storage	Cured Compost Storage	0.02

Digestate dewatering is conducted in a bunker vented to a biofilter for emissions control. Digestate is expected to be processed in the existing CASP, followed by curing in NMDF's existing curing piles. Cured digestate is blended with and stored with cured compost prior to shipment. Digestate dewatering POC emission calculations are provided in Attachment 4, Table 3.

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5.3.2 TAC Emissions

Because digestate has a composition similar to compost, it is assumed that digestate will have TAC emission profiles that are similar to compost. Accordingly, TAC speciation information is taken from the BAAQMD Permit Handbook (BAAQMD 2024), Section 11.16. The TAC emission factors are listed in Table 5-3.

Table 5-3: Digestate Management TAC Emission Factors

Pollutant	Dewatering (lb TAC/ lb POC)	Curing (lb TAC/ lb POC)	Storage (lb TAC/ lb POC)
Acetone	7.23E-02	1.08E-01	4.86E-02
1,4-Dichlorobenzene	2.22E-04	6.10E-04	3.56E-03
2-Propanol (Isopropyl alcohol, IPA)	2.59E-04	7.37E-04	1.46E-03
Acetaldehyde	4.29E-02	2.83E-02	1.86E-02
Allyl Chloride (3-Chloropropene)	1.08E-04	8.75E-04	1.86E-03
Benzene	1.60E-04	5.42E-04	1.89E-03
Carbon disulfide	3.74E-04	1.30E-03	7.75E-03
Chloroethane	8.30E-05	2.68E-04	1.56E-03
Chloroform	1.63E-04	4.99E-04	2.89E-03
Ethylbenzene	3.50E-04	8.06E-04	2.57E-03
Ethylene Dichloride (1,2-dichloroethane)	5.37E-04	5.78E-04	2.40E-03
Hexane	3.18E-04	6.42E-04	2.09E-03
Methanol (Methyl alcohol)	4.88E-02	3.07E-02	7.77E-04
Methyl Ethyl Ketone (2-butanone)	7.82E-02	3.77E-02	1.75E-03
Naphthalene	7.14E-04	1.12E-03	3.11E-03
Propene (Propylene)	5.89E-03	3.21E-02	6.87E-02
Styrene	3.53E-04	6.34E-04	2.53E-03
Toluene	6.30E-04	2.54E-03	6.96E-03
Vinyl acetate	3.01E-03	7.67E-04	2.09E-03
Xylenes	4.36E-04	1.24E-03	5.15E-03

5.4 Biogas Storage

Biogas flows from the AD into the biogas storage unit. The flexible membrane roof of the biogas storage unit does not vent to atmosphere under normal operating conditions (but there are pressure relief valves to prevent over-pressure situations; pressure relief vents to flare). Therefore, the biogas storage unit is not expected to emit criteria pollutants during normal operations, and emission calculations are not provided.

5.5 Biogas Upgrading System

Biogas is pumped from the Biogas Storage Unit to the Biogas Upgrading System. The purpose of the Biogas Upgrading System is to upgrade the biogas to Renewable Natural Gas (RNG) standards

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by removing sulfur, carbon dioxide (CO_2), and water. The finished RNG product consists primarily of methane (>99%). The CO_2 emissions are biogenic and do not contribute to the GHG emissions inventory from the facility and are not estimated.

Sulfur will be removed from the biogas using an iron sponge reactor, scrubber, carbon adsorption, or equivalent; the sulfur leaves the system as a solid; emissions of sulfur, sulfur dioxide (SO_2), or SO_x are not expected to occur.[10] CO_2 and water are separated from methane using a three-stage membrane system. The CO_2 and water are vented to atmosphere. Emissions of criteria pollutants are not expected to occur during membrane separation.

5.6 Boiler

A 1.05 MMBtu/hr boiler is used to provide heat to the AD to stimulate biological activity, primarily during winter months.

5.6.1 Criteria Pollutants

The boiler combusts pipeline-quality natural gas; emissions of POC, NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_x result from its operation. NO_x and CO are estimated based on the BACT concentration limits of 20 and 50 parts per million by volume (ppmv), respectively, at 3% excess oxygen (O_2). POC, PM_{10} and SO_x are based on SCAQMD default emission factors (SCAQMD 2024), as shown in Table 5-4. $PM_{2.5}$ is assumed to be equal to PM_{10}. Boiler criteria pollutant emission calculations are provided in Attachment 4, Table 4.

Table 5-4: Boiler Criteria Pollutant Emission Factors

Pollutant	Emission Limit (ppmv @ 3% O_2)	Emission Factor (lb/MMscf)
POC	–	5.5
NO_x	20	24.66
SO_x	–	0.6
CO	50	37.52
PM_{10}	–	7.6
$PM_{2.5}$	–	7.6

5.6.2 Toxic Air Contaminant Emissions

TACs are emitted during the operation of the boiler. The TAC emission factors were taken from the SCAQMD's default emission factors for AER (SCAQMD 2024), which are shown in Table 5-5. Boiler emission calculations are provided in Attachment 4, Table 4.

[10] Sulfur is also removed *in situ* in the AD via the injection of iron oxide. Sulfur removed from the process by iron oxide injection leaves the AD as a solid, a trace constituent in the digestate.

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Table 5-5: Boiler TAC Emission Factors

Pollutant	Emission Factor (lb/MMscf)
Benzene	0.008
Formaldehyde	0.017
PAH (excl. Naphthalene)	0.0001
Naphthalene	0.0003
Acetaldehyde	0.0043
Acrolein	0.0027
Ammonia	3.2
Ethyl benzene	0.0095
Hexane	0.0063
Propylene	0.731
Toluene	0.0366
Xylenes	0.0272

5.6.3 Greenhouse Gas Emissions

GHG emissions from the boiler are based on EPA emission factors for natural gas combustion (EPA 2024). GHG emission estimates for the boiler are provided in Attachment 4, Table 4.

5.7 Flare Pilot and Flare

The first year of operation may include approximately 3 months of commissioning for the AD, during which time the biogas quality (e.g., Btu content) is low and not suitable for purification and subsequent use or sale. During this period, biogas may be vented to the flare for disposal for up to 2,000 hours. This commissioning period is required because the digesters will be in a ramp-up mode, during which the feedstock is fed at relatively low rates, which allows bacterial cultures to develop and stabilize. The biogas output during this period may be low, and the methane concentration may be low. The low volume/low concentration output does not allow operation of the Biogas Upgrading System; thus, the biogas must be vented to the flare during this period.[11]

After commissioning is complete, the flare may be used to control biogas emissions, including during periods when the Biogas Upgrading System and/or compressor are out of service, when the quantity of biogas produced exceeds the Biogas Upgrading System and/or compressor capacity, and/or when the quantity or quality of the biogas produced is insufficient to operate the Biogas Upgrading System. Emission estimates assume a maximum of 200 hours of flare operation for disposal of biogas (except for the Commissioning period, as described above).

The flare will emit NO_x, CO, PM_{10}, $PM_{2.5}$, POC, and SO_x, from the combustion of biogas. Flare emission calculations are provided in Attachment 4, Tables 5 (pilot commissioning), 6 (Biogas commissioning), 7 (pilot normal operations) and 8 (Biogas normal operations).

[11] Biogas will be treated for sulfur removal prior to processing in the Biogas Upgrading System or combustion in the flare.

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5.7.1 Criteria Pollutant Emission Estimates

Criteria pollutant emissions from the natural gas pilot flame are based on SCAQMD AER default emissions factors for natural gas combustion (SCAQMD 2024), 50 standard cubic feet per hour, 2,200 hours per year of operation during the Commissioning Year[12] and 200 hours per year for each subsequent year.

For biogas combustion, the NO_x emission factor is determined by BACT (SCAQMD 2019). CO, POC, PM_{10}, and $PM_{2.5}$ emission factors are the SCAQMD AER default factors for natural gas combustion (SCAQMD 2024). These factors are summarized in Table 5-6.

The SO_x emission factor is calculated based on the maximum sulfur content of 40 ppmv (as H_2S) in the biogas following the sulfur removal stage. The SO_x emission factor is calculated as follows:

E.F. (SO_x) = (40 ppmv H_2S / MMscf biogas) x (1 / 387 scf/lbmol) x (1 mol SO_2 / 1 mol H_2S) x (64 lb SO_2/lbmol) = <u>6.615 lb/MMscf</u>

The annual hours of operation of the flare will be limited to 2,200 hours for the first year of operation (including 2,000 hours for commissioning and 200 hours for biogas emissions control during the balance of the year). Each subsequent year of operation would is limited to 200 hours per year for biogas emissions control. Flare criteria pollutant emissions are provided in Attachment 4, Tables 6 and 8 for the commissioning period and normal operations, respectively.

Table 5-6: Flare Pilot and Flare Criteria Pollutant Emission Factors

Pollutant	Flare Pilot Emission Factor (lb/MMscf)	Flare Biogas Emission Factor (lb/MMscf)	Flare Biogas Emission Factor (lb/MMBtu)
POC	5.5	5.5	0.009
NO_x	100	36	0.060
SO_x	0.6	6.615	0.006
CO	84	84	0.082
PM_{10}	7.6	7.6	0.007
$PM_{2.5}$	7.6	7.6	0.007

5.7.2 Toxic Air Contaminant Emission Estimates

TAC emissions from the natural gas combustion in the pilot flame are based on SCAQMD AER default emissions factors (SCAQMD 2024), 50 standard cubic feet per hour, 2,200 hours per year of operation for the Commissioning Year, and 200 hours for each subsequent year.

The TAC emissions for the biogas combustion in the flare are calculated using the emission factors from the 2024 SCAQMD AER Help and Support document for combustion emissions (SCAQMD 2024). The TAC emission factors for digester gas (i.e., biogas)

[12] The flare use during the commissioning year include 2,000 for commissioning plus 200 hours of "normal" flare operation.

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combustion are shown in Table 5-7. Flare TAC emissions are provided in Attachment 4, Tables 6 and 8 for Year 1 and normal operations, respectively.

Hydrogen sulfide is assumed to be fully oxidized in the flare to SO_2, thus no H_2S emissions are expected during the commissioning or any other period of operation.

Table 5-7: TAC Emission Factors for Biogas Combustion in the Flare

Pollutant	Emission Factor (lb/MMscf)
Benzene	0.0058
Formaldehyde	0.0123
PAH (excl. Naphthalene)	0.0001
Naphthalene	0.0003
Acetaldehyde	0.0031
Acrolein	0.0027
Ammonia	3.2
Ethylbenzene	0.0069
Hexane	0.0046
Toluene	0.0265
Xylenes	0.0197
Propylene	0.53

5.7.3 Greenhouse Gas Emissions

GHG emissions from natural gas combustion in the flare pilot and digester gas combustion in the flare are based on EPA emission factors for natural gas and digester gas combustion (EPA 2024). GHG emission estimates for the flare pilot appear in Attachment 4, Table 7 and for the flare itself in Table 8.

5.8 Emergency Engine

The Project will operate a small natural gas-fired emergency generator with an electrical output of 130 kilowatts (kW). The generator provides power to critical systems to allow operation of the critical control functions of the AD system during power disruptions.

5.8.1 Criteria Pollutant Emission Estimates

Criteria pollutant emissions from natural gas combustion are based on SCAQMD AER default emissions factors for a 4-stroke rich burn engine (SCAQMD 2024), 1,496 standard cubic feet per hour (per the generator specification sheet), and 200 hours per year of operation. Criteria pollutant emission estimates for the emergency engine maintenance and testing are provided in Attachment 4, Table 9.

5.8.2 Toxic Air Contaminant Emission Estimates

TAC emissions from the natural gas combustion in the emergency engine are based on the Bay Area Air District Permit Handbook (BAAQMD 2024), 1,496 standard cubic feet per hour, and 200 hours per year of maintenance and testing operation. TAC emission estimates for the emergency engine are provided in Attachment 4, Table 9.

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5.8.3 Greenhouse Gas Emissions

GHG emissions from the emergency engine are based on EPA emission factors for natural gas combustion (EPA 2024). GHG emission estimates for the emergency engine are provided in Attachment 4, Table 9.

5.9 GHG Emissions from Electricity and Water Usage

Operation of the AD requires electricity to operate the paddle mix motor, biofilter blower, gas upgrading system, RNG compressor, boiler combustion blower, and conveyor motors. Estimated electricity requirements[13] are summarized in Table 5-8 and are also provided in Attachment 4, Table 10.

Table 5-8: Motor Load and Electricity Usage

Device Description	Rated Power (hp)	Operating Load (hp)	Electric Load (kW)
Paddle Mix Motor	30	24	17.90
Biofilter Blower	50	40	29.83
Gas Upgrade System	10	8	5.97
RNG Compressor	200	160	119.31
Boiler combustion blower	2	1.6	1.19
Conveyor motors	10	8	5.97

Indirect GHG emissions were estimated using the CalEEMod Appendix G-3 GHG intensity factors for Pacific Gas & Electric Company (PG&E) 2019-2050 (CAPCOA 2022). CalEEMod uses global warming potentials (GWPs) per the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5). Annual emissions assume operation at 8,760 hours per year. Indirect GHG emissions due to electricity usage are summarized in Table 5-9. Emission calculations are provided in Attachment 4, Table 10.

Table 5-9: Indirect GHG Emissions from Electricity Usage

Greenhouse Gas	Global Warming Potential	Intensity Factor (lb/MWh)	Electric Power Load (kW)	Electric Power Consumption (MWh/yr)	Indirect Emissions (MT/yr)
CO_2	1	203.98	180.16	1,578	146.1
CH_4	30	0.033			0.6
N_2O	265	0.004			0.9
CO_2e	–	206			147.5

Water is used in the AD to fluidize the organic waste. Water is not consumed in the process, rather, it is recirculated. Recirculation of the water recirculates the biological organisms to inoculate the incoming wastes which ensures efficient digestion. Water demand is negligible; thus, indirect GHG emissions due to water consumption are negligible and are not calculated.

[13] Some components of the system have not been specified yet; motor horsepower is estimated based on engineering judgement.

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5.10 Summary of Anaerobic Digester Criteria Pollutant and GHG Emissions

The predicted emissions from the proposed anaerobic digester are summarized in Attachment 4, Table 11.

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6.0 BASELINE AND PROJECT COMPOSTING EMISSIONS

Emissions estimates have been prepared for NMDF CASP composting operations for the Baseline and proposed Project phases. Note that NMDF does not anticipate any increases or decreases to composting throughput as a result of NRRP 2.0 implementation. Consequently, proposed Project and Baseline composting throughput and emissions are equal, and the emission estimates reflect that.

For each category of emissions, the methodology is explained and the data and assumptions used in the calculations are provided. Emission calculation worksheets are provided in Attachment 5.

6.1 Facility Throughput

The operational emissions were estimated based on material throughput rates shown in Table 6-1 for the baseline period. The proposed Project will operate at the same capacity as the Baseline period. Proposed Project and Baseline throughputs are shown in Table 1 of Attachments 5a and 5b, respectively.

Composting operations emit POC over the entire duration of processing, lasting 6 weeks or more. Thus, average daily throughput better represents the process than maximum daily throughput, with respect to POC emissions. Maximum daily throughput would impact particulate emission rates for the initial material handling operations (grinding and material transfer) but average daily throughput would better represent subsequent process steps. To simplify the analysis, average daily throughput is used for daily emission calculations.

Table 6-1: Baseline and Project Facility Throughput

Processing Step	2023 (TPY)	2024 (TPY)	2-Year Average (TPY)	2-Year Average (TPD)
CASP S-6	65,300.26	61,516.86	63,409	175
Stock Pile Yardwaste	85,673.36	82,917.44	84,295	233
Stock Pile Food Waste Building	12,761.73	10,819.81	11,791	33
Stock Pile Wood	8,841.85	9,965.96	9,404	26
Transfer tons Yardwaste	19,785.03	32,030.29	25,908	72
Grinder				
Yardwaste	26,139.08	19,380.69	22,760	63
Wood	8,841.85	9,592.00	9,217	25
Trommel Screen				
Food Depackager	12,761.73	10,819.81	11,791	33
Curing (80% of CASP)	52,240.20	49,213.49	50,727	140
Finish Screen	52,240.20	49,213.49	50,727	140

6.2 Dust/Particulate Emissions

Operations that involve the movement of material or that expose or disturb erodible surfaces may generate fugitive dust. During composting operations, fugitive dust is generated by a variety of

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activities, such as the transport of material on paved and unpaved roads, material handling, and wind erosion.

Fugitive dust emissions were calculated using EPA-recommended equations that generate "predictive emission factors" that are specific to the given activity. The calculations generally take into account the silt and moisture content of the material. The methodologies and detailed emission calculations are presented in the following sections.

6.2.1 Grinding and Screening

In preparation for the active composting phase, feedstock materials may be pre-processed by grinding. Grinding the feedstock reduces the volume of material, increases the surface area to promote biological decomposition, and provides a more uniform mixture of material and particle size. Cured compost is screened to remove "overs," which typically consist of composted pieces of woody material or inorganic matter such as plastic or glass. Emissions from grinding and screening are presented in this section.

6.2.1.1 Methodology

The uncontrolled emission factor for grinding is based on guidance provided in the BAAQMD permit manual for wood grinders (BAAQMD 2018) and is derived from the since de-listed EPA emission factor for "log debarking" (EPA 1985).[14] PM_{10} is assumed to be 60% of total suspended particulate (TSP). The $PM_{2.5}$ emissions are assumed to be 15% of the PM_{10}, consistent with the fine particulate matter ($PM_{2.5}$) to respirable particulate matter (PM_{10}) ratio from EPA AP-42, Chapter 13.2.4 (= 0.053/0.35) (EPA 2006).

E_{TSP} = 0.024 lb TSP/ton processed

E_{PM10} = 0.60 x E_{TSP} = 0.60 x 0.024 = 0.0144 lb PM_{10}/ton processed

$E_{PM2.5}$ = 0.0144 x 0.15 = 0.00216 lb $PM_{2.5}$/ton processed

The uncontrolled particulate emission factor for screening is from AP-42 Chapter 10.3, Plywood Veneer and Layout Operations (EPA 1985) for log debarking, assuming 60% of the TSP emissions are PM_{10}. The $PM_{2.5}$ emissions are assumed to be 15% of the PM_{10}, consistent with the $PM_{2.5}$ to PM_{10} ratio from AP-42, Chapter 13.2.4 (= 0.053/0.35) (EPA 2006).

E_{PM10} = 0.024 lb-TSP/ton x 0.60 lb-PM_{10}/lb-TSP = 0.0144 lb/ton

$E_{PM2.5}$ = 0.024 lb-TSP/ton x 0.60 lb-PM_{10}/lb-TSP x 0.15 lb-PM_{10}/lb-$PM_{2.5}$

= 0.00216 lb/ton

6.2.1.2 Emission Controls

The screens and grinders will be fitted with water sprays to ensure the material is sufficiently wetted to minimize emissions. An emission control efficiency of 75% is applied to derive controlled emissions (MDAQMD 2000).

[14] EPA Chapter 10.9 currently lists debarking as "non-detect"; however, emission factors from previous versions, such as cited in Section 3.1.1.2, are still available in EPA's archive.

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6.2.1.3 Grinding and Screening Particulate Emissions

Emission calculations, including daily and hourly emissions, are provided in Table 3 in Attachments 5a and 5b for the proposed Project and baseline, respectively.

6.2.2 Material Handling

6.2.2.1 Methodology

PM_{10} and $PM_{2.5}$ emissions were estimated using the equation for material transfer from Chapter 13.2.4 of AP-42, Aggregate Handling and Storage Piles (EPA 2006). $PM_{2.5}$ is assumed to be 15% of PM_{10}, per the particle size multipliers in the equation. The emission factor is calculated according to Equation 6-1.

$$EF\ (lb/ton) = k(0.0032) \times (U/5)^{1.3} / (M/2)^{1.4} \qquad \text{(Eq. 6-1)}$$

Where:

EF = Emission Factor (lb/ton)

k = particle size multiplier (k = 0.35 for PM_{10}, and k = 0.053 for $PM_{2.5}$)

U = mean windspeed (miles per hour)

M = material moisture content

For these emission factor calculations, a windspeed of 3.6 miles per hour is used (CAPCOA 2020, Table 1.1). A moisture content of 4.8% is assumed.[15] Emission factors are summarized in Table 6-2.

Table 6-2: Material Handling PM_{10}/$PM_{2.5}$ Emission Factors

Emission Mechanism	PM_{10} Emission Factor (lb/ton/drop point)	$PM_{2.5}$ Emission Factor (lb/ton/drop point)
Material Transfer	2.15 E-04	3.25 E-05

6.2.2.2 Material Handling Particulate Emissions

Operational fugitive dust emissions from material handling, are provided in Table 4 in Attachments 5a and 5b for the proposed Project and baseline, respectively.

6.2.3 Wind Erosion

6.2.3.1 Methodology

The uncontrolled wind erosion PM_{10} emission factor is calculated based on Equation 6-2 (MDAQMD 2000).

$$E_f = J\ x\ 1.7\ x\ \frac{sL}{1.5}\ x\ \frac{(365-P)}{235}\ x\ \frac{I}{15} \qquad \text{(Eq. 6-2)}$$

[15] The range of moisture content for which this equation is valid is 0.25% to 4.8%. Because green waste has moisture content greater than 50%, the use of 4.8% in the emission calculations is expected to be extremely conservative (i.e., will overestimate emissions).

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Where:

Ef = Emission factor in tons per acre per day

J = Particulate aerodynamic factor (=0.5 for PM10 and 0.2 for PM2.5)

sL = Average silt loading of storage pile in percent (%) (assumed to be 0.5%)

P = Average number of days during the year with at least 0.01 inches of precipitation (= 38.4 at Napa County Airport)

I = Percentage of time with unobstructed wind speed >12 mph in percent (%) (= 5.41% in the project area)

Table 6-3: Wind Erosion $PM_{10}/PM_{2.5}$ Emission Factors

Emission Mechanism	Uncontrolled PM_{10} Emission Factor (lb/acre-day)	Uncontrolled $PM_{2.5}$ Emission Factor (lb/acre-day)
Wind Erosion	1.42E-01	5.68E-02

6.2.3.2 Emission Control

The compost and curing piles are fitted with water sprays to ensure the material is sufficiently wetted to minimize emissions. Storage piles are wetted using a water truck, as necessary, to minimize dust emissions. An emission control efficiency of 75% is applied to derive controlled emissions (MDAQMD 2000).

6.2.3.3 Wind Erosion – Process Information

Wind erosion varies according to the acreage involved; acreage was determined using GoogleEarth. Process areas for each operational activity are summarized in Table 6-4.

Table 6-4: Wind Erosion Process Information

Area	Baseline Acres	Proposed Project Acres
CASP	1.71	1.71
Curing Pile	1.57	1.57
Stock Pile Yardwaste	1	1
Stock Pile Food Waste Building	0	0
Stock Pile Wood	0.5	0.5
Transfer tons Yardwaste	1	1

6.2.3.4 Wind Erosion Particulate Emissions

Wind erosion particulate emissions are calculated in Table 5 of Attachments 5a and 5b for the proposed Project and baseline, respectively.

6.3 Composting Operations

The proposed composting operations will emit POC due to the decomposition of the organic materials during the composting and curing operations and associated storage. POC is the only

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criteria pollutant that would be emitted directly from the decomposition of organic matter in the composting process.

6.3.1.1 Methodology

Emissions of POC were estimated using emission factors recommended by the SJVAPCD, BAAQMD, or CARB, permit conditions, derived from reports published by these agencies or from source test data from similar facilities elsewhere in California.

The POC emission factor for feedstock storage is taken from Table 7 of the SJVAPCD Compost Emission Factor Report (SJVAPCD 2023). The POC emission factor for composting is based on the permit limit of 1.6 pounds per wet ton (composting + curing). POC emission factors are summarized in Table 6-5.

Table 6-5: Summary of Composting POC Emission Factors

Source	Controlled Emission Factor	Reference
Feedstock Storage	0.2 lb/wet ton/day	SVJAPCD 2023,Table 7
Composting + Curing	1.6 lb/ton	NRWS CASP Permit Limit
Storage	0.02 lb/ton	SJVAPCD 2010, Table 4.3

6.3.1.2 Process Throughput Information

Feedstock is either delivered directly to the compost pile, or is pre-processed by grinding and/or blending [e.g., blended to improve moisture content and/or, blended to optimize the carbon to nitrogen (C:N) ratio]. To ensure that emissions from feedstock storage are not underestimated, the amount of material directed to the feedstock storage is assumed to be 100% of the CASP throughput. Feedstock storage is assumed to last no more than 2 days.

6.3.1.3 Composting Process Emissions

POC emissions from the raw material stockpile, composting, curing, and the finished compost stockpile are summarized the emission calculation worksheets in Table 6 in Attachments 5a and 5b for the proposed Project and Baseline, respectively.

6.4 Toxic Air Contaminant Emissions

Emissions of TACs are estimated using either process information for a given activity and an appropriate emission factor, or by "speciating" the PM_{10} and POC emissions using a profile that identifies the weight fraction of the TAC constituent in the parent compound.

6.4.1.1 Dust and Particulate TAC Emissions

Material handling, screening, grinding, and wind erosion can each result in particulate emissions. The particulate emissions may contain TACs consisting primarily of heavy metals that are present in the biomass feedstock. Particulate emissions are speciated into TAC emissions using a co-composting speciation profile published by the SJVAPCD (SJVAPCD 2015). The speciation profile and resulting TAC emissions are provided as Table 6-6. Emission calculations are provided in Table 8 in Attachments 5a and 5b for the proposed Project and Baseline, respectively.

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Table 6-6: Compost Operations Fugitive Dust TAC Emissions

TAC	Concentration (lb/lb dust)
Arsenic	6.20E-06
Cadmium	2.00E-06
Hexavalent Chromium	2.45E-06
Cobalt	8.80E-06
Copper	6.90E-05
Lead	2.00E-04
Manganese	4.40E-04
Mercury	1.00E-06
Nickel	9.50E-05
Selenium	1.00E-06

6.4.1.2 Ammonia

Ammonia may be emitted from organic waste processing operations due to decomposition of nitrogen-bearing compounds present in the feedstock. Ammonia can form if the C:N ratio is low, the pH is too high, there is insufficient oxygen, or if the temperature is too high.

The ammonia emission factor for composting and curing of 0.178 pounds per ton is the average emission factor from a series of five source tests conducted at the NMDF facility in Napa California between January 2020 and May 2022. Ammonia emission factors are summarized in Table 6-7. Ammonia emissions estimates are based on these emission factors and the process throughput; ammonia emission calculations are provided in Table 9 in Attachments 5a and 5b for the proposed Project and Baseline, respectively.

Table 6-7: Ammonia Emission Factors

Source Description	Emission Factor (lb/ton)	Reference
Feedstock Storage	0.02 lb/ton/day	SJVAPCD 2010
Composting + Curing	0.178 lb/ton	NMDF 2020
Compost Storage	0.00038 lb/ton	SJVAPCD 2010

6.4.1.3 Organic TACs

Organic TAC emissions for composting, curing, and finished compost storage are estimated by speciating the POC emissions using the speciation profiles published in the BAAQMD's Permit Handbook (BAAQMD 2023), which are summarized in Table 6-8. Organic TAC emission calculations are provided in Table 10 in Attachments 5a and 5b for the proposed Project and Baseline, respectively.

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Table 6-8: TAC Speciation Profile

TAC	Feedstock Storage (lb TAC/lb POC)	Composting (lb TAC/lb POC)	Finished Compost Storage (lb TAC/lb POC)
Acetone	8.25E-03	7.23E-02	4.86E-02
1,4-Dichlorobenzene	4.21E-04	2.22E-04	3.56E-03
Isopropyl alcohol (IPA)	1.13E-03	2.59E-04	1.46E-03
Acetaldehyde	8.96E-02	4.29E-02	1.86E-02
Allyl Chloride (3-Chloropropene)	2.19E-04	1.08E-04	1.86E-03
Benzene	2.24E-04	1.60E-04	1.89E-03
Carbon disulfide	2.18E-04	3.74E-04	7.75E-03
Chloroethane	1.85E-04	8.30E-05	1.56E-03
Chloroform	3.42E-04	1.63E-04	2.89E-03
Ethylbenzene	3.04E-04	3.50E-04	2.57E-03
Ethylene Dichloride (1,2-dichloroethane)	2.84E-04	5.37E-04	2.40E-03
Hexane	7.86E-03	3.18E-04	2.09E-03
Methanol	9.68E-02	4.88E-02	7.77E-04
Methyl ethyl ketone	5.36E-02	7.82E-02	1.75E-03
Naphthalene	2.81E-04	7.14E-04	3.11E-03
Propene (Propylene)	9.45E-05	5.89E-03	6.87E-02
Styrene	2.98E-04	3.53E-04	2.53E-03
Toluene	2.64E-04	6.30E-04	6.96E-03
Vinyl acetate	1.45E-02	3.01E-03	2.09E-03
Xylenes	3.15E-04	4.36E-04	5.15E-03

6.5 GHG Emissions

Composting GHG emissions are considered biogenic, i.e., part of the natural carbon cycle. To ensure a complete GHG inventory for the baseline and proposed Project, GHG emission from composting are estimated using GHG emission factors published by EPA for the solid waste management industry (EPA 2010). The emission factors are shown in Table 6-9. These emission factors are based on dry tonnage; compost feedstock is assumed to have 30% moisture content upon receipt. GHG emission calculations are provided in Table 6 in Attachments 5a and 5b for the proposed Project and Baseline, respectively.

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Table 6-9: GHG Emission Factors

Pollutant	Emission Factor (kg/dry ton)
CO_2	0.44
CH_4	0.0040
N_2O	0.0003

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7.0 WOODCHIP MANAGEMENT GHG EMISSIONS

Woodchips generated via the grinding process and compost "overs" from the compost screening process at NWDF will be used as the feedstock for the proposed Biomass Conversion Facility. The woodchips are currently most commonly used as Alternate Daily Cover (ADC) at a local landfill, although they may also be sold as biomass or screened mulch. GHG emissions associated with woodchip management are discussed in this section.

7.1 Overview

There are four aspects of woodchip management to consider when assessing the GHG emissions:

1) The current woodchip management practices result in emissions due to transport of woodchips to the landfill for use as ADC. Mobile source emissions associated with woodchip transport to landfill were addressed in the Mobile Source Analysis, Section 3 and Attachments 2a and 2b of this technical report.
2) Woodchips processed in the biomass conversion process will release GHG due to the combustion of the syngas in the engines or flares; the GHG emissions associated with this aspect of woodchip management were discussed in Section 4 and Attachment 3 of this technical report.
3) The biomass conversion process generates biochar which represents long-term sequestration of carbon. The GHG emission impacts associated with carbon sequestration are discussed in Section 3.7.3 of this technical report.
4) Woodchips diverted from landfill will avoid landfill GHG emissions associated with woodchip decomposition; avoided GHG emissions are discussed in Section 7.2 and Attachments 6a and 6b of this technical report

7.2 Landfill GHG Emissions

The current "business-as-usual" approach to woodchip disposal at NWDF is to use as ADC in a local landfill. When woodchips are landfilled, they decompose over time to emit CO_2 and methane[16]. Due to the environmental conditions in the landfill (e.g., low moisture, low oxygen), the decomposition and resulting emissions may occur over a period of 100 years or more. The proposed Biomass Conversion Process provides an alternative disposal option so as to avoid landfill disposal and the associated emissions.

The EPA landfill gas (LFG) emissions model LandGEM (EPA 2025) is used to predict landfill gas emissions of CO_2 and methane. For this analysis, the proposed Project is assumed to have a lifespan of 25 years and would divert 15,960 TPY of woodchips from landfill each year of the project lifetime. To estimate the GHG emissions avoided via implementation of the Biomass Conversion Process, 15,960 tons of organic waste is input to LandGEM each year for 25 years.

LandGEM reports LFG emissions for this scenario for more than 100 years. To determine the annual benefit of landfill diversion afforded by the proposed Project, the CO_2 and methane emissions are summed over the 25-year lifetime of the proposed NRRP Project, and the emissions

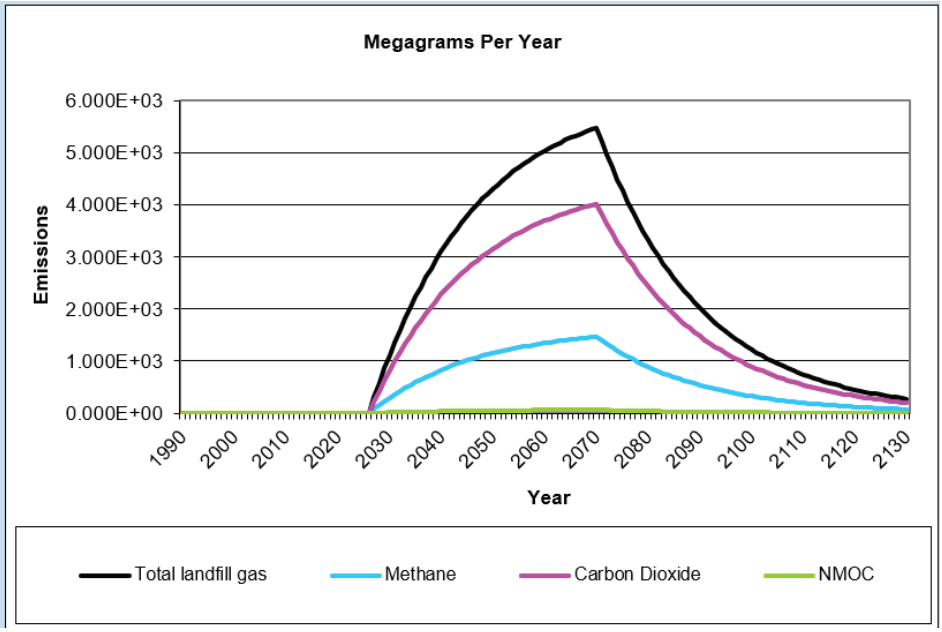
[16] LFG emissions also include non-methane organic compounds, including many organic toxic air contaminants. "Avoided" emissions at the landfill of the NMOC and toxics have no regulatory significance to the proposed Project and are not estimated for the analysis.

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are then averaged to derive the annual benefit. The annual GHG benefit is shown in Table 2 of Attachment 6b. This approach provides the most conservative estimate of Project benefits, as it underestimates the total lifecycle reductions in landfill gas emissions, because most of the emissions occur after the Project lifetime, i.e., after year 25, as discussed below.

The total GHG benefit based on the 100+ years of decomposition is illustrated by the LFG output graph provided as Figure 7-1. As shown, the peak LFG emission rate, and thus the greatest benefit of this landfill diversion project, occurs after the useful life of the Project itself. Further, because GHG impacts are normally assessed over a 100-year atmospheric lifetime of GHG pollutants, accumulating those benefits for the entire decomposition period is consistent with the manner in which GHG emissions are analyzed and would be a reasonable alternative approach to evaluating the benefits. However, to ensure that the benefits are not overestimated, the GHG reductions for only the first 25 years are evaluated. The annual GHG benefit of this alternative scenario is shown in Table 3 of Attachment 6b.

Figure 7-1: LandGEM Uncontrolled LFG GHG Emission Estimates



LFG CO_2 emissions are emitted directly to atmosphere untreated, so the LandGEM output can be used directly to predict emissions. Methane emissions are evaluated differently because the landfill in question has a LFG collection and control system to reduce methane emissions with a capture and control efficiency of 75%. Methane emissions that are captured are burned to form CO_2, either in engine(s) (for power production) or in flare(s) for LFG disposal. GHG emissions of CO_2, methane and nitrous oxide are estimated based on EPA emission factors for biogas combustion. That portion of the methane emissions that is not captured and treated (25%) is released to atmosphere as methane.

LFG generation is calculated in the LandGEM spreadsheet included as Attachment 6a. GHG emission calculations are provided in Attachment 6b.

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8.0 REFERENCES

Section 2 – Construction Emissions

CAPCOA 2025. California Emissions Estimation Model® (CalEEMod), Version 2022.1.1.29, Accessed via website: (http://www.caleemod.com/), April 10, 2025.

Section 3 – Mobile Source Emissions

CAPCOA 2021a. California Emissions Estimator Model (CalEEMod), Appendix G Default Data Tables, Table G-12, May.

CAPCOA 2021b. California Emissions Estimator Model (CalEEMod), Appendix G Default Data Tables, Table G-1 (Napa Airport), May.

CARB 2021. EMFAC database, accessed online at: https://arb.ca.gov/emfac/2021/. May 2021.

EPA 2011. EPA AP-42 5th Edition, Chapter 13, Section 13.2.1, Paved Roads, January.

EPA 2010. "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Modeling," EPA-420-R-10-016, NR-005d, July 2010.

SJVAPCD 2005. Appendix A: Comments and Responses Rule 9510 and 3180 December 15.

Section 4 – Biomass Conversion Stationary Source Emissions

BAAQMD 2024. Bay Area Air District, "Permit Handbook", Section 11.13, Tub Grinders.

CAPCOA 2021. California Emissions Estimator Model (CalEEMod), Appendix G Default Data Tables, Table G-1 (Napa Airport), May.

EPA 2015. U.S. EPA Center for Corporate Climate Leadership, Emission Factors for Greenhouse Gas Inventories, November 19.

EPA 2006. AP-42, Chapter 13.2.4 Aggregate Handling and Storage Piles, November.

EPA 2002. U.S. Environmental Protection Agency, AP-42, Section 10.6.3, Medium Density Fiberboard Manufacturing, Table 10.6.3-3, August.

EPA 1985. AP-42, Fourth Edition, Chapter 10.3 Plywood Veneer and Layout Operations, Accessed: Volume I, Stationary Point & Area Sources, Compilation of Air Pollutant Emission Factors, Fourth Edition (epa.gov), September.

MDAQMD 2000. Mojave Desert Air Quality Management District, Emissions Inventory Guidance, Mineral Handling and Processing Industries, Material Handling Table 6, April.

NYSERDA 2013. New York State Energy Research and Development Authority, Elemental Analysis of Wood Fuels, Final Report, NYSERDA Report 13-13, June.

ODEQ 2021. Oregon Department of Environmental Quality, "DEQ HAP and VOC Emission Factors for Lumber Drying, 2021", document no. AQ-EF09.

SJVAPCD 2019. San Joaquin Valley Air Pollution Control District, Notice of Final Action – Authority to Construct, Facility Number C-8980, Project Number C1160156, permits C-8980-1/2-0 (engine) and C-8980-3-0 (flare), July.

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USBI 2025. United States Biochar Initiative, “Biochar Removes Carbon, Carbon markets offer a new opportunity for biochar, accessed via website: https://biochar-us.org/.

Section 5 – Anaerobic Digestion Stationary Source Emissions

BAAQMD 2024. Bay Area Air Quality Management District, “Permit Handbook”, March.

CAPCOA 2021. California Emissions Estimator Model (CalEEMod), Appendix G Default Data Tables, Table G-1 (Napa Airport), May.

EPA 2006. U.S. Environmental Protection Agency, AP-42, Ch. 13.2.4 13.2.4 Aggregate Handling And Storage Piles, November.

SCAQMD 2024. South Coast Air Quality Management District, AER Help and Support, Combustion Default Emission Factors, revised December. Accessed online at: https://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/combustion-default-emission-factors-2024.pdf?sfvrsn=9c358361_9

SCAQMD 2019. South Coast Air Quality Management District, Rule 1118.1 Control of Emissions from Non-Refinery Flares, January.

SJVAPCD 2016. San Joaquin Valley Air Pollution Control District, "PM10 Based Emissions from Operations Generating Dust from Greenwaste Composting" (spreadsheet), June.

Section 6 – Composting Emissions

BAAQMD 2024. Bay Area Air Quality Management District, Permit Handbook, Section 11.16, Composting Operations, October.

BAAQMD 2018. Bay Area Air Quality Management District, Engineering Evaluation Report, Davis Street SMART, Plant #2773, 2615 Davis Street, San Leandro, CA, Application #29215.

CAPCOA 2021. California Emissions Estimator Model (CalEEMod), Appendix D Default Data Tables, May.

CARB 2021. California Air Resources Board, Speciation Profiles Used in CARB Modeling, https://ww2.arb.ca.gov/speciation-profiles-used-carb-modeling, accessed May 2021.

EPA 2010. U.S. Environmental Protection Agency, Greenhouse Gas Emissions Estimation Methodologies for Biogenic Emissions from Selected Source Categories: Solid Waste Disposal Wastewater Treatment Ethanol Fermentation Submitted to: U.S. Environmental Protection Agency Sector Policies and Programs Division Measurement Policy Group, December.

EPA 2006. AP-42, Chapter 13.2.4 Aggregate Handling and Storage Piles, November.

EPA 1985. AP-42, Fourth Edition, Chapter 10.3 Plywood Veneer and Layout Operations, Accessed: Volume I, Stationary Point & Area Sources, Compilation OF Air Pollutant Emission Factors, Fourth Edition (epa.gov), September.

MDAQMD 2000. Mojave Desert Air Quality Management District, Emissions Inventory Guidance, Mineral Handling and Processing Industries, Material Handling Table 5, April.

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NMDF 2020. Napa Recycling and Waste Services, "Source Test Report, 2020 Quarterly Compost Emissions Testing – 4th Quarter. CASP Composting System – American Canyon, California," prepared by Montrose Air Quality Services LLC, document no. W005AS-732024-RT-895R1, July 29. For the ammonia emission factor, the Q2-2022, Q3-2020, Q2-2020, and Q1-2021 test reports were also accessed.

SJVAPCD 2023. Compost Emission Factor Report, Originally Published September 15, 2010, Revised March 21, 2023, Table 7.

SJVAPCD 2015. San Joaquin Valley Air Pollution Control District, "PM10 based Emissions from Operations generating Dust from Co-composting", September, accessed: https://www.valleyair.org/busind/pto/emission_factors/emission_factors_idx.htm.

SJVAPCD 2010. San Joaquin Valley Air Pollution Control District, Compost ROG Emission Factors, September 15.

Section 7 – Woodchip Management GHG Emissions

EPA 2025. U.S. Environmental Protection Agency, Landfill Gas Emissions Model (LandGEM) Version 3.1, July.

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ATTACHMENT 1 – CONSTRUCTION EMISSION CALCULATIONS AND SUPPORTING DATA

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Table 1: Land Use Data for CalEEMod Input - NRRP 2.0 Biomass Facility						
Project Element	**Land Use Type**	**Land Use Subtype**	**Unit Amount**	**Size Metric**	**Lot Acreage (footprint)**	**Square Feet (est.)**
Biomass Processing Buildings	Industrial	General Heavy Industry	18.200	1,000 sq. ft.	0.418	**18,200**
Other Non-Asphalt Surfaces	Parking	Other Non-Asphalt Surfaces	98.265	1,000 sq. ft.	2.256	**98,265**
Parking Lot	Parking	Parking Lot	10.000	Unit	0.089	**3,877**
Project Site					**2.76**	**120,342**

Source: Applicant 2025, CalEEMod version 2022.1.1.30

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Table 2: Truck Trips from Ready Mix Facility

Materials	Estimated Footprint (sf)	Volume of Cement Required (CY Cement)	Volume of Cement Conversion Factor (CY/Truck)	No. of Truck Trips (10 CY/load)	Total Truck VMT	Truck One Way Trips Per Day for Ready Mix	Trip Rate (Trips per Size Metric per Day)
Concrete Slab Paving	98,265	2,426	10	243	972	12	0.01173
Tilt-up Concrete Pouring	--	4,613	10	461	1,844		

Conversion Factors		
Value	**Units**	**Comments**
12	in/ft	constant
3	ft/yd	constant
0.037037037	CY/cubic ft	constant
1000	square feet, CalEEMOD Size Metric	constant
10	CY Cement/Truck	Assumption
8	inches Paving Thickness	Assumption
2	Facility to Ready Mix Site (miles)	Approximate, from site to Crown Hill Ready Mix
120	Days of Concrete Pouring	Assumption

Table 3: Dust from Material Movement

Activity	Amount Import (CY)	Amount Export (CY)	Density (lb/CY)	Mass of Import (tons)	Mass of Export (tons)	Import/Export Phased?	No. of Haul Trips (8 CY/load)
Site Preparation/Grading	0	4864.0	2100	0	5107.2	No	608

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Table 4: Control Measures Assumptions Summary

Source	Control Measure	Amount/Reduction
Construction	Water Application	2x daily

Table 5: Other Non Default CalEEMod Settings / Assumptions	
construction control measures	Clean paved roads 0.5
construction control measures	Water Exposed Area 2x a day
construction control measures	Limit vehicle speeds on unpaved roads to 25 mph
construction control measures	Sweep paved roads once per month
construction control measures	Limit Heavy-Duty Diesel Vehicle Idling

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Table 6: Controlled Annual Construction Emissions	
Criteria Pollutants	**Annual Emissions (TPY)**
ROG (VOC)	0.14
NO_X	0.52
CO	1.70
SO_X	0.0030
Total PM_{10}	0.17
Total $PM_{2.5}$	0.07

Table 7: Controlled Maximum Daily Construction Emissions	
Criteria Pollutants	**Maximum Daily Emissions (lb/day)**
ROG (VOC)	4.96
NO_X	5.49
CO	22.77
SO_X	0.05
Total PM_{10}	3.73
Total $PM_{2.5}$	1.61

Table 8: Construction Greenhouse Gas Emissions Summary	
Greenhouse Gases	**Annual Emissions (MT/Yr)**
CO_2	330.4
CH_4	0.01
N_2O	0.0154
CO_2e	335.5

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Table 1: Land Use Data for CalEEMod Input - Anaerobic Digester Building Construction						
Project Element	**Land Use Type**	**Land Use Subtype**	**Unit Amount**	**Size Metric**	**Lot Acreage (footprint)**	**Square Feet (est.)**
Anaerobic Digester Building	Industrial	General Heavy Industry	26.064	1,000 sq. ft.	0.598	**26,064**
Project Site					**0.598**	**26,064**

Source: Applicant 2025, CalEEMod version 2022.1.1.30

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Table 2: Truck Trips from Ready Mix Facility

Materials	Estimated Footprint (sf)	Volume of Cement Required (CY Cement)	Volume of Cement Conversion Factor (CY/Truck)	No. of Truck Trips (10 CY/load)	Total Truck VMT	Truck One Way Trips Per Day for Ready Mix	Trip Rate (Trips per Size Metric per Day)
Tilt-up Concrete Pouring	--	729	10	73	292	3	0.00292

Conversion Factors

Value	Units	Comments
12	in/ft	constant
3	ft/yd	constant
0.037037037	CY/cubic ft	constant
30	ft/in	Site plan scaling
5.11	inches	Paddle shaft room perimeter in site plan, approximate
153.3	feet	Paddle shaft room perimeter
30	feet	AD building height, assumption
4599	square feet	Total area of paddle shaft room walls
26,064	square feet	AD building footprint
1000	square feet, CalEEMOD Size Metric	constant
10	CY Cement/Truck	Assumption
0.5	feet	Paddle shaft room wall thickness (6 inches)
0.67	feet	Buidling footprint thickness, assumption (8 inches)
2	Facility to Ready Mix Site (miles)	Approximate, from site to Crown Hill Ready Mix
50	Days of Concrete Pouring	Assumption

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Table 3: Control Measures Assumptions Summary

Source	Control Measure	Amount/Reduction
Construction	Water Application	2x daily

Table 4: Other Non Default CalEEMod Settings / Assumptions	
construction control measures	Clean paved roads 0.5
construction control measures	Water Exposed Area 2x a day
construction control measures	Limit vehicle speeds on unpaved roads to 25 mph
construction control measures	Sweep paved roads once per month
construction control measures	Limit Heavy-Duty Diesel Vehicle Idling

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Table 5: Controlled Annual Construction Emissions	
Criteria Pollutants	**Annual Emissions (TPY)**
ROG (VOC)	0.16
NO_X	0.23
CO	1.07
SO_X	0.0021
Total PM_{10}	0.11
Total $PM_{2.5}$	0.02

Table 6: Controlled Maximum Daily Construction Emissions	
Criteria Pollutants	**Maximum Daily Emissions (lb/day)**
ROG (VOC)	18.16
NO_X	2.23
CO	10.06
SO_X	0.02
Total PM_{10}	1.01
Total $PM_{2.5}$	0.17

Table 7: Construction Greenhouse Gas Emissions Summary	
Greenhouse Gases	**Annual Emissions (MT/Yr)**
CO_2	208.4
CH_4	0.01
N_2O	0.0085
CO_2e	211.3

NRWS Biomass Plant Detailed Report

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6.3. Adjusted Climate Risk Scores

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

7.2. Healthy Places Index Scores

7.3. Overall Health & Equity Scores

7.4. Health & Equity Measures

7.5. Evaluation Scorecard

7.6. Health & Equity Custom Measures

8. User Changes to Default Data

8.1. Justifications

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	NRWS Biomass Plant
Construction Start Date	1/6/2026
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.6
Precipitation (days)	38
Location	38.208685717963164, -122.2642156250821
County	Napa
City	Unincorporated
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	801
EDFZ	2
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.33

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
General Heavy Industry	18	1000sqft	0.42	18,200	0.00	—	—	Biomass Processing Buildings

Other Non-Asphalt Surfaces	98	1000sqft	2.3	98,265	0.00	—	—	—
Parking Lot	10.0	Space	0.09	0.00	0.00	—	—	Parking Lot

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-2*	Limit Heavy-Duty Diesel Vehicle Idling
Construction	C-5	Use Advanced Engine Tiers

* Qualitative or supporting measure. Emission reductions not included in the mitigated emissions results.

2. Emissions Summary

2.1. Construction 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.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.0	5.0	5.4	23	0.05	0.09	4.4	4.5	0.09	1.6	1.7	—	5,616	5,616	0.23	0.29	4.4	5,711
Mit.	5.0	5.0	5.4	23	0.05	0.09	4.4	4.5	0.09	1.6	1.7	—	5,616	5,616	0.23	0.29	4.4	5,711
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.0	5.0	5.5	17	0.03	0.07	4.1	4.2	0.07	1.6	1.6	—	4,047	4,047	0.17	0.28	0.11	4,133
Mit.	5.0	5.0	5.5	17	0.03	0.07	4.1	4.2	0.07	1.6	1.6	—	4,047	4,047	0.17	0.28	0.11	4,133
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.76	0.75	2.9	9.3	0.02	0.03	1.4	1.4	0.03	0.40	0.43	—	2,001	2,001	0.08	0.09	0.88	2,032
Mit.	0.76	0.75	2.9	9.3	0.02	0.03	1.4	1.4	0.03	0.40	0.43	—	2,001	2,001	0.08	0.09	0.88	2,032
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.14	0.14	0.53	1.7	< 0.005	0.01	0.25	0.25	0.01	0.07	0.08	—	331	331	0.01	0.02	0.14	336
Mit.	0.14	0.14	0.53	1.7	< 0.005	0.01	0.25	0.25	0.01	0.07	0.08	—	331	331	0.01	0.02	0.14	336
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

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

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.56	0.48	5.4	23	0.05	0.09	4.4	4.5	0.09	1.6	1.7	—	5,616	5,616	0.23	0.29	4.4	5,711
2027	5.0	5.0	1.4	7.1	0.01	0.02	1.1	1.1	0.02	0.15	0.17	—	1,260	1,260	0.05	0.04	1.4	1,274
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.48	0.40	5.5	17	0.03	0.07	4.1	4.2	0.07	1.6	1.6	—	4,047	4,047	0.17	0.28	0.11	4,133
2027	5.0	5.0	3.8	13	0.02	0.04	1.2	1.3	0.04	0.19	0.23	—	2,532	2,532	0.10	0.07	0.06	2,556
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.30	0.27	2.9	9.3	0.02	0.03	1.4	1.4	0.03	0.40	0.43	—	2,001	2,001	0.08	0.09	0.88	2,032
2027	0.76	0.75	1.2	4.6	0.01	0.01	0.61	0.62	0.01	0.09	0.10	—	878	878	0.03	0.03	0.40	887
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

2026	0.06	0.05	0.53	1.7	< 0.005	0.01	0.25	0.25	0.01	0.07	0.08	—	331	331	0.01	0.02	0.14	336
2027	0.14	0.14	0.22	0.84	< 0.005	< 0.005	0.11	0.11	< 0.005	0.02	0.02	—	145	145	0.01	< 0.005	0.07	147

2.3. Construction Emissions by Year, Mitigated

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

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.56	0.48	5.4	23	0.05	0.09	4.4	4.5	0.09	1.6	1.7	—	5,616	5,616	0.23	0.29	4.4	5,711
2027	5.0	5.0	1.4	7.1	0.01	0.02	1.1	1.1	0.02	0.15	0.17	—	1,260	1,260	0.05	0.04	1.4	1,274
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.48	0.40	5.5	17	0.03	0.07	4.1	4.2	0.07	1.6	1.6	—	4,047	4,047	0.17	0.28	0.11	4,133
2027	5.0	5.0	3.8	13	0.02	0.04	1.2	1.3	0.04	0.19	0.23	—	2,532	2,532	0.10	0.07	0.06	2,556
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.30	0.27	2.9	9.3	0.02	0.03	1.4	1.4	0.03	0.40	0.43	—	2,001	2,001	0.08	0.09	0.88	2,032
2027	0.76	0.75	1.2	4.6	0.01	0.01	0.61	0.62	0.01	0.09	0.10	—	878	878	0.03	0.03	0.40	887
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.06	0.05	0.53	1.7	< 0.005	0.01	0.25	0.25	0.01	0.07	0.08	—	331	331	0.01	0.02	0.14	336
2027	0.14	0.14	0.22	0.84	< 0.005	< 0.005	0.11	0.11	< 0.005	0.02	0.02	—	145	145	0.01	< 0.005	0.07	147

3. Construction Emissions Details

3.1. Site Prep/SWPPP (2026) - Unmitigated

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

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

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.27	0.27	2.5	16	0.02	0.05	—	0.05	0.05	—	0.05	—	2,364	2,364	0.10	0.02	—	2,373
Dust From Material Movement	—	—	—	—	—	—	2.1	2.1	—	1.0	1.0	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	8.5	8.5	< 0.005	< 0.005	< 0.005	8.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.44	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	65	65	< 0.005	< 0.005	—	65
Dust From Material Movement	—	—	—	—	—	—	0.06	0.06	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	0.23	0.23	< 0.005	< 0.005	< 0.005	0.24
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.08	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	11	11	< 0.005	< 0.005	—	11
Dust From Material Movement	—	—	—	—	—	—	0.01	0.01	—	0.01	0.01	—	—	—	—	—	—	—

Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.04	0.04	< 0.005	< 0.005	< 0.005	0.04
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.05	0.55	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	111	111	< 0.005	< 0.005	0.01	113
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.10	0.03	2.1	0.69	0.01	0.02	0.40	0.42	0.02	0.11	0.13	—	1,563	1,563	0.07	0.25	0.08	1,639
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.1	3.1	< 0.005	< 0.005	0.01	3.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	43	43	< 0.005	0.01	0.04	45
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.51	0.51	< 0.005	< 0.005	< 0.005	0.52
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.1	7.1	< 0.005	< 0.005	0.01	7.4

3.2. Site Prep/SWPPP (2026) - Mitigated

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

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

Off-Roa Equipment	0.27	0.27	2.5	16	0.02	0.05	—	0.05	0.05	—	0.05	—	2,364	2,364	0.10	0.02	—	2,373
Dust From Material Movement	—	—	—	—	—	—	2.1	2.1	—	1.0	1.0	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	8.5	8.5	< 0.005	< 0.005	< 0.005	8.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.01	0.01	0.07	0.44	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	65	65	< 0.005	< 0.005	—	65
Dust From Material Movement	—	—	—	—	—	—	0.06	0.06	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	0.23	0.23	< 0.005	< 0.005	< 0.005	0.24
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	< 0.005	< 0.005	0.01	0.08	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	11	11	< 0.005	< 0.005	—	11
Dust From Material Movement	—	—	—	—	—	—	0.01	0.01	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.04	0.04	< 0.005	< 0.005	< 0.005	0.04
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.05	0.55	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	111	111	< 0.005	< 0.005	0.01	113
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.10	0.03	2.1	0.69	0.01	0.02	0.40	0.42	0.02	0.11	0.13	—	1,563	1,563	0.07	0.25	0.08	1,639
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.1	3.1	< 0.005	< 0.005	0.01	3.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	43	43	< 0.005	0.01	0.04	45
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.51	0.51	< 0.005	< 0.005	< 0.005	0.52
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.1	7.1	< 0.005	< 0.005	0.01	7.4

3.3. Construct Footing/Retaining Wall (2026) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.09	1.8	5.0	< 0.005	0.01	—	0.01	0.01	—	0.01	—	407	407	0.02	< 0.005	—	408

Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	8.5	8.5	< 0.005	< 0.005	< 0.005	8.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.07	0.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	17	17	< 0.005	< 0.005	—	17
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	< 0.005	—	0.35	0.35	< 0.005	< 0.005	< 0.005	0.37
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.8	2.8	< 0.005	< 0.005	—	2.8
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.06	0.06	< 0.005	< 0.005	< 0.005	0.06
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.08	0.07	0.78	0.00	0.00	0.17	0.17	0.00	0.04	0.04	—	159	159	< 0.005	0.01	0.02	161

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.04	0.02	0.78	0.33	< 0.005	< 0.005	0.10	0.10	< 0.005	0.03	0.03	—	417	417	0.03	0.07	0.02	437
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.6	6.6	< 0.005	< 0.005	0.01	6.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	17	17	< 0.005	< 0.005	0.01	18
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.1	1.1	< 0.005	< 0.005	< 0.005	1.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.8	2.8	< 0.005	< 0.005	< 0.005	3.0

3.4. Construct Footing/Retaining Wall (2026) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.09	1.8	5.0	< 0.005	0.01	—	0.01	0.01	—	0.01	—	407	407	0.02	< 0.005	—	408
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	8.5	8.5	< 0.005	< 0.005	< 0.005	8.9

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.07	0.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	17	17	< 0.005	< 0.005	—	17
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	< 0.005	—	0.35	0.35	< 0.005	< 0.005	< 0.005	0.37
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.8	2.8	< 0.005	< 0.005	—	2.8
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.06	0.06	< 0.005	< 0.005	< 0.005	0.06
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.08	0.07	0.78	0.00	0.00	0.17	0.17	0.00	0.04	0.04	—	159	159	< 0.005	0.01	0.02	161
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.04	0.02	0.78	0.33	< 0.005	< 0.005	0.10	0.10	< 0.005	0.03	0.03	—	417	417	0.03	0.07	0.02	437
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.6	6.6	< 0.005	< 0.005	0.01	6.7

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	17	17	< 0.005	< 0.005	0.01	18
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.1	1.1	< 0.005	< 0.005	< 0.005	1.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.8	2.8	< 0.005	< 0.005	< 0.005	3.0

3.5. Earthwork/Rough Grading/Sediment Basin (2026) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.26	0.26	2.7	15	0.02	0.05	—	0.05	0.05	—	0.05	—	2,240	2,240	0.09	0.02	—	2,248
Dust From Material Movement	—	—	—	—	—	—	2.7	2.7	—	1.3	1.3	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.1	7.1	< 0.005	< 0.005	< 0.005	7.4
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.11	0.61	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	92	92	< 0.005	< 0.005	—	92

Dust From Material Movement	—	—	—	—	—	—	0.11	0.11	—	0.05	0.05	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	< 0.005	—	0.29	0.29	< 0.005	< 0.005	< 0.005	0.31
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.11	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15	15	< 0.005	< 0.005	—	15
Dust From Material Movement	—	—	—	—	—	—	0.02	0.02	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.05	0.05	< 0.005	< 0.005	< 0.005	0.05
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.11	0.10	1.1	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	222	222	0.01	0.01	0.02	225
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.10	0.03	2.1	0.69	0.01	0.02	0.40	0.42	0.02	0.11	0.13	—	1,563	1,563	0.07	0.25	0.08	1,639
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.2	9.2	< 0.005	< 0.005	0.02	9.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.09	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	64	64	< 0.005	0.01	0.06	67
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.5	1.5	< 0.005	< 0.005	< 0.005	1.5

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	11	11	< 0.005	< 0.005	0.01	11

3.6. Earthwork/Rough Grading/Sediment Basin (2026) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.26	0.26	2.7	15	0.02	0.05	—	0.05	0.05	—	0.05	—	2,240	2,240	0.09	0.02	—	2,248
Dust From Material Movement	—	—	—	—	—	—	2.7	2.7	—	1.3	1.3	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.1	7.1	< 0.005	< 0.005	< 0.005	7.4
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.11	0.61	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	92	92	< 0.005	< 0.005	—	92
Dust From Material Movement	—	—	—	—	—	—	0.11	0.11	—	0.05	0.05	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	< 0.005	—	0.29	0.29	< 0.005	< 0.005	< 0.005	0.31

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.11	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15	15	< 0.005	< 0.005	—	15
Dust From Material Movement	—	—	—	—	—	—	0.02	0.02	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.05	0.05	< 0.005	< 0.005	< 0.005	0.05
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.11	0.10	1.1	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	222	222	0.01	0.01	0.02	225
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.10	0.03	2.1	0.69	0.01	0.02	0.40	0.42	0.02	0.11	0.13	—	1,563	1,563	0.07	0.25	0.08	1,639
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.2	9.2	< 0.005	< 0.005	0.02	9.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.09	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	64	64	< 0.005	0.01	0.06	67
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.5	1.5	< 0.005	< 0.005	< 0.005	1.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	11	11	< 0.005	< 0.005	0.01	11

3.7. Underground Utilities (wet and dry) (2026) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	0.21	3.2	10	0.01	0.04	—	0.04	0.04	—	0.04	—	1,467	1,467	0.06	0.01	—	1,472
Dust From Material Movement	—	—	—	—	—	—	2.6	2.6	—	1.3	1.3	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.1	7.1	< 0.005	< 0.005	0.02	7.4
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	0.21	3.2	10	0.01	0.04	—	0.04	0.04	—	0.04	—	1,467	1,467	0.06	0.01	—	1,472
Dust From Material Movement	—	—	—	—	—	—	2.6	2.6	—	1.3	1.3	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.1	7.1	< 0.005	< 0.005	< 0.005	7.4
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.35	1.1	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	161	161	0.01	< 0.005	—	161

Dust From Material Movement	—	—	—	—	—	—	0.28	0.28	—	0.14	0.14	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.07	0.07	< 0.005	0.01	0.01	—	0.78	0.78	< 0.005	< 0.005	< 0.005	0.82
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.06	0.20	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	27	27	< 0.005	< 0.005	—	27
Dust From Material Movement	—	—	—	—	—	—	0.05	0.05	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	0.13	0.13	< 0.005	< 0.005	< 0.005	0.13
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.13	0.09	1.5	0.00	0.00	0.28	0.28	0.00	0.07	0.07	—	289	289	0.01	0.01	1.2	294
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.10	0.03	2.0	0.68	0.01	0.02	0.40	0.42	0.02	0.11	0.13	—	1,563	1,563	0.07	0.25	3.2	1,642
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.13	0.12	1.3	0.00	0.00	0.28	0.28	0.00	0.07	0.07	—	270	270	0.01	0.01	0.03	274
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.10	0.03	2.1	0.69	0.01	0.02	0.40	0.42	0.02	0.11	0.13	—	1,563	1,563	0.07	0.25	0.08	1,639
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.01	0.14	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	30	30	< 0.005	< 0.005	0.05	30
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.01	< 0.005	0.23	0.07	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	171	171	0.01	0.03	0.15	180
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	4.9	4.9	< 0.005	< 0.005	0.01	5.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.04	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	28	28	< 0.005	< 0.005	0.03	30

3.8. Underground Utilities (wet and dry) (2026) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	0.21	3.2	10	0.01	0.04	—	0.04	0.04	—	0.04	—	1,467	1,467	0.06	0.01	—	1,472
Dust From Material Movement	—	—	—	—	—	—	2.6	2.6	—	1.3	1.3	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.1	7.1	< 0.005	< 0.005	0.02	7.4
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	0.21	3.2	10	0.01	0.04	—	0.04	0.04	—	0.04	—	1,467	1,467	0.06	0.01	—	1,472
Dust From Material Movement	—	—	—	—	—	—	2.6	2.6	—	1.3	1.3	—	—	—	—	—	—	—

Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.1	7.1	< 0.005	< 0.005	< 0.005	7.4
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.35	1.1	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	161	161	0.01	< 0.005	—	161
Dust From Material Movement	—	—	—	—	—	—	0.28	0.28	—	0.14	0.14	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.07	0.07	< 0.005	0.01	0.01	—	0.78	0.78	< 0.005	< 0.005	< 0.005	0.82
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.06	0.20	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	27	27	< 0.005	< 0.005	—	27
Dust From Material Movement	—	—	—	—	—	—	0.05	0.05	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	0.13	0.13	< 0.005	< 0.005	< 0.005	0.13
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.13	0.09	1.5	0.00	0.00	0.28	0.28	0.00	0.07	0.07	—	289	289	0.01	0.01	1.2	294
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.10	0.03	2.0	0.68	0.01	0.02	0.40	0.42	0.02	0.11	0.13	—	1,563	1,563	0.07	0.25	3.2	1,642
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.13	0.12	1.3	0.00	0.00	0.28	0.28	0.00	0.07	0.07	—	270	270	0.01	0.01	0.03	274

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.10	0.03	2.1	0.69	0.01	0.02	0.40	0.42	0.02	0.11	0.13	—	1,563	1,563	0.07	0.25	0.08	1,639
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.01	0.14	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	30	30	< 0.005	< 0.005	0.05	30
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.23	0.07	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	171	171	0.01	0.03	0.15	180
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	4.9	4.9	< 0.005	< 0.005	0.01	5.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.04	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	28	28	< 0.005	< 0.005	0.03	30

3.9. Lime Treat/Final Grading (2026) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.37	0.37	1.9	21	0.04	0.07	—	0.07	0.07	—	0.07	—	3,875	3,875	0.16	0.03	—	3,889
Dust From Material Movement	—	—	—	—	—	—	3.1	3.1	—	1.4	1.4	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.1	7.1	< 0.005	< 0.005	0.02	7.4
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.58	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	106	106	< 0.005	< 0.005	—	107
Dust From Material Movement	—	—	—	—	—	—	0.08	0.08	—	0.04	0.04	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	0.19	0.19	< 0.005	< 0.005	< 0.005	0.20
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.11	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	18	18	< 0.005	< 0.005	—	18
Dust From Material Movement	—	—	—	—	—	—	0.02	0.02	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.03	0.03	< 0.005	< 0.005	< 0.005	0.03
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.05	0.86	0.00	0.00	0.17	0.17	0.00	0.04	0.04	—	170	170	< 0.005	0.01	0.68	173
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.10	0.03	2.0	0.68	0.01	0.02	0.40	0.42	0.02	0.11	0.13	—	1,563	1,563	0.07	0.25	3.2	1,642
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	4.4	4.4	< 0.005	< 0.005	0.01	4.5

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	43	43	< 0.005	0.01	0.04	45
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.73	0.73	< 0.005	< 0.005	< 0.005	0.74
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.1	7.1	< 0.005	< 0.005	0.01	7.4

3.10. Lime Treat/Final Grading (2026) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.37	0.37	1.9	21	0.04	0.07	—	0.07	0.07	—	0.07	—	3,875	3,875	0.16	0.03	—	3,889
Dust From Material Movement	—	—	—	—	—	—	3.1	3.1	—	1.4	1.4	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.1	7.1	< 0.005	< 0.005	0.02	7.4
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.58	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	106	106	< 0.005	< 0.005	—	107

Dust From Material Movement	—	—	—	—	—	—	0.08	0.08	—	0.04	0.04	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	0.19	0.19	< 0.005	< 0.005	< 0.005	0.20
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.11	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	18	18	< 0.005	< 0.005	—	18
Dust From Material Movement	—	—	—	—	—	—	0.02	0.02	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.03	0.03	< 0.005	< 0.005	< 0.005	0.03
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.05	0.86	0.00	0.00	0.17	0.17	0.00	0.04	0.04	—	170	170	< 0.005	0.01	0.68	173
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.10	0.03	2.0	0.68	0.01	0.02	0.40	0.42	0.02	0.11	0.13	—	1,563	1,563	0.07	0.25	3.2	1,642
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	4.4	4.4	< 0.005	< 0.005	0.01	4.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	43	43	< 0.005	0.01	0.04	45
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.73	0.73	< 0.005	< 0.005	< 0.005	0.74

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.1	7.1	< 0.005	< 0.005	0.01	7.4

3.11. Building Construction (2026) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.20	0.20	3.2	11	0.02	0.03	—	0.03	0.03	—	0.03	—	1,876	1,876	0.08	0.02	—	1,882
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.1	7.1	< 0.005	< 0.005	0.02	7.4
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.20	0.20	3.2	11	0.02	0.03	—	0.03	0.03	—	0.03	—	1,876	1,876	0.08	0.02	—	1,882
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.1	7.1	< 0.005	< 0.005	< 0.005	7.4
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.09	1.5	5.0	0.01	0.02	—	0.02	0.02	—	0.02	—	859	859	0.03	0.01	—	862
Onsite truck	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.30	0.30	< 0.005	0.03	0.03	—	3.2	3.2	< 0.005	< 0.005	< 0.005	3.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	0.02	0.02	0.27	0.92	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	142	142	0.01	< 0.005	—	143
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.06	0.06	< 0.005	0.01	0.01	—	0.54	0.54	< 0.005	< 0.005	< 0.005	0.56
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.21	0.20	0.14	2.2	0.00	0.00	0.41	0.41	0.00	0.10	0.10	—	426	426	0.01	0.02	1.7	432
Vendor	0.02	0.01	0.36	0.14	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	265	265	0.01	0.04	0.68	278
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.21	0.19	0.17	2.0	0.00	0.00	0.41	0.41	0.00	0.10	0.10	—	397	397	0.01	0.02	0.04	402
Vendor	0.02	0.01	0.38	0.14	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	265	265	0.01	0.04	0.02	278
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.09	0.07	0.86	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	183	183	0.01	0.01	0.34	186
Vendor	0.01	< 0.005	0.17	0.07	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	122	122	< 0.005	0.02	0.13	127
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.01	0.16	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	30	30	< 0.005	< 0.005	0.06	31
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	20	20	< 0.005	< 0.005	0.02	21
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.12. Building Construction (2026) - Mitigated

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

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

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.20	0.20	3.2	11	0.02	0.03	—	0.03	0.03	—	0.03	—	1,876	1,876	0.08	0.02	—	1,882
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.1	7.1	< 0.005	< 0.005	0.02	7.4
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.20	0.20	3.2	11	0.02	0.03	—	0.03	0.03	—	0.03	—	1,876	1,876	0.08	0.02	—	1,882
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.1	7.1	< 0.005	< 0.005	< 0.005	7.4
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.09	1.5	5.0	0.01	0.02	—	0.02	0.02	—	0.02	—	859	859	0.03	0.01	—	862
Onsite truck	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.30	0.30	< 0.005	0.03	0.03	—	3.2	3.2	< 0.005	< 0.005	< 0.005	3.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.27	0.92	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	142	142	0.01	< 0.005	—	143
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.06	0.06	< 0.005	0.01	0.01	—	0.54	0.54	< 0.005	< 0.005	< 0.005	0.56
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.21	0.20	0.14	2.2	0.00	0.00	0.41	0.41	0.00	0.10	0.10	—	426	426	0.01	0.02	1.7	432
Vendor	0.02	0.01	0.36	0.14	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	265	265	0.01	0.04	0.68	278
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.21	0.19	0.17	2.0	0.00	0.00	0.41	0.41	0.00	0.10	0.10	—	397	397	0.01	0.02	0.04	402
Vendor	0.02	0.01	0.38	0.14	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	265	265	0.01	0.04	0.02	278
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.09	0.07	0.86	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	183	183	0.01	0.01	0.34	186
Vendor	0.01	< 0.005	0.17	0.07	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	122	122	< 0.005	0.02	0.13	127
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.01	0.16	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	30	30	< 0.005	< 0.005	0.06	31
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	20	20	< 0.005	< 0.005	0.02	21
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Building Construction (2027) - Unmitigated

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

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

Off-Road Equipm	0.20	0.20	3.2	11	0.02	0.03	—	0.03	0.03	—	0.03	—	1,876	1,876	0.08	0.02	—	1,882
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.0	7.0	< 0.005	< 0.005	< 0.005	7.3
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.51	1.7	< 0.005	0.01	—	0.01	0.01	—	0.01	—	297	297	0.01	< 0.005	—	298
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.11	0.11	< 0.005	0.01	0.01	—	1.1	1.1	< 0.005	< 0.005	< 0.005	1.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.09	0.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	49	49	< 0.005	< 0.005	—	49
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	0.18	0.18	< 0.005	< 0.005	< 0.005	0.19
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.19	0.18	0.16	1.8	0.00	0.00	0.41	0.41	0.00	0.10	0.10	—	390	390	0.01	0.02	0.04	395
Vendor	0.02	0.01	0.36	0.14	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	260	260	0.01	0.04	0.02	272
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.28	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	62	62	< 0.005	< 0.005	0.11	63
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	41	41	< 0.005	0.01	0.04	43
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10	10	< 0.005	< 0.005	0.02	10
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.8	6.8	< 0.005	< 0.005	0.01	7.1
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.14. Building Construction (2027) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.20	0.20	3.2	11	0.02	0.03	—	0.03	0.03	—	0.03	—	1,876	1,876	0.08	0.02	—	1,882
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.0	7.0	< 0.005	< 0.005	< 0.005	7.3
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.51	1.7	< 0.005	0.01	—	0.01	0.01	—	0.01	—	297	297	0.01	< 0.005	—	298
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.11	0.11	< 0.005	0.01	0.01	—	1.1	1.1	< 0.005	< 0.005	< 0.005	1.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.09	0.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	49	49	< 0.005	< 0.005	—	49

Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	0.18	0.18	< 0.005	< 0.005	< 0.005	0.19
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.19	0.18	0.16	1.8	0.00	0.00	0.41	0.41	0.00	0.10	0.10	—	390	390	0.01	0.02	0.04	395
Vendor	0.02	0.01	0.36	0.14	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	260	260	0.01	0.04	0.02	272
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.28	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	62	62	< 0.005	< 0.005	0.11	63
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	41	41	< 0.005	0.01	0.04	43
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10	10	< 0.005	< 0.005	0.02	10
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.8	6.8	< 0.005	< 0.005	0.01	7.1
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Paving (2027) - Unmitigated

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

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

Off-Road Equipment	0.08	0.08	0.98	5.5	0.01	0.01	—	0.01	0.01	—	0.01	—	836	836	0.03	0.01	—	838
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.0	7.0	< 0.005	< 0.005	0.02	7.3
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.08	0.98	5.5	0.01	0.01	—	0.01	0.01	—	0.01	—	836	836	0.03	0.01	—	838
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.0	7.0	< 0.005	< 0.005	< 0.005	7.3
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.32	1.8	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	275	275	0.01	< 0.005	—	276
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.22	0.22	< 0.005	0.02	0.02	—	2.3	2.3	< 0.005	< 0.005	< 0.005	2.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.06	0.33	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	45	45	< 0.005	< 0.005	—	46
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.04	0.04	< 0.005	< 0.005	< 0.005	—	0.38	0.38	< 0.005	< 0.005	< 0.005	0.40
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.15	0.14	0.09	1.5	0.00	0.00	0.31	0.31	0.00	0.07	0.07	—	318	318	0.01	0.01	1.2	323
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	0.01	0.26	0.14	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	100	100	0.01	0.02	0.16	105
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.14	0.12	1.4	0.00	0.00	0.31	0.31	0.00	0.07	0.07	—	296	296	0.01	0.01	0.03	300
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	0.01	0.27	0.14	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	100	100	0.01	0.02	< 0.005	105
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.04	0.44	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	98	98	< 0.005	< 0.005	0.17	100
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.09	0.05	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	33	33	< 0.005	0.01	0.02	35
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	16	16	< 0.005	< 0.005	0.03	17
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.4	5.4	< 0.005	< 0.005	< 0.005	5.7

3.16. Paving (2027) - Mitigated

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

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

Off-Road Equipm	0.08	0.08	0.98	5.5	0.01	0.01	—	0.01	0.01	—	0.01	—	836	836	0.03	0.01	—	838
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.0	7.0	< 0.005	< 0.005	0.02	7.3
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.08	0.98	5.5	0.01	0.01	—	0.01	0.01	—	0.01	—	836	836	0.03	0.01	—	838
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.0	7.0	< 0.005	< 0.005	< 0.005	7.3
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.32	1.8	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	275	275	0.01	< 0.005	—	276
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.22	0.22	< 0.005	0.02	0.02	—	2.3	2.3	< 0.005	< 0.005	< 0.005	2.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.06	0.33	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	45	45	< 0.005	< 0.005	—	46
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.04	0.04	< 0.005	< 0.005	< 0.005	—	0.38	0.38	< 0.005	< 0.005	< 0.005	0.40
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.15	0.14	0.09	1.5	0.00	0.00	0.31	0.31	0.00	0.07	0.07	—	318	318	0.01	0.01	1.2	323
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	0.01	0.26	0.14	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	100	100	0.01	0.02	0.16	105
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.14	0.12	1.4	0.00	0.00	0.31	0.31	0.00	0.07	0.07	—	296	296	0.01	0.01	0.03	300
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	0.01	0.27	0.14	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	100	100	0.01	0.02	< 0.005	105
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.04	0.44	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	98	98	< 0.005	< 0.005	0.17	100
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.09	0.05	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	33	33	< 0.005	0.01	0.02	35
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	16	16	< 0.005	< 0.005	0.03	17
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.4	5.4	< 0.005	< 0.005	< 0.005	5.7

3.17. Architectural Coatings (2027) - Unmitigated

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

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

Off-Road Equipm	0.04	0.04	1.2	1.7	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	244	244	0.01	< 0.005	—	245
Architectural Coatings	4.9	4.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.0	7.0	< 0.005	< 0.005	0.02	7.3
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.04	1.2	1.7	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	244	244	0.01	< 0.005	—	245
Architectural Coatings	4.9	4.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.0	7.0	< 0.005	< 0.005	< 0.005	7.3
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.14	0.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	30	30	< 0.005	< 0.005	—	30
Architectural Coatings	0.60	0.60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.08	0.08	< 0.005	0.01	0.01	—	0.86	0.86	< 0.005	< 0.005	< 0.005	0.90
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	< 0.005	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.0	5.0	< 0.005	< 0.005	—	5.0
Architectural Coatings	0.11	0.11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	0.14	0.14	< 0.005	< 0.005	< 0.005	0.15
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.04	0.72	0.00	0.00	0.15	0.15	0.00	0.03	0.03	—	150	150	< 0.005	0.01	0.56	153
Vendor	0.01	< 0.005	0.21	0.08	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	156	156	0.01	0.02	0.38	163
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.06	0.66	0.00	0.00	0.15	0.15	0.00	0.03	0.03	—	140	140	< 0.005	0.01	0.01	142
Vendor	0.01	< 0.005	0.22	0.08	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	156	156	0.01	0.02	0.01	163
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17	17	< 0.005	< 0.005	0.03	18
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	19	19	< 0.005	< 0.005	0.02	20
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.9	2.9	< 0.005	< 0.005	< 0.005	2.9
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.2	3.2	< 0.005	< 0.005	< 0.005	3.3
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.18. Architectural Coatings (2027) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.04	1.2	1.7	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	244	244	0.01	< 0.005	—	245
Architectural Coatings	4.9	4.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.0	7.0	< 0.005	< 0.005	0.02	7.3
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.04	1.2	1.7	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	244	244	0.01	< 0.005	—	245
Architectural Coatings	4.9	4.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	7.0	7.0	< 0.005	< 0.005	< 0.005	7.3
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.14	0.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	30	30	< 0.005	< 0.005	—	30

Architect Coatings	0.60	0.60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.08	0.08	< 0.005	0.01	0.01	—	0.86	0.86	< 0.005	< 0.005	< 0.005	0.90
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.0	5.0	< 0.005	< 0.005	—	5.0
Architectural Coatings	0.11	0.11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	0.14	0.14	< 0.005	< 0.005	< 0.005	0.15
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.04	0.72	0.00	0.00	0.15	0.15	0.00	0.03	0.03	—	150	150	< 0.005	0.01	0.56	153
Vendor	0.01	< 0.005	0.21	0.08	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	156	156	0.01	0.02	0.38	163
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.06	0.66	0.00	0.00	0.15	0.15	0.00	0.03	0.03	—	140	140	< 0.005	0.01	0.01	142
Vendor	0.01	< 0.005	0.22	0.08	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	156	156	0.01	0.02	0.01	163
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17	17	< 0.005	< 0.005	0.03	18
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	19	19	< 0.005	< 0.005	0.02	20
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.9	2.9	< 0.005	< 0.005	< 0.005	2.9
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.2	3.2	< 0.005	< 0.005	< 0.005	3.3
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

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	TOG	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	TOG	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	TOG	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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

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

Vegetation	TOG	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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

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

Land Use	TOG	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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

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

Species	TOG	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

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Prep/SWPPP	Site Preparation	1/6/2026	1/19/2026	5.0	10.0	—
Construct Footing/Retaining Wall	Site Preparation	1/20/2026	2/9/2026	5.0	15	—
Earthwork/Rough Grading/Sediment Basin	Grading	2/10/2026	3/2/2026	5.0	15	—
Underground Utilities (wet and dry)	Grading	3/3/2026	4/27/2026	5.0	40	—

Lime Treat/Final Grading	Grading	4/28/2026	5/11/2026	5.0	10.0	—
Building Construction	Building Construction	5/12/2026	3/22/2027	5.0	225	Includes multiple building phases
Paving	Paving	3/23/2027	9/6/2027	5.0	120	Includes multiple paving phases
Architectural Coatings	Architectural Coating	9/7/2027	11/8/2027	5.0	45	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Prep/SWPPP	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.0	7.0	84	0.37
Site Prep/SWPPP	Graders	Diesel	Tier 4 Final	1.00	8.0	148	0.41
Site Prep/SWPPP	Generator Sets	Diesel	Tier 4 Final	1.00	8.0	60	0.48
Site Prep/SWPPP	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	6.0	367	0.40
Construct Footing/Retaining Wall	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	1.00	7.0	84	0.37
Construct Footing/Retaining Wall	Forklifts	Diesel	Tier 4 Final	1.00	8.0	82	0.20
Construct Footing/Retaining Wall	Generator Sets	Diesel	Tier 4 Final	1.00	6.0	60	0.74
Earthwork/Rough Grading/Sediment Basin	Graders	Diesel	Tier 4 Final	1.00	6.0	148	0.41
Earthwork/Rough Grading/Sediment Basin	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.0	367	0.40
Earthwork/Rough Grading/Sediment Basin	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	2.0	6.0	84	0.37

Earthwork/Rough Grading/Sediment Basin	Generator Sets	Diesel	Tier 4 Final	1.00	6.0	60	0.74
Underground Utilities (wet and dry)	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.0	367	0.40
Underground Utilities (wet and dry)	Excavators	Diesel	Tier 4 Final	1.00	5.0	36	0.38
Underground Utilities (wet and dry)	Generator Sets	Diesel	Tier 4 Final	1.00	8.0	60	0.74
Lime Treat/Final Grading	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	2.0	7.0	84	0.37
Lime Treat/Final Grading	Graders	Diesel	Tier 4 Final	1.00	8.0	148	0.41
Lime Treat/Final Grading	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.0	367	0.40
Lime Treat/Final Grading	Scrapers	Diesel	Tier 4 Final	1.00	6.0	423	0.48
Building Construction	Cranes	Diesel	Tier 4 Final	1.00	6.0	367	0.29
Building Construction	Forklifts	Diesel	Tier 4 Final	2.0	7.0	82	0.20
Building Construction	Generator Sets	Diesel	Tier 4 Final	1.00	8.0	14	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	1.00	6.0	84	0.37
Building Construction	Welders	Diesel	Tier 4 Final	3.0	7.0	46	0.45
Paving	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	1.00	5.0	84	0.37
Paving	Pavers	Diesel	Tier 4 Final	1.00	4.0	81	0.42
Paving	Paving Equipment	Diesel	Tier 4 Final	1.00	8.0	89	0.36
Paving	Rollers	Diesel	Tier 4 Final	2.0	4.0	36	0.38
Paving	Cement and Mortar Mixers	Diesel	Tier 4 Final	1.00	8.0	10.0	0.56
Architectural Coatings	Air Compressors	Diesel	Tier 4 Final	1.00	6.0	37	0.48
Architectural Coatings	Aerial Lifts	Diesel	Tier 4 Final	1.00	6.0	46	0.31

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Prep/SWPPP	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.0	7.0	84	0.37
Site Prep/SWPPP	Graders	Diesel	Tier 4 Final	1.00	8.0	148	0.41
Site Prep/SWPPP	Generator Sets	Diesel	Tier 4 Final	1.00	8.0	60	0.48
Site Prep/SWPPP	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	6.0	367	0.40
Construct Footing/Retaining Wall	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	1.00	7.0	84	0.37
Construct Footing/Retaining Wall	Forklifts	Diesel	Tier 4 Final	1.00	8.0	82	0.20
Construct Footing/Retaining Wall	Generator Sets	Diesel	Tier 4 Final	1.00	6.0	60	0.74
Earthwork/Rough Grading/Sediment Basin	Graders	Diesel	Tier 4 Final	1.00	6.0	148	0.41
Earthwork/Rough Grading/Sediment Basin	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.0	367	0.40
Earthwork/Rough Grading/Sediment Basin	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	2.0	6.0	84	0.37
Earthwork/Rough Grading/Sediment Basin	Generator Sets	Diesel	Tier 4 Final	1.00	6.0	60	0.74
Underground Utilities (wet and dry)	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.0	367	0.40
Underground Utilities (wet and dry)	Excavators	Diesel	Tier 4 Final	1.00	5.0	36	0.38
Underground Utilities (wet and dry)	Generator Sets	Diesel	Tier 4 Final	1.00	8.0	60	0.74
Lime Treat/Final Grading	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	2.0	7.0	84	0.37

Lime Treat/Final Grading	Graders	Diesel	Tier 4 Final	1.00	8.0	148	0.41
Lime Treat/Final Grading	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.0	367	0.40
Lime Treat/Final Grading	Scrapers	Diesel	Tier 4 Final	1.00	6.0	423	0.48
Building Construction	Cranes	Diesel	Tier 4 Final	1.00	6.0	367	0.29
Building Construction	Forklifts	Diesel	Tier 4 Final	2.0	7.0	82	0.20
Building Construction	Generator Sets	Diesel	Tier 4 Final	1.00	8.0	14	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	1.00	6.0	84	0.37
Building Construction	Welders	Diesel	Tier 4 Final	3.0	7.0	46	0.45
Paving	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	1.00	5.0	84	0.37
Paving	Pavers	Diesel	Tier 4 Final	1.00	4.0	81	0.42
Paving	Paving Equipment	Diesel	Tier 4 Final	1.00	8.0	89	0.36
Paving	Rollers	Diesel	Tier 4 Final	2.0	4.0	36	0.38
Paving	Cement and Mortar Mixers	Diesel	Tier 4 Final	1.00	8.0	10.0	0.56
Architectural Coatings	Air Compressors	Diesel	Tier 4 Final	1.00	6.0	37	0.48
Architectural Coatings	Aerial Lifts	Diesel	Tier 4 Final	1.00	6.0	46	0.31

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Prep/SWPPP	Worker	14	12	LDA,LDT1,LDT2
Site Prep/SWPPP	Vendor	—	8.4	HHDT,MHDT
Site Prep/SWPPP	Hauling	22	20	HHDT
Site Prep/SWPPP	Onsite truck	1.00	2.0	HHDT

Construct Footing/Retaining Wall	Worker	20	12	LDA,LDT1,LDT2
Construct Footing/Retaining Wall	Vendor	—	8.4	HHDT,MHDT
Construct Footing/Retaining Wall	Hauling	22	5.0	HHDT
Construct Footing/Retaining Wall	Onsite truck	1.00	2.0	HHDT
Earthwork/Rough Grading/Sediment Basin	Worker	28	12	LDA,LDT1,LDT2
Earthwork/Rough Grading/Sediment Basin	Vendor	—	8.4	HHDT,MHDT
Earthwork/Rough Grading/Sediment Basin	Hauling	22	20	HHDT
Earthwork/Rough Grading/Sediment Basin	Onsite truck	1.00	2.0	HHDT,MHDT
Underground Utilities (wet and dry)	Worker	34	12	LDA,LDT1,LDT2
Underground Utilities (wet and dry)	Vendor	—	8.4	HHDT,MHDT
Underground Utilities (wet and dry)	Hauling	22	20	HHDT
Underground Utilities (wet and dry)	Onsite truck	1.00	2.0	HHDT,MHDT
Lime Treat/Final Grading	Worker	20	12	LDA,LDT1,LDT2
Lime Treat/Final Grading	Vendor	—	8.4	HHDT,MHDT
Lime Treat/Final Grading	Hauling	22	20	HHDT
Lime Treat/Final Grading	Onsite truck	1.00	2.0	HHDT,MHDT
Building Construction	Worker	50	12	LDA,LDT1,LDT2
Building Construction	Vendor	10.0	8.4	HHDT,MHDT
Building Construction	Hauling	0.00	20	HHDT
Building Construction	Onsite truck	1.00	2.0	HHDT,MHDT
Paving	Worker	38	12	LDA,LDT1,LDT2
Paving	Vendor	—	8.4	HHDT,MHDT
Paving	Hauling	12	2.0	HHDT
Paving	Onsite truck	1.00	2.0	HHDT,MHDT
Architectural Coatings	Worker	18	12	LDA,LDT1,LDT2
Architectural Coatings	Vendor	6.0	8.4	HHDT,MHDT

Architectural Coatings	Hauling	0.00	20	HHDT
Architectural Coatings	Onsite truck	1.00	2.0	HHDT,MHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Prep/SWPPP	Worker	14	12	LDA,LDT1,LDT2
Site Prep/SWPPP	Vendor	—	8.4	HHDT,MHDT
Site Prep/SWPPP	Hauling	22	20	HHDT
Site Prep/SWPPP	Onsite truck	1.00	2.0	HHDT
Construct Footing/Retaining Wall	Worker	20	12	LDA,LDT1,LDT2
Construct Footing/Retaining Wall	Vendor	—	8.4	HHDT,MHDT
Construct Footing/Retaining Wall	Hauling	22	5.0	HHDT
Construct Footing/Retaining Wall	Onsite truck	1.00	2.0	HHDT
Earthwork/Rough Grading/Sediment Basin	Worker	28	12	LDA,LDT1,LDT2
Earthwork/Rough Grading/Sediment Basin	Vendor	—	8.4	HHDT,MHDT
Earthwork/Rough Grading/Sediment Basin	Hauling	22	20	HHDT
Earthwork/Rough Grading/Sediment Basin	Onsite truck	1.00	2.0	HHDT,MHDT
Underground Utilities (wet and dry)	Worker	34	12	LDA,LDT1,LDT2
Underground Utilities (wet and dry)	Vendor	—	8.4	HHDT,MHDT
Underground Utilities (wet and dry)	Hauling	22	20	HHDT
Underground Utilities (wet and dry)	Onsite truck	1.00	2.0	HHDT,MHDT
Lime Treat/Final Grading	Worker	20	12	LDA,LDT1,LDT2
Lime Treat/Final Grading	Vendor	—	8.4	HHDT,MHDT
Lime Treat/Final Grading	Hauling	22	20	HHDT
Lime Treat/Final Grading	Onsite truck	1.00	2.0	HHDT,MHDT

Building Construction	Worker	50	12	LDA,LDT1,LDT2
Building Construction	Vendor	10.0	8.4	HHDT,MHDT
Building Construction	Hauling	0.00	20	HHDT
Building Construction	Onsite truck	1.00	2.0	HHDT,MHDT
Paving	Worker	38	12	LDA,LDT1,LDT2
Paving	Vendor	—	8.4	HHDT,MHDT
Paving	Hauling	12	2.0	HHDT
Paving	Onsite truck	1.00	2.0	HHDT,MHDT
Architectural Coatings	Worker	18	12	LDA,LDT1,LDT2
Architectural Coatings	Vendor	6.0	8.4	HHDT,MHDT
Architectural Coatings	Hauling	0.00	20	HHDT
Architectural Coatings	Onsite truck	1.00	2.0	HHDT,MHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Reduction	PM2.5 Reduction
Water unpaved roads twice daily	55%	55%
Limit vehicle speeds on unpaved roads to 25 mph	44%	44%
Sweep paved roads once per month	9%	9%

5.5. Architectural Coatings

Phase Name	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)
Architectural Coatings	0.00	0.00	27,300	9,100	6,131

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Prep/SWPPP	—	—	8.8	0.00	0.00
Construct Footing/Retaining Wall	—	—	0.00	0.00	0.00
Earthwork/Rough Grading/Sediment Basin	—	4,864	15	0.00	0.00
Underground Utilities (wet and dry)	—	—	20	0.00	0.00
Lime Treat/Final Grading	—	—	18	0.00	0.00
Paving	0.00	0.00	0.00	0.00	2.3

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

Phase Name	Land Use	Area Paved (acres)	% Asphalt
Paving	General Heavy Industry	0.00	0%
Paving	Other Non-Asphalt Surfaces	2.3	0%
Paving	Parking Lot	0.09	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	0.00	204	0.03	< 0.005
2027	0.00	204	0.03	< 0.005

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

5.18.1.2. Mitigated

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

5.18.1.2. Mitigated

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)

5.18.2.2. Mitigated

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	12	annual days of extreme heat
Extreme Precipitation	5.7	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	16	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	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	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	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	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 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	17

AQ-PM	36
AQ-DPM	23
Drinking Water	69
Lead Risk Housing	56
Pesticides	66
Toxic Releases	61
Traffic	83
Effect Indicators	—
CleanUp Sites	62
Groundwater	0.00
Haz Waste Facilities/Generators	83
Impaired Water Bodies	24
Solid Waste	84
Sensitive Population	—
Asthma	72
Cardio-vascular	67
Low Birth Weights	51
Socioeconomic Factor Indicators	—
Education	62
Housing	12
Linguistic	39
Poverty	34
Unemployment	36

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	80.85461311
Employed	75.23418452
Median HI	74.554087
Education	—
Bachelor's or higher	69.35711536
High school enrollment	100
Preschool enrollment	12.62671628
Transportation	—
Auto Access	83.51084306
Active commuting	27.38354934
Social	—
2-parent households	62.7229565
Voting	57.75696138
Neighborhood	—
Alcohol availability	76.10676248
Park access	56.71756705
Retail density	24.22687027
Supermarket access	27.9481586
Tree canopy	22.44321827
Housing	—
Homeownership	87.02681894
Housing habitability	96.41986398
Low-inc homeowner severe housing cost burden	70.11420506
Low-inc renter severe housing cost burden	97.06146542
Uncrowded housing	60.05389452
Health Outcomes	—
Insured adults	79.19928141
Arthritis	0.0

Asthma ER Admissions	56.0
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	25.5
Cognitively Disabled	20.1
Physically Disabled	17.3
Heart Attack ER Admissions	55.3
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	43.5
Children	32.5
Elderly	69.3
English Speaking	60.5
Foreign-born	72.3

Outdoor Workers	52.3
Climate Change Adaptive Capacity	—
Impervious Surface Cover	43.7
Traffic Density	45.1
Traffic Access	23.0
Other Indices	—
Hardship	34.8
Other Decision Support	—
2016 Voting	51.4

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	63
Healthy Places Index Score for Project Location (b)	73
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

8.1. Justifications

Screen	Justification
Construction: Construction Phases	Phases provided by NRWS
Construction: Off-Road Equipment	Expected equipment list provided by NRWS. Assuming Tier 4F units.
Construction: Dust From Material Movement	Material export estimated for the project.
Construction: Trips and VMT	Number of workers per phase provided by NRWS, number of trips are estimated using the number of workers and number of estimated haul trips needed for equipment, cement, and material export. One on-site truck assumed per phase.

NRWS Anerobic Digester Detailed Report

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8.1. Justifications

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	NRWS Anerobic Digester
Construction Start Date	2/3/2026
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.6
Precipitation (days)	38
Location	38.209560574942714, -122.2650776132727
County	Napa
City	Napa
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	801
EDFZ	2
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.33

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
General Heavy Industry	26	1000sqft	0.60	26,064	0.00	—	—	Anerobic Digester Building

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-2*	Limit Heavy-Duty Diesel Vehicle Idling
Construction	C-5	Use Advanced Engine Tiers

* Qualitative or supporting measure. Emission reductions not included in the mitigated emissions results.

2. Emissions Summary

2.1. Construction 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.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.24	0.22	2.2	10	0.02	0.03	0.97	1.0	0.03	0.13	0.17	—	2,201	2,201	0.09	0.09	1.6	2,232
Mit.	0.24	0.22	2.2	10	0.02	0.03	0.97	1.0	0.03	0.13	0.17	—	2,201	2,201	0.09	0.09	1.6	2,232
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	18	18	2.2	10	0.02	0.03	0.99	1.0	0.03	0.13	0.17	—	2,194	2,194	0.09	0.09	0.04	2,224
Mit.	18	18	2.2	10	0.02	0.03	0.99	1.0	0.03	0.13	0.17	—	2,194	2,194	0.09	0.09	0.04	2,224
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.88	0.87	1.3	5.9	0.01	0.02	0.56	0.58	0.02	0.08	0.10	—	1,259	1,259	0.05	0.05	0.39	1,276
Mit.	0.88	0.87	1.3	5.9	0.01	0.02	0.56	0.58	0.02	0.08	0.10	—	1,259	1,259	0.05	0.05	0.39	1,276

% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.16	0.16	0.23	1.1	< 0.005	< 0.005	0.10	0.11	< 0.005	0.01	0.02	—	208	208	0.01	0.01	0.06	211
Mit.	0.16	0.16	0.23	1.1	< 0.005	< 0.005	0.10	0.11	< 0.005	0.01	0.02	—	208	208	0.01	0.01	0.06	211
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

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

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.24	0.22	2.2	10	0.02	0.03	0.97	1.0	0.03	0.13	0.17	—	2,201	2,201	0.09	0.09	1.6	2,232
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	18	18	2.2	10	0.02	0.03	0.99	1.0	0.03	0.13	0.17	—	2,194	2,194	0.09	0.09	0.04	2,224
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.88	0.87	1.3	5.9	0.01	0.02	0.56	0.58	0.02	0.08	0.10	—	1,259	1,259	0.05	0.05	0.39	1,276
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.16	0.16	0.23	1.1	< 0.005	< 0.005	0.10	0.11	< 0.005	0.01	0.02	—	208	208	0.01	0.01	0.06	211

2.3. Construction Emissions by Year, Mitigated

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

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

Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.24	0.22	2.2	10	0.02	0.03	0.97	1.0	0.03	0.13	0.17	—	2,201	2,201	0.09	0.09	1.6	2,232
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	18	18	2.2	10	0.02	0.03	0.99	1.0	0.03	0.13	0.17	—	2,194	2,194	0.09	0.09	0.04	2,224
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.88	0.87	1.3	5.9	0.01	0.02	0.56	0.58	0.02	0.08	0.10	—	1,259	1,259	0.05	0.05	0.39	1,276
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.16	0.16	0.23	1.1	< 0.005	< 0.005	0.10	0.11	< 0.005	0.01	0.02	—	208	208	0.01	0.01	0.06	211

3. Construction Emissions Details

3.1. Site Preparation (2026) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.08	0.42	6.0	0.01	0.02	—	0.02	0.02	—	0.02	—	858	858	0.03	0.01	—	861
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.02	0.02	—	—	—	—	—	—	—

Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	8.5	8.5	< 0.005	< 0.005	< 0.005	8.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.33	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	47	47	< 0.005	< 0.005	—	47
Dust From Material Movement	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.04	0.04	< 0.005	< 0.005	< 0.005	—	0.47	0.47	< 0.005	< 0.005	< 0.005	0.49
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	< 0.005	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.8	7.8	< 0.005	< 0.005	—	7.8
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	0.08	0.08	< 0.005	< 0.005	< 0.005	0.08
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.20	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	40	40	< 0.005	< 0.005	< 0.005	40
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.2	2.2	< 0.005	< 0.005	< 0.005	2.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.36	0.36	< 0.005	< 0.005	< 0.005	0.37
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.2. Site Preparation (2026) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.08	0.42	6.0	0.01	0.02	—	0.02	0.02	—	0.02	—	858	858	0.03	0.01	—	861
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	8.5	8.5	< 0.005	< 0.005	< 0.005	8.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road	< 0.005	< 0.005	0.02	0.33	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	47	47	< 0.005	< 0.005	—	47
Dust From Material Movement	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.04	0.04	< 0.005	< 0.005	< 0.005	—	0.47	0.47	< 0.005	< 0.005	< 0.005	0.49
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	< 0.005	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.8	7.8	< 0.005	< 0.005	—	7.8
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	0.08	0.08	< 0.005	< 0.005	< 0.005	0.08
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.20	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	40	40	< 0.005	< 0.005	< 0.005	40
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.2	2.2	< 0.005	< 0.005	< 0.005	2.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.36	0.36	< 0.005	< 0.005	< 0.005	0.37
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Building Construction (2026) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.15	1.4	9.2	0.02	0.03	—	0.03	0.03	—	0.03	—	1,606	1,606	0.07	0.01	—	1,612
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	8.5	8.5	< 0.005	< 0.005	0.01	8.9
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.15	1.4	9.2	0.02	0.03	—	0.03	0.03	—	0.03	—	1,606	1,606	0.07	0.01	—	1,612
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	8.5	8.5	< 0.005	< 0.005	< 0.005	8.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.08	0.76	5.1	0.01	0.02	—	0.02	0.02	—	0.02	—	880	880	0.04	0.01	—	883
Onsite truck	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.36	0.36	< 0.005	0.04	0.04	—	4.7	4.7	< 0.005	< 0.005	< 0.005	4.9

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.14	0.92	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	146	146	0.01	< 0.005	—	146
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.07	0.07	< 0.005	0.01	0.01	—	0.77	0.77	< 0.005	< 0.005	< 0.005	0.81
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.03	0.52	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	102	102	< 0.005	< 0.005	0.41	104
Vendor	0.03	0.02	0.58	0.23	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	424	424	0.02	0.06	1.1	445
Hauling	0.01	< 0.005	0.15	0.08	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	59	59	0.01	0.01	0.10	63
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.04	0.47	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	95	95	< 0.005	< 0.005	0.01	97
Vendor	0.03	0.02	0.61	0.23	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	425	425	0.02	0.07	0.03	444
Hauling	0.01	< 0.005	0.16	0.08	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	60	60	0.01	0.01	< 0.005	63
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.02	0.25	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	53	53	< 0.005	< 0.005	0.10	53
Vendor	0.02	0.01	0.33	0.13	< 0.005	< 0.005	0.06	0.06	< 0.005	0.02	0.02	—	233	233	0.01	0.04	0.26	244
Hauling	0.01	< 0.005	0.09	0.04	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	33	33	< 0.005	0.01	0.02	34
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.7	8.7	< 0.005	< 0.005	0.02	8.9
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	39	39	< 0.005	0.01	0.04	40
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.4	5.4	< 0.005	< 0.005	< 0.005	5.7

3.4. Building Construction (2026) - Mitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.15	1.4	9.2	0.02	0.03	—	0.03	0.03	—	0.03	—	1,606	1,606	0.07	0.01	—	1,612
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	8.5	8.5	< 0.005	< 0.005	0.01	8.9
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.15	1.4	9.2	0.02	0.03	—	0.03	0.03	—	0.03	—	1,606	1,606	0.07	0.01	—	1,612
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	8.5	8.5	< 0.005	< 0.005	< 0.005	8.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.08	0.76	5.1	0.01	0.02	—	0.02	0.02	—	0.02	—	880	880	0.04	0.01	—	883
Onsite truck	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.36	0.36	< 0.005	0.04	0.04	—	4.7	4.7	< 0.005	< 0.005	< 0.005	4.9
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.14	0.92	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	146	146	0.01	< 0.005	—	146
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.07	0.07	< 0.005	0.01	0.01	—	0.77	0.77	< 0.005	< 0.005	< 0.005	0.81

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.03	0.52	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	102	102	< 0.005	< 0.005	0.41	104
Vendor	0.03	0.02	0.58	0.23	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	424	424	0.02	0.06	1.1	445
Hauling	0.01	< 0.005	0.15	0.08	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	59	59	0.01	0.01	0.10	63
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.04	0.47	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	95	95	< 0.005	< 0.005	0.01	97
Vendor	0.03	0.02	0.61	0.23	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	425	425	0.02	0.07	0.03	444
Hauling	0.01	< 0.005	0.16	0.08	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	60	60	0.01	0.01	< 0.005	63
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.02	0.25	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	53	53	< 0.005	< 0.005	0.10	53
Vendor	0.02	0.01	0.33	0.13	< 0.005	< 0.005	0.06	0.06	< 0.005	0.02	0.02	—	233	233	0.01	0.04	0.26	244
Hauling	0.01	< 0.005	0.09	0.04	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	33	33	< 0.005	0.01	0.02	34
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.7	8.7	< 0.005	< 0.005	0.02	8.9
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	39	39	< 0.005	0.01	0.04	40
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.4	5.4	< 0.005	< 0.005	< 0.005	5.7

3.5. Architectural Coating (2026) - Unmitigated

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

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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	18	18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	8.5	8.5	< 0.005	< 0.005	< 0.005	8.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.5	5.5	< 0.005	< 0.005	—	5.5
Architectural Coatings	0.74	0.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	< 0.005	—	0.35	0.35	< 0.005	< 0.005	< 0.005	0.37
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.91	0.91	< 0.005	< 0.005	—	0.91
Architectural Coatings	0.14	0.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.06	0.06	< 0.005	< 0.005	< 0.005	0.06
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.09	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17	17	< 0.005	< 0.005	< 0.005	18
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.72	0.72	< 0.005	< 0.005	< 0.005	0.73
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.12	0.12	< 0.005	< 0.005	< 0.005	0.12
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.6. Architectural Coating (2026) - Mitigated

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

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

Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	18	18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.74	0.74	< 0.005	0.07	0.07	—	8.5	8.5	< 0.005	< 0.005	< 0.005	8.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.5	5.5	< 0.005	< 0.005	—	5.5
Architectural Coatings	0.74	0.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	< 0.005	—	0.35	0.35	< 0.005	< 0.005	< 0.005	0.37
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.91	0.91	< 0.005	< 0.005	—	0.91
Architectural Coatings	0.14	0.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.06	0.06	< 0.005	< 0.005	< 0.005	0.06
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.09	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17	17	< 0.005	< 0.005	< 0.005	18
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.72	0.72	< 0.005	< 0.005	< 0.005	0.73
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.12	0.12	< 0.005	< 0.005	< 0.005	0.12
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

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	TOG	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	TOG	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	TOG	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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

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

Vegetation	TOG	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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

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

Land Use	TOG	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	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

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

Species	TOG	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

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	2/2/2026	2/27/2026	5.0	20	—
Building Construction	Building Construction	3/2/2026	12/4/2026	5.0	200	—
Architectural Coating	Architectural Coating	12/7/2026	12/25/2026	5.0	15	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Graders	Diesel	Tier 4 Final	1.00	8.0	148	0.41
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	1.00	8.0	84	0.37
Building Construction	Cranes	Diesel	Tier 4 Final	1.00	4.0	367	0.29
Building Construction	Forklifts	Diesel	Tier 4 Final	2.0	6.0	82	0.20
Building Construction	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	2.0	8.0	84	0.37
Building Construction	Cement and Mortar Mixers	Diesel	Tier 4 Final	1.00	6.0	10.0	0.56
Building Construction	Welders	Diesel	Tier 4 Final	1.00	6.0	46	0.45
Building Construction	Generator Sets	Diesel	Tier 4 Final	1.00	8.0	14	0.74
Architectural Coating	Air Compressors	Diesel	Tier 4 Final	1.00	6.0	37	0.48

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Graders	Diesel	Tier 4 Final	1.00	8.0	148	0.41

Site Preparation	Tractors/Loaders/Back	Diesel	Tier 4 Final	1.00	8.0	84	0.37
Building Construction	Cranes	Diesel	Tier 4 Final	1.00	4.0	367	0.29
Building Construction	Forklifts	Diesel	Tier 4 Final	2.0	6.0	82	0.20
Building Construction	Tractors/Loaders/Back hoes	Diesel	Tier 4 Final	2.0	8.0	84	0.37
Building Construction	Cement and Mortar Mixers	Diesel	Tier 4 Final	1.00	6.0	10.0	0.56
Building Construction	Welders	Diesel	Tier 4 Final	1.00	6.0	46	0.45
Building Construction	Generator Sets	Diesel	Tier 4 Final	1.00	8.0	14	0.74
Architectural Coating	Air Compressors	Diesel	Tier 4 Final	1.00	6.0	37	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	Worker	5.0	12	LDA,LDT1,LDT2
Site Preparation	Vendor	—	8.4	HHDT,MHDT
Site Preparation	Hauling	0.00	20	HHDT
Site Preparation	Onsite truck	1.00	2.0	HHDT
Building Construction	Worker	12	12	LDA,LDT1,LDT2
Building Construction	Vendor	16	8.4	HHDT,MHDT
Building Construction	Hauling	7.0	2.0	HHDT
Building Construction	Onsite truck	1.00	2.0	HHDT
Architectural Coating	Worker	2.2	12	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	8.4	HHDT,MHDT
Architectural Coating	Hauling	0.00	20	HHDT
Architectural Coating	Onsite truck	1.00	2.0	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	Worker	5.0	12	LDA,LDT1,LDT2
Site Preparation	Vendor	—	8.4	HHDT,MHDT
Site Preparation	Hauling	0.00	20	HHDT
Site Preparation	Onsite truck	1.00	2.0	HHDT
Building Construction	Worker	12	12	LDA,LDT1,LDT2
Building Construction	Vendor	16	8.4	HHDT,MHDT
Building Construction	Hauling	7.0	2.0	HHDT
Building Construction	Onsite truck	1.00	2.0	HHDT
Architectural Coating	Worker	2.2	12	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	8.4	HHDT,MHDT
Architectural Coating	Hauling	0.00	20	HHDT
Architectural Coating	Onsite truck	1.00	2.0	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Reduction	PM2.5 Reduction
Water unpaved roads twice daily	55%	55%
Limit vehicle speeds on unpaved roads to 25 mph	44%	44%
Sweep paved roads once per month	9%	9%

5.5. Architectural Coatings

Phase Name	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)
Architectural Coating	0.00	0.00	39,096	13,032	—

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	—	—	10.0	0.00	0.00

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	0.00	204	0.03	< 0.005

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

5.18.1.2. Mitigated

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

5.18.1.2. Mitigated

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)

5.18.2.2. Mitigated

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	12	annual days of extreme heat
Extreme Precipitation	5.7	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	16	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	N/A	N/A	N/A	N/A
Extreme Precipitation	2	0	0	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	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	N/A	N/A	N/A	N/A
Extreme Precipitation	2	1	1	3
Sea Level Rise	1	1	1	2

Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
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	17
AQ-PM	36
AQ-DPM	23
Drinking Water	69
Lead Risk Housing	56
Pesticides	66
Toxic Releases	61
Traffic	83
Effect Indicators	—
CleanUp Sites	62
Groundwater	0.00

Haz Waste Facilities/Generators	83
Impaired Water Bodies	24
Solid Waste	84
Sensitive Population	—
Asthma	72
Cardio-vascular	67
Low Birth Weights	51
Socioeconomic Factor Indicators	—
Education	62
Housing	12
Linguistic	39
Poverty	34
Unemployment	36

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	80.85461311
Employed	75.23418452
Median HI	74.554087
Education	—
Bachelor's or higher	69.35711536
High school enrollment	100
Preschool enrollment	12.62671628
Transportation	—
Auto Access	83.51084306
Active commuting	27.38354934

Social	—
2-parent households	62.7229565
Voting	57.75696138
Neighborhood	—
Alcohol availability	76.10676248
Park access	56.71756705
Retail density	24.22687027
Supermarket access	27.9481586
Tree canopy	22.44321827
Housing	—
Homeownership	87.02681894
Housing habitability	96.41986398
Low-inc homeowner severe housing cost burden	70.11420506
Low-inc renter severe housing cost burden	97.06146542
Uncrowded housing	60.05389452
Health Outcomes	—
Insured adults	79.19928141
Arthritis	0.0
Asthma ER Admissions	56.0
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	25.5
Cognitively Disabled	20.1
Physically Disabled	17.3

Heart Attack ER Admissions	55.3
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	43.5
Children	32.5
Elderly	69.3
English Speaking	60.5
Foreign-born	72.3
Outdoor Workers	52.3
Climate Change Adaptive Capacity	—
Impervious Surface Cover	43.7
Traffic Density	45.1
Traffic Access	23.0
Other Indices	—
Hardship	34.8
Other Decision Support	—
2016 Voting	51.4

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	63
Healthy Places Index Score for Project Location (b)	73
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

8.1. Justifications

Screen	Justification
Construction: Construction Phases	Assuming no grading or paving required.
Construction: Off-Road Equipment	Equipment added to building construction phase.
Construction: Trips and VMT	Added vendor trips to building construction phase, for specialized equipment installation. Added hauling trips to building construction phase for cement hauling and heavy equipment hauling.

ATTACHMENT 2 – MOBILE SOURCE EMISSION CALCULATION WORKSHEETS

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Table 1: NRRP Process Throughput and Vehicle Counts

Table 1a: Process Throughput [1]

Processing Step	Proposed Project (TPY)	Proposed Project (TPD)
Feedstock Inbound	105,510	291
Finished Compost Outbound	43,671	121
MRF Inbound	266,095	735
MRF Outbound	213,928	591
Conversion Feedstock	15,960	62
AD Feedstock	32,000	88
Conversion Biochar	3,273	9
Digestate Management	19,200	53

Table 1b: Truck Capacity

Material	Vehicle Description	Capacity (CY)	Material Density (lb/CY)	Capacity (ton/truck)
Greenwaste	Self haul pick-up trucks	4	500	1
Greenwaste	Collection Route Trucks	25	500	6.25
Greenwaste	Transfer Trucks	40	500	10
Wood Chips	Transfer Trucks	30	800	12
Compost	Transfer Trucks	20	800	8
Biochar	Transfer Trucks	30	800	12
MRF Inbound	Transfer Trucks	See footnote 4		
MRF Outbound	Transfer Trucks	---	---	20

Table 1c: Vehicle Requirements

Processing Step	Proposed Project Truck Count		Notes
	truck/year	truck/day	
Feedstock Inbound - self haul	24,254	67	1,2,3,6
Feedstock Inbound - Collection Route	26,064	72	1,2,3,6
Feedstock Inbound - Transfer	9,050	25	1,2,3,6
Finished Compost Outbound	5,459	16	1,2,3,6
MRF Inbound	21,066	60	5
MRF Outbound	10,697	30	6
Conversion Feedstock	1,330	6	7
AD Feedstock	0	0	8
Conversion Biochar	273	1	9
Digestate Management	2400	7	10

Data and Parameters			Comment
Daily Operating Hours	24	hours/day	Project specification
Raw Material Receive Days	362	Day/year	Project specification
Operating Hours - Truck Travel	10	hours/day	Project specification
Operating hours - loader	8.5	Hours/day	Project specification
Operating hours - forklift	1.5	Hours/day	Assumption
Number of Existing Employees	50	each	NRWS provided
New Employees	6	each	NRWS provided
Total NRRP Project Employees	56	each	NRWS provided
Conversion	2000	lb/ton	Constant
Mass Loss upon digestion	40%		Assumption
MRF Capacity Increase	240	ton/day	Project specification
MRF Capacity Increase	86,880	ton/yr	Calculated
Total Baseline Truck Count	204	truck/day	Project specification
Baseline Truck Count Greenwaste	163	truck/day	See Baseline calculations (Attachment 2b)
Self haul pick-up trucks	41%	of greenwaste inbound	Project specification
Collection Route Trucks	44%	of greenwaste inbound	Project specification
Transfer Trucks	15%	of greenwaste inbound	Project specification

Notes:

1. Feedstock tonnage is reported at 30% moisture by weight.
2. Compost Facility Feedstock includes all materials (CASP feedstock, Transfer Tons, and woodchips, etc.)
3. Greenwaste density is used for calculating transportation requirements for inbound materials.
4. Increased capacity trucking requirements, provided by RCH:

100 tpd / (20 tons/truck) = 5 transport trucks (daily)
140 tpd / (10 tons/truck) = 14 collection trucks (daily)
240 tpd = 19 heavy trucks (daily)

Assume same ratio of small to large trucks for the existing MRF capacity.

42%	20 ton trucks
58%	10 ton trucks

Of the 14 10-ton collection trucks, 47% are assumed to be diesel, 53% are assumed to be NG (project specification). This ratio is applied to the baseline and to the proposed Project (not just the increase).

Table 1d: MRF Delivery Vehicle Breakdown

Period	Vehicle	Fuel	Percent of Vehicles	Ton/yr	Truck/year	Ton/day	Truck/day
Proposed Project	20-ton truck	Diesel	100%	110,873	5544	306.28	16
	10-ton truck	Diesel	47%	72,954	7295	201.53	21
	10-ton truck	NG	53%	82,268	8227	227.26	23

5. MRF is assumed to ship outbound in 20-ton loads.
6. Feedstock truck counts based on 204 average daily trucks minus the MRF inbound of 41 trucks = 163 trucks per day. 41% of those are self haul, 44% collection vehicles and 15% transfer vehicles per Project specification.
7. Conversion feedstock consists of woodchips taken from existing facility feedstock: onsite transport, but no new offsite transport.
8. AD Feedstock is diverted from existing compost facility feedstock via conveyor, i.e., no new onsite or offsite transport.
9. Biochar is derived from wood chips that would otherwise have been disposed offsite (e.g., landfill). Wood chip disposal transportation will be eliminated, biochar shipment will occur.
10. Digestate is blended with compost feedstock and processed through the CASP. Digestate will be transported onsite from the AD to the CASP. Because the compost derived from the AD feedstock and digestate was compost facility feedstock, there will be no new transportation associated with offsite digestate shipment.

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Table 2: Onroad Mobile Sources - Vehicle Information

Table 2a: Vehicle Information and Mileage Calculation

Vehicle Type	Vehicle Use	Vehicle Weight (lb)			Days	Average Daily One-way Trips	Annual One-way Trips	Daily Onsite Milage (VMT/day)	Annual Onsite Mileage (VMT/yr)	Daily Offsite Milage (VMT/day)	Annual Offsite Mileage (VMT/yr)	Total Daily Milage (VMT/day)	Total Annual Mileage (VMT/yr)
		Gross	Empty	Average									
LHD2	Feedstock Inbound - self haul	10,500	8,500	9,500	362	134	48,508	21.57	7,809	2,680	970,160	2701.6	977,969
T7 SWCV Class 8 (Diesel)	Feedstock Inbound - Collection Route	45,501	33,001	39,251	362	144	52,128	23.18	8,392	2,880	1,042,560	2903.2	1,050,952
T7 SWCV Class 8 (Diesel)	Feedstock Inbound - Transfer	53,002	33,002	43,002	362	50	18,100	8.05	2,914	1,000	362,000	1008.0	364,914
T7 SWCV Class 8 (Diesel)	Finished Compost Outbound	49,001	33,001	41,001	362	32	10,918	5.15	1,758	640	218,360	645.2	220,118
T7 SWCV Class 8 (Diesel)	MRF Inbound	73,001	33,001	53,001	362	32	11,088	5.15	1,785	640	221,760	645.2	223,545
T7 SWCV Class 8 (Diesel)	MRF Inbound	53,001	33,001	43,001	362	42	14,590	6.76	2,349	840	291,800	846.8	294,149
T7 SWCV Class 8 (NG)	MRF Inbound	53,001	33,001	43,001	362	46	16,454	7.41	2,649	920	329,080	927.4	331,729
T7 SWCV Class 8 (Diesel)	MRF Outbound	73,001	33,001	53,001	362	60	21,394	9.66	3,444	1,200	427,880	1209.7	431,324
T7 Tractor Class 8	Conversion Feedstock	57,001	33,001	45,001	362	12	2,660	1.93	428	0	0	1.9	428
T7 SWCV Class 8 (Diesel)	AD Feedstock	35,001	33,001	34,001	362	0	0	0.00	0	0	0	0.0	0
T7 SWCV Class 8 (Diesel)	Conversion Biochar	57,001	33,001	45,001	362	2	546	0.32	88	40	10,910	40.3	10,998
T7 Tractor Class 8	Digestate Management	57,001	33,001	45,001	362	14	4,800	2.25	773	0	0	2.3	773
LDA	Employees[1]	8,500	8,500	8,500	362	112	40,544	0.00	0	2,240	810,880	2240.0	810,880
LHD2	Miscellaneous Business	8,500	8,500	8,500	362	2	724	0.32	117	50	18,100	50.3	18,217
T6 Public Class 6	Fuels	54,000	26,000	40,000	52	2	104	0.32	17	30	1,560	30.3	1,577

Table 2b: Onsite/Offsite Vehicle Usage Information

Vehicle Type	Fuel	Average Daily One-way Trips	One-way Trips per Year	Onsite Total VMT/yr	Offsite Total VMT/yr	Total VMT/yr
LDA	gasoline	112	40,544	0	810,880	810,880
LHD2	diesel	136	49,232	7,926	988,260	996,186
T6 Public Class 6	diesel	2	104	17	1,560	1,577
T7 SWCV Class 8 (Diesel)	diesel	362	128,764	20,729	2,575,270	2,595,999
T7 SWCV Class 8 (NG)	natural gas	46	16,454	2,649	329,080	331,729
T7 Tractor Class 8	diesel	26	7,460	1,201	0	1,201

Data and Parameters

Onsite Travel Distance	850	feet	Google Earth, measured distance NRWS storage to new facilities
Onsite Travel Distance	0.16	miles, one way	Calculated
Number of employees	56	each	Project specification
Employee Travel Distance	20	mile/day, one way	Assumption
Miscellaneous Business	25	mile/day, one way	Assumption
Fuels	15	mile/day, one way	Assumption
Feedstock and Compost Shipment	20	miles, one way	Specified
Fuel Load	28,000	lbs	Calculated based on 4,000 gal and 7 lb/gal
Conversion	2,000	lb/ton	

Notes:

1. Employees are assumed not to drive personal vehicles onsite.

Vehicle Definitions

LDA - Light-duty vehicle is a vehicle weight category that includes cars and light trucks that weigh less than 8,500 lbs.

LHD2 - Light Heavy-Duty 2 (GVWR: 10,001 lb to 14,000 lb)

T6 public class 6 - refers to a vehicle with a Gross Vehicle Weight Rating (GVWR) between 19,501 and 26,000 pounds; this is considered a medium-duty truck classification according to the standard vehicle weight classes.

T7 Tractor Class 8 - typically weighs over 33,000 pounds as this is the minimum weight requirement for a Class 8 vehicle according to US truck classifications; meaning it falls into the heavy-duty truck category with a Gross Vehicle Weight Rating (GVWR) exceeding 33,001 pounds.

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Table 3: Onroad Mobile Sources Exhaust Emissions

Table 3a: Onroad Mobile Sources - Criteria Pollutant Exhaust Emissions

Pollutant	Vehicle Type	Running Exhaust EF (g/mile)	Idle EF (g/trip)	Start EF (g/trip)	Total Running Exhaust (lb/yr)	Total Idle (lb/yr)	Total Start (lb/yr)	Total Emissions (lb/yr)	Onsite Emissions (lb/yr)	Offsite Emissions (lb/yr)	Total Exhaust Emissions (lb/day)	Onsite Exhaust Emissions (lb/day)
NOx	LDA	0.039	0.000	0.252	70.09	0.00	22.57	92.66	0.00	92.66	0.256	0.00E+00
	LHD2	1.158	0.146	0.000	2,542.92	15.89	0.00	2,558.81	20.36	2,538.45	7.069	5.62E-02
	T6 Public Class 6	4.360	6.517	1.082	15.16	1.49	0.25	16.90	0.18	16.72	0.047	5.03E-04
	T7 SWCV Class 8 (Diesel)	7.694	8.746	2.120	44,034.32	2,482.79	601.91	47,119.01	376.24	46,742.77	130.163	1.04E+00
	T7 SWCV Class 8 (NG)	1.706	1.287	0.000	1,247.96	46.68	0.00	1,294.64	10.34	1,284.30	3.576	2.86E-02
	T7 Tractor Class 8	1.595	2.756	3.904	4.22	45.32	64.21	113.75	113.75	0.00	0.314	3.14E-01
POC	LDA	0.008	0.024	0.318	14.59	2.12	28.44	45.15	0.00	45.15	0.125	0.00E+00
	LHD2	0.156	0.000	0.000	341.76	0.00	0.00	341.76	2.72	339.04	0.944	7.51E-03
	T6 Public Class 6	0.065	0.000	0.000	0.23	0.00	0.00	0.23	0.00	0.22	0.001	6.75E-06
	T7 SWCV Class 8 (Diesel)	0.033	0.054	0.000	187.01	15.39	0.00	202.40	1.62	200.79	0.559	4.46E-03
	T7 SWCV Class 8 (NG)	0.083	0.000	0.000	60.50	0.00	0.00	60.50	0.48	60.02	0.167	1.33E-03
	T7 Tractor Class 8	0.015	0.000	0.000	0.04	0.00	0.00	0.04	0.04	0.00	0.000	1.07E-04
CO	LDA	0.683	0.000	3.167	1,221.71	0.00	283.08	1,504.78	0.00	1,504.78	4.157	0.00E+00
	LHD2	0.400	0.072	0.000	879.02	7.85	0.00	886.87	7.06	879.82	2.450	1.95E-02
	T6 Public Class 6	0.161	1.419	0.000	0.56	0.33	0.00	0.88	0.01	0.87	0.002	2.63E-05
	T7 SWCV Class 8 (Diesel)	0.085	2.116	0.000	488.94	600.76	0.00	1,089.70	8.70	1,081.00	3.010	2.40E-02
	T7 SWCV Class 8 (NG)	18.713	12.775	0.000	13,685.94	463.42	0.00	14,149.35	112.99	14,036.36	39.087	3.12E-01
	T7 Tractor Class 8	0.079	3.481	0.000	0.21	57.25	0.00	57.46	57.46	0.00	0.159	1.59E-01
SOx	LDA	0.003	0.000	0.001	4.80	0.00	0.06	4.86	0.00	4.86	0.013	0.00E+00
	LHD2	0.007	0.000	0.000	15.72	0.02	0.00	15.74	0.13	15.62	0.043	3.46E-04
	T6 Public Class 6	0.012	0.006	0.000	0.04	0.00	0.00	0.04	0.00	0.04	0.000	1.24E-06
	T7 SWCV Class 8 (Diesel)	0.038	0.008	0.000	218.59	2.27	0.00	220.86	1.76	219.10	0.610	4.87E-03
	T7 SWCV Class 8 (NG)	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00E+00
	T7 Tractor Class 8	0.015	0.005	0.000	0.04	0.09	0.00	0.13	0.13	0.00	0.000	3.52E-04
PM10	LDA	0.001	0.000	0.002	2.26	0.00	0.18	2.45	0.00	2.45	0.007	0.00E+00
	LHD2	0.033	0.002	0.000	72.45	0.24	0.00	72.69	0.58	72.12	0.201	1.60E-03
	T6 Public Class 6	0.026	0.011	0.000	0.09	0.00	0.00	0.09	0.00	0.09	0.000	2.73E-06
	T7 SWCV Class 8 (Diesel)	0.014	0.010	0.000	81.70	2.82	0.00	84.52	0.67	83.85	0.233	1.86E-03
	T7 SWCV Class 8 (NG)	0.002	0.000	0.000	1.58	0.01	0.00	1.59	0.01	1.58	0.004	3.50E-05
	T7 Tractor Class 8	0.023	0.001	0.000	0.06	0.02	0.00	0.08	0.08	0.00	0.000	2.18E-04
PM2.5	LDA	0.001	0.000	0.002	2.08	0.00	0.17	2.25	0.00	2.25	0.006	0.00E+00
	LHD2	0.032	0.002	0.000	69.32	0.23	0.00	69.55	0.55	69.00	0.192	1.53E-03
	T6 Public Class 6	0.024	0.011	0.000	0.09	0.00	0.00	0.09	0.00	0.09	0.000	2.61E-06
	T7 SWCV Class 8 (Diesel)	0.014	0.010	0.000	78.17	2.70	0.00	80.87	0.65	80.22	0.223	1.78E-03
	T7 SWCV Class 8 (NG)	0.002	0.000	0.000	1.45	0.01	0.00	1.46	0.01	1.45	0.004	3.22E-05
	T7 Tractor Class 8	0.022	0.001	0.000	0.06	0.02	0.00	0.08	0.08	0.00	0.000	2.09E-04

Table 3b: Onroad Mobile Sources - Fugitive POC Emissions

Pollutant	Vehicle Type	Hot Soak EF (g/trip)	Running Loss EF (g/trip)	Diurnal EF (g/trip)	Total Hot Soak (lb/yr)	Total Running Loss (lb/yr)	Total Diurnal (lb/yr)	Total Emissions (lb/yr)	Onsite Emissions (lb/yr)	Offsite Emissions (lb/yr)	Total Emissions (lb/day)
POC	LDA	0.09	0.24	0.31	8.1	21.2	27.6	57.01	0.00	57.01	0.16
	LHD2	0.00	0.00	0.00	---	---	---	---	---	---	---
	T6 Public Class 6	0.00	0.00	0.00	---	---	---	---	---	---	---
	T7 SWCV Class 8 (Diesel)	0.00	0.00	0.00	---	---	---	---	---	---	---
	T7 SWCV Class 8 (NG)	0.00	0.00	0.00	---	---	---	---	---	---	---
	T7 Tractor Class 8	0.00	0.00	0.00	---	---	---	---	---	---	---

Table 3c: Onroad Mobile Sources - Fugitive PM Emissions

Pollutant	Vehicle Type	Tire Wear (g/mile)	Brake Wear (g/mile)	Total Tire Wear (lb/yr)	Total Brake Wear (lb/yr)	Total Emissions (lb/yr)	Onsite Emissions (lb/yr)	Offsite Emissions (lb/yr)	Onsite Emissions (lb/day)	Total Emissions (lb/day)
PM10	LDA	0.0080	0.0073	14.30	13.09	27.39	0.00	27.39	0.00E+00	0.076
	LHD2	0.0120	0.0910	26.35	199.86	226.21	1.80	224.41	4.97E-03	0.625
	T6 Public Class 6	0.0120	0.0462	0.04	0.16	0.20	0.00	0.20	6.02E-06	0.001
	T7 SWCV Class 8 (Diesel)	0.0360	0.2100	206.04	1,201.88	1,407.91	11.24	1,396.67	3.11E-02	3.889
	T7 SWCV Class 8 (NG)	0.0360	0.2100	26.33	153.58	179.91	1.44	178.47	3.97E-03	0.497
	T7 Tractor Class 8	0.0360	0.0784	0.10	0.21	0.30	0.30	0.00	8.37E-04	0.001
PM2.5	LDA	0.0020	0.0026	3.58	4.58	8.16	0.00	8.16	0.00E+00	0.023
	LHD2	0.0030	0.0319	6.59	69.95	76.54	0.61	75.93	1.68E-03	0.211
	T6 Public Class 6	0.0030	0.0162	0.01	0.06	0.07	0.00	0.07	1.98E-06	0.000
	T7 SWCV Class 8 (Diesel)	0.0090	0.0735	51.51	420.66	472.17	3.77	468.40	1.04E-02	1.304
	T7 SWCV Class 8 (NG)	0.0090	0.0735	6.58	53.75	60.34	0.48	59.85	1.33E-03	0.167
	T7 Tractor Class 8	0.0090	0.0275	0.02	0.07	0.10	0.10	0.00	2.67E-04	0.000

Table 3d: Summary of Criteria Pollutant Emissions from Onroad Operations Vehicles

Type	NO_x (lb/yr)	POC (lb/yr)	CO (lb/yr)	SO_x (lb/yr)	PM_{10} (lb/yr)	$PM_{2.5}$ (lb/yr)
Exhaust	51195.78	650.07	17689.06	241.63	161.42	154.29
Fugitive	---	57.01	---	---	1841.93	617.36
Total (Lb/Yr)	51195.78	707.08	17689.06	241.63	2003.36	771.65
Total (TPY)	25.60	0.35	8.84	0.12	1.00	0.39

Table 3e: Onroad Mobile Sources - Greenhouse Gas Exhaust Emissions

Pollutant	Vehicle Type	Running Exhaust EF (g/mile)	Idle EF (g/trip)	Start EF (g/trip)	Total Running Exhaust (MT/yr)	Total Idle (MT/yr)	Total Start (MT/yr)	Total Emissions (MT/yr)
CO2	LDA	271.499	0.000	68.869	220.2	0.000	2.8	223
	LHD2	755.564	16.552	0.000	752.7	0.815	0.0	753
	T6 Public Class 6	1217.310	646.023	0.000	1.9	0.067	0.0	2
	T7 SWCV Class 8 (Diesel)	4033.362	845.048	0.000	10,470.6	108.812	0.0	10,579
	T7 SWCV Class 8 (NG)	1571.488	1452.470	0.000	521.3	23.899	0.0	545
	T7 Tractor Class 8	1538.170	569.475	0.000	1.8	4.248	0.0	6
CH4	LDA	2.16E-03	0.00E+00	6.95E-02	1.75E-03	0.00E+00	2.82E-03	4.57E-03
	LHD2	7.23E-03	4.05E-04	0.00E+00	7.20E-03	2.00E-05	0.00E+00	7.22E-03
	T6 Public Class 6	3.03E-03	2.98E-03	0.00E+00	4.77E-06	3.10E-07	0.00E+00	5.08E-06
	T7 SWCV Class 8 (Diesel)	1.52E-03	1.14E-02	0.00E+00	3.94E-03	1.47E-03	0.00E+00	5.41E-03
	T7 SWCV Class 8 (NG)	3.37E+00	2.88E+00	0.00E+00	1.12E+00	4.74E-02	0.00E+00	1.17E+00
	T7 Tractor Class 8	6.81E-04	1.10E-02	0.00E+00	8.18E-07	8.24E-05	0.00E+00	8.32E-05
N2O	LDA	4.47E-03	0.00E+00	3.26E-02	3.62E-03	0.00E+00	1.32E-03	4.94E-03
	LHD2	1.19E-01	2.61E-03	0.00E+00	1.19E-01	1.28E-04	0.00E+00	1.19E-01
	T6 Public Class 6	1.92E-01	1.02E-01	0.00E+00	3.02E-04	1.06E-05	0.00E+00	3.13E-04
	T7 SWCV Class 8 (Diesel)	6.35E-01	1.33E-01	0.00E+00	1.65E+00	1.71E-02	0.00E+00	1.67E+00
	T7 SWCV Class 8 (NG)	3.20E-01	2.96E-01	0.00E+00	1.06E-01	4.87E-03	0.00E+00	1.11E-01
	T7 Tractor Class 8	2.42E-01	8.97E-02	0.00E+00	2.91E-04	6.69E-04	0.00E+00	9.60E-04
CO2e	LDA							224
	LHD2							785
	T6 Public Class 6							2
	T7 SWCV Class 8 (Diesel)							11,021
	T7 SWCV Class 8 (NG)							610
	T7 Tractor Class 8							6
							Total	**12,649**

Table 3f: GHG Emissions from Onroad Mobile Source Activity

CO_2	CH_4	N_2O	Total CO_2e
(MT/Yr)	(Kg/Yr)	(Kg/Yr)	(MT/Yr)
12,109	1,183.68	1,902.87	12,649

Table 3g: Global Warming Potential

Pollutant	GWP
CO2	1
CH4	30
N2O	265

Data and Parameters

Operating days	362	day/yr
Conversion	453.59	gm/lb
Conversion	2000	lb/ton
Conversion	1.00E+06	gm/MT

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Table 4: Offroad Equipment - Criteria Pollutant and GHG Emissions

Table 4a: Emission Factors

Offroad Equipment	Project Element	Typical Model (or Equivalent)	Fuel	Engine Tier and Information			NOx (g/BHp-hr)	POC (g/BHp-hr)	CO (g/BHp-hr)	SOx (g/BHp-hr)	PM10 (g/BHp-hr)	PM2.5 (g/BHp-hr)	CO2 (kg/gal)	CH4 (kg/gal)	N2O (kg/gal)
				Tier	BHp	BSFC (lb/hp-hr)									
Front-end Loader	Compost Facility Ops	John Deere 624 P	Diesel	T4f	192	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Front-end Loader	Compost Facility Ops	John Deere 624 P	Diesel	T4f	192	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Front-end Loader	Compost Facility Ops	John Deere 624 P	Diesel	T4f	192	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Front-end Loader	Compost Facility Ops	John Deere 624 P	Diesel	T4f	192	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Front-end Loader	Compost Facility Ops	John Deere 624 P	Diesel	T4f	192	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Front-end Loader	Compost Facility Ops	John Deere 624 P	Diesel	T4f	192	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Excavator	Compost Facility Ops	Linkbelt 210x4	Diesel	T4f	160	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Forklift	Compost Facility Ops	Cat DP30N	Diesel	T4f	59	0.3627	2.74	0.09	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Loader	Biomass Conversion	Volvo 2016 L90H Wheel Loader	Diesel	T4f	184	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Forklift	Biomass Conversion	Hyster Electric	Electric	---	---	---	---	---	---	---	---	---	---	---	---
Loader	AD	Volvo 2016 L90H Wheel Loader	Diesel	T4f	184	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05

Table 4b: Total Daily Criteria Pollutant Emissions from Offroad Equipment

Offroad Equipment	Project Element	Typical Model (or Equivalent)	Engine Characteristics				Criteria Pollutant Exhaust Emissions (lb/day)					
			BHp	Op Load[1]	Hr/Day	Hr/Yr	NOx	POC	CO	SOx	PM10	PM2.5
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.50	3,077	0.36	0.07	5.06	0.01	0.01	0.01
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.50	3,077	0.36	0.07	5.06	0.01	0.01	0.01
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.50	3,077	0.36	0.07	5.06	0.01	0.01	0.01
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.50	3,077	0.36	0.07	5.06	0.01	0.01	0.01
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.50	3,077	0.36	0.07	5.06	0.01	0.01	0.01
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.50	3,077	0.36	0.07	5.06	0.01	0.01	0.01
Excavator	Compost Facility Ops	Linkbelt 210x4	160	0.38	8.50	3,077	0.30	0.06	4.22	0.01	0.01	0.01
Forklift	Compost Facility Ops	Cat DP30N	59	0.20	1.50	543	0.11	0.00	0.14	0.00	0.00	0.00
Loader	Biomass Conversion	Volvo 2016 L90H Wheel Loader	184	0.38	8.50	3,077	0.34	0.07	4.85	0.01	0.01	0.01
Forklift	Biomass Conversion	Hyster Electric	---	---	---	---	---	---	---	---	---	---
Loader	AD	Volvo 2016 L90H Wheel Loader	184	0.38	8.50	3,077	0.34	0.07	4.85	0.01	0.01	0.01
Total Emissions from offroad equipment (lb/day)							3.22	0.60	44.41	0.06	0.12	0.12

Table 4c: Total Annual Criteria Pollutant Emissions from Offroad Equipment

Offroad Equipment	Project Element	Typical Model (or Equivalent)	Engine Characteristics				Criteria Pollutant Exhaust Emissions (lb/yr)					
			BHp	Op Load[1]	Hr/Day	Hr/Yr	NOx	POC	CO	SOx	PM10	PM2.5
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.5	3077	128.68	24.75	1831.26	2.44	4.95	4.95
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.5	3077	128.68	24.75	1831.26	2.44	4.95	4.95
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.5	3077	128.68	24.75	1831.26	2.44	4.95	4.95
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.5	3077	128.68	24.75	1831.26	2.44	4.95	4.95
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.5	3077	128.68	24.75	1831.26	2.44	4.95	4.95
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.5	3077	128.68	24.75	1831.26	2.44	4.95	4.95
Excavator	Compost Facility Ops	Linkbelt 210x4	160	0.38	8.5	3077	107.24	20.62	1526.05	2.04	4.12	4.12
Forklift	Compost Facility Ops	Cat DP30N	59	0.2	1.5	543	38.71	1.27	52.27	0.07	0.14	0.14
Loader	Biomass Conversion	Volvo 2016 L90H Wheel Loader	184	0.38	8.50	3,077	123.32	23.72	1754.96	2.34	4.74	4.74
Forklift	Biomass Conversion	Hyster Electric	---	---	---	---	---	---	---	---	---	---
Loader	AD	Volvo 2016 L90H Wheel Loader	184	0.38	8.50	3,077	123.32	23.72	1754.96	2.34	4.74	4.74
Total Emissions from offroad equipment (lb/yr)							1164.68	217.81	16075.81	21.46	43.45	43.45

Table 4d: Offroad Equipment - GHG Emissions[2]

Offroad Equipment	Project Element	Typical Model (or Equivalent)	Engine Information				Fuel (gal/yr)	CO2 (MT/yr)	CH4 (kg/yr)	N2O (kg/yr)	CO2e (MT/Yr)
			BHp	Operating Hours	BSFC (lb/hp-hr)	Op Load[1]					
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	3077	0.3627	0.38	11,468.19	117	4.75	0.95	117
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	3077	0.3627	0.38	11,468.19	117	4.75	0.95	117
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	3077	0.3627	0.38	11,468.19	117	4.75	0.95	117
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	3077	0.3627	0.38	11,468.19	117	4.75	0.95	117
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	3077	0.3627	0.38	11,468.19	117	4.75	0.95	117
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	3077	0.3627	0.38	11,468.19	117	4.75	0.95	117
Excavator	Compost Facility Ops	Linkbelt 210x4	160	3077	0.3627	0.38	9,556.82	98	3.96	0.79	98
Forklift	Compost Facility Ops	Cat DP30N	59	543	0.3627	0.2	327.31	3	0.14	0.03	3
Loader	Biomass Conversion	Volvo 2016 L90H Wheel Loader	184	3,077	0.3627	0.38	10,990.34	112	4.55	0.91	113
Forklift	Biomass Conversion	Hyster Electric	---	---	---	---	---	---	---	---	---
Loader	AD	Volvo 2016 L90H Wheel Loader	184	3,077	0.3627	0.38	10,990.34	112	4.55	0.91	113
Total GHG Exhaust Emissions from Equipment								1,028	42	8	1,031

Table 4e: Brake Specific Fuel Consumption (BSFC) Conversion - Diesel

Parameter	Value	Unit of Measure	Basis
BSFC	7000	btu/hp-hr	Per EPA AP-42 Table 3,3-1, Footnote a
Heat Content	19,300	btu/lb	SDS
BSFC	0.3627	lb/hp-hr	calculated

Table 4f: Conversion of ppm S to gm/BHp-hr

Parameter	Value	Unit of Measure	Basis
Sulfur concentration	15	ppmw	Diesel Specification
BSFC	0.3627	lb/hp-hr	Calculated in Table 4e
Conversion	1,000,000	ppm/wt fraction	
Conversion	453.9	gm/lb	Constant
Molecular Wt. Conversion	2	unitless	Ratio of molecular weight of SO2 (64 lb/mol) to S (32 lb/mol)
Sulfur content	0.005	gm/Bhp-hr	Calculated

Table 4g: GWP[2]

Pollutant	GWP
CO2	1
CH4	30
N2O	265

Table 4h: CO2 Emission Factors[2]

Fuel	HHV (MMBtu/gal)	Default CO2 EF (kg CO2/MMBtu)	CO2 EF (kg/gal)	Default CH4 EF (kg/MMBtu)	CH4 EF (kg/gal)	Default N2O EF (kg/MMBtu)	N2O EF (kg/gal)
Diesel	0.138	73.96	10.20648	3.00E-03	4.14E-04	6.00E-04	8.28E-05
Gasoline	0.125	70.22	8.7775	3.00E-03	3.75E-04	6.00E-04	7.50E-05

Data and Parameters

Operating Days	362	day/yr
Conversion	453.59	gram/lb
Conversion	1000000	gm/MT
Conversion	1000	Kg/MT
Conversion	1000	gram/Kg
Fuel Density Diesel	7.1	lb/gal

Notes:

1. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 3.3.
2. Ref: 40 CFR 98, Subpart C, Tables C-1 and C-2

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Table 5: Onroad Offsite Mobile Source Paved Road Dust

Table 5a: Paved Road PM_{10} Emission Factors[1]

Vehicle	Average Vehicle Weight (ton)	Pollutant	Freeway (lb/VMT)	Major (lb/VMT)	Collector (lb/VMT)	Local (lb/VMT)
		sL (g/m^2)^2 -->	0.020	0.035	0.035	0.320
Fleet Average	2.40	PM10	1.49E-04	2.48E-04	2.48E-04	1.86E-03
		PM2.5	3.72E-05	6.20E-05	6.20E-05	4.64E-04

$$E = k\,(sL)^{0.91} \times (W)^{1.02} * C_f$$

Variable	Value	UOM
k (PM10)	1.00	g/VMT
k(PM2.5)	0.25	g/VMT
Rain Days[3]	38.4	day/yr
C_f	0.974	

Table 4b: Fraction of VMT by Functional Type of Roadway[2]

Freeway	Major	Collector	Local
33.25%	38.97%	27.59%	0.19%

Table 5c: Summary of Onroad VMT by Phase and Road Type

EMFAC Vehicle Type	Activity	Unit of Measure	Freeway	Major	Collector	Local	Total VMT
LDA	Employees	VMT/day	744.8	872.9	618.0	4.3	2240.0
		VMT/Yr	269617.6	315999.9	223721.8	1540.7	810880.0
LHD2	Vendor/Delivery	VMT/day	907.7	1063.9	753.2	5.2	2730.0
		VMT/Yr	328596.5	385124.9	272660.9	1877.7	988260.0
T6 Public Class 6	Fuel Delivery	VMT/day	1.4	1.7	1.2	0.0	4.3
		VMT/Yr	518.7	607.9	430.4	3.0	1560.0
T7 SWCV Class 8 (Diesel)	Material Delivery/Shipment	VMT/day	2365.4	2772.3	1962.8	13.5	7114.0
		VMT/Yr	856277.3	1003582.7	710517.0	4893.0	2575270.0
T7 SWCV Class 8 (NG)	Material Delivery/Shipment	VMT/day	302.3	354.3	250.8	1.7	909.1
		VMT/Yr	109419.1	128242.5	90793.2	625.3	329080.0
T7 Tractor Class 8	Onsite Transport	VMT/day	0.0	0.0	0.0	0.0	0.0
		VMT/Yr	0.0	0.0	0.0	0.0	0.0

Table 5d: Entrained Road Dust Emissions from Travel on Paved Roads (lb/day)

EMFAC Vehicle Type	Activity	Pollutant	Freeway	Major	Collector	Local	Total
LDA	Employees	PM10	1.11E-01	2.16E-01	1.53E-01	7.90E-03	4.88E-01
		PM2.5	2.77E-02	5.41E-02	3.83E-02	1.98E-03	1.22E-01
LHD2	Vendor/Delivery	PM10	1.35E-01	2.64E-01	1.87E-01	9.63E-03	5.95E-01
		PM2.5	3.38E-02	6.59E-02	4.67E-02	2.41E-03	1.49E-01
T6 Public Class 6	Fuel Delivery	PM10	2.13E-04	4.16E-04	2.95E-04	1.52E-05	9.40E-04
		PM2.5	5.34E-05	1.04E-04	7.37E-05	3.80E-06	2.35E-04
T7 SWCV Class 8 (Diesel)	Material Delivery/Shipment	PM10	3.52E-01	6.87E-01	4.87E-01	2.51E-02	1.55E+00
		PM2.5	8.81E-02	1.72E-01	1.22E-01	6.28E-03	3.88E-01
T7 SWCV Class 8 (NG)	Material Delivery/Shipment	PM10	4.50E-02	8.78E-02	6.22E-02	3.21E-03	1.98E-01
		PM2.5	1.13E-02	2.20E-02	1.55E-02	8.02E-04	4.96E-02
T7 Tractor Class 8	Onsite Transport	PM10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		PM2.5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	All	PM10	0.64	1.26	0.89	0.05	2.83
		PM2.5	0.16	0.31	0.22	0.01	0.71

Table 5e: Entrained Road Dust Emissions from Travel on Paved Roads (lb/yr)

EMFAC Vehicle Type	Activity	Pollutant	Freeway	Major	Collector	Local	Total
LDA	Employees	PM10	40.17	78.34	55.46	2.86	176.83
		PM2.5	10.04	19.58	13.87	0.72	44.21
LHD2	Vendor/Delivery	PM10	48.95	95.47	67.59	3.49	215.51
		PM2.5	12.24	23.87	16.90	0.87	53.88
T6 Public Class 6	Incoming Materials	PM10	0.08	0.15	0.11	0.01	0.34
		PM2.5	0.02	0.04	0.03	0.00	0.09
T7 SWCV Class 8 (Diesel)	Material Delivery/Shipment	PM10	127.57	248.79	176.14	9.09	561.59
		PM2.5	31.89	62.20	44.04	2.27	140.40
T7 SWCV Class 8 (NG)	Material Delivery/Shipment	PM10	16.30	31.79	22.51	1.16	71.76
		PM2.5	4.08	7.95	5.63	0.29	17.94
T7 Tractor Class 8	Onsite Transport	PM10	0.00	0.00	0.00	0.00	0.00
		PM2.5	0.00	0.00	0.00	0.00	0.00
Total	All	PM10	233.07	454.55	321.81	16.60	1026.03
		PM2.5	58.27	113.64	80.45	4.15	256.51

Notes:

1. Methodology per AP-42, 13.2.1 Paved Roads

2. SJVAPCD, Appendix A: Comments and Responses Rule 9510 and 3180 December 15, 2005; also Proposed Revisions to AP-42 Chapter 13.2, accessed at: https://www.google.com/search?q=PROPOSED+REVISIONS+TO+ROADWAY+FUGITIVE+DUST+ESTIMATIONS+USING+AP-42+CHAPTER+13&rlz=1C1GCEU_enUS909US909&oq=PROPOSED+REVISIONS+TO+ROADWAY+FUGITIVE+DUST+ESTIMATIONS+USING++AP-42+CHAPTER+13&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIGCAEQRRg80gEJMjYyMGowajE1qAIAsAIA&sourceid=chrome&ie=UTF-8

3. CalEEMod, Appendix G_v2022.1.1.3, Table G-2 for Napa County Airport lists 38.4 days of >0.1" precipitation

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Table 6: Onsite Mobile Source Paved Road Dust

Table 6a: Paved Road PM_{10} Emission Factors[1]

Vehicle	Average Vehicle Weight (ton)	Pollutant	Emission Factor (lb/VMT)
Fleet Average	17.72	PM10	2.49E-01
		PM2.5	6.22E-02

$$E = k\,(sL)^{0.91} \times (W)^{1.02} * C_f$$

Variable	Value	UOM
k (PM10)	1.00	g/VMT
k(PM2.5)	0.25	g/VMT
Rain Days[3]	38.4	day/yr
C_f	0.974	---
Silt Loading[2]	7.4	g/m^2

Table 6b: Onsite Equipment Operating Hours and VMT

Equipment Description and Use			Operating Hours (hr/day)	Operating Hours (hr/yr)	Ave. Speed (MPH)	Total Travel (VMT/day)	Total Travel (VMT/yr)
Front-end Loader	Compost Facility Ops	John Deere 624 P	8.5	3,077	0.5	4.3	1,539
Front-end Loader	Compost Facility Ops	John Deere 624 P	8.5	3,077	0.5	4.3	1,539
Front-end Loader	Compost Facility Ops	John Deere 624 P	8.5	3,077	0.5	4.3	1,539
Front-end Loader	Compost Facility Ops	John Deere 624 P	8.5	3,077	0.5	4.3	1,539
Front-end Loader	Compost Facility Ops	John Deere 624 P	8.5	3,077	0.5	4.3	1,539
Front-end Loader	Compost Facility Ops	John Deere 624 P	8.5	3,077	0.5	4.3	1,539
Excavator	Compost Facility Ops	Linkbelt 210x4	8.5	3,077	0.5	4.3	1,539
Forklift	Compost Facility Ops	Cat DP30N	1.5	543	0.5	0.8	272
Loader	Biomass Conversion	Volvo 2016 L90H Wheel Loader	8.5	3,077	0.5	4.3	1,539
Forklift	Biomass Conversion	Hyster Electric	1.5	543	0.5	0.8	272
Loader	AD	Volvo 2016 L90H Wheel Loader	8.5	3,077	0.5	4.3	1,539

Table 6c: Summary of Onroad VMT

EMFAC Vehicle Type	Activity	VMT/day	VMT/Yr
LHD2	Vendor/Delivery	21.90	7926
T6 Public Class 6	Incoming Materials	0.05	17
T7 SWCV Class 8 (Diesel)	Material Delivery/Shipment	57.26	20729
T7 SWCV Class 8 (NG)	Material Delivery/Shipment	7.32	2649
T7 Tractor Class 8	Onsite Transport	3.32	1201

Table 6d: Onroad and Offroad Equipment Paved Road Dust Emissions

Equipment Description and Use			Uncontrolled (lb/day)		Controlled (lb/day)		Uncontrolled (lb/yr)		Controlled (lb/yr)	
			PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Front-end Loader	Compost Facility Ops	John Deere 624 P	1.06	0.26	0.10	0.02	383	96	35.4	8.8
Front-end Loader	Compost Facility Ops	John Deere 624 P	1.06	0.26	0.10	0.02	383	96	35.4	8.8
Front-end Loader	Compost Facility Ops	John Deere 624 P	1.06	0.26	0.10	0.02	383	96	35.4	8.8
Front-end Loader	Compost Facility Ops	John Deere 624 P	1.06	0.26	0.10	0.02	383	96	35.4	8.8
Front-end Loader	Compost Facility Ops	John Deere 624 P	1.06	0.26	0.10	0.02	383	96	35.4	8.8
Front-end Loader	Compost Facility Ops	John Deere 624 P	1.06	0.26	0.10	0.02	383	96	35.4	8.8
Excavator	Compost Facility Ops	Linkbelt 210x4	1.06	0.26	0.10	0.02	383	96	35.4	8.8
Forklift	Compost Facility Ops	Cat DP30N	0.19	0.05	0.02	0.00	68	17	6.2	1.6
Loader	Biomass Conversion	Volvo 2016 L90H Wheel Loader	1.06	0.26	0.10	0.02	383	96	35.4	8.8
Forklift	Biomass Conversion	Hyster Electric	0.19	0.05	0.02	0.00	68	17	6.2	1.6
Loader	AD	Volvo 2016 L90H Wheel Loader	1.06	0.26	0.10	0.02	383	96	35.4	8.8
LHD2	Vendor/Delivery	LHD2	5.45	1.36	0.50	0.13	1972	493	182.2	45.6
T6 Public Class 6	Incoming Materials	T6 Public Class 6	0.01	0.00	0.00	0.00	4	1	0.4	0.1
T7 SWCV Class 8 (Diesel)	Material Delivery/Shipment	T7 SWCV Class 8 (Diesel)	14.25	3.56	1.32	0.33	5157	1289	476.5	119.1
T7 SWCV Class 8 (NG)	Material Delivery/Shipment	T7 SWCV Class 8 (NG)	1.82	0.46	0.17	0.04	659	165	60.9	15.2
T7 Tractor Class 8	Onsite Transport	T7 Tractor Class 8	0.83	0.21	0.08	0.02	299	75	27.6	6.9
Total Dust from Equip. On Paved Areas (Lb/Day or Lb/yr)			32.24	8.06	2.98	0.74	11,670.97	2,917.74	1,078.40	269.60

Overall Control Efficiency	91%	
Control for watering	70%	Ref 4, 5
Control for vehicle speed	44%	Ref 6
Control for sweeping	45%	Ref 7

Notes:

1. Methodology per AP-42, 13.2.1 Paved Roads
2. AP-42, 13.2.1 Paved Roads, Table 13.2.1-3
3. CalEEMod, Appendix G_v2022.1.1.3, Table G-2 for Napa Co. Airport lists 38.4 days of > 0.1" precipitation
4. Mojave Desert Air Quality Management District, Emissions Inventory Guidance, Mineral Handling and Processing Industries, April 2010, page 19.
5. U.S. Environmental Protection Agency, Office of Air and Radiation, Office of Air Quality Planning and Standards, Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, EPA-450/2-92-004, September 1992, Table 3-1.
6. Assumes twice daily watering and limiting travel speed to 25 mph; http://www.aqmd.gov/docs/default-source/ceqa/handbook/mitigation-measures-and-control-efficiencies/fugitive-dust/fugitive-dust-table-xi-d.doc?sfvrsn=2.
7. Chow, Judith C., et. al., "Evaluation of Regenerative-air Vacuum Street Sweeping on Geological Contributions to PM10", Journal of the Air & Waste Management Association, published online 06 Mar 2012.

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Table 7: Summary of Emissions

Table 7a: Summary of Daily Criteria Pollutant Emissions

Activity	NOx (lb/day)	POC (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
3. Onroad Vehicle Exhaust	141.42	1.95	48.86	0.67	5.53	2.13
4. Offroad Equipment Exhaust	3.22	0.60	44.41	0.06	0.12	0.12
5. Onroad Vehicle Paved Road Dust	---	---	---	---	2.83	0.71
6. Onsite Paved Dust	---	---	---	---	2.98	0.74
Total	144.64	2.55	93.27	0.73	11.47	3.70

Table 7b: Summary of Annual Criteria Pollutant Emissions

Activity	NOx (lb/yr)	POC (lb/yr)	CO (lb/yr)	SOx (lb/yr)	PM10 (lb/yr)	PM2.5 (lb/yr)
3. Onroad Vehicle Exhaust	51,195.8	707.1	17,689.1	241.6	2003.4	771.7
4. Offroad Equipment Exhaust	1,164.7	217.8	16,075.8	21.5	43.4	43.4
5. Onroad Vehicle Paved Road Dust	---	---	---	---	1026.0	256.5
6. Onsite Paved Dust	---	---	---	---	1078.4	269.6
Total	52,360.5	924.9	33,764.9	263.1	4151.2	1341.2
Total (TPY)	26.18	0.46	16.88	0.13	2.08	0.67

Table 7c: Summary of Annual GHG Emissions

Activity	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/Yr)
3. Onroad Vehicle Exhaust	12,109	1.18E+00	1.90E+00	12,649
4. Offroad Equipment Exhaust	1,028	42	8	1,031
5. Onroad Vehicle Paved Road Dust	---	---	---	---
6. Offroad Unpaved	---	---	---	---
Total	**13,137**	**43**	**10**	**13,680**

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Table 8: Engine Exhaust TAC Emissions (DPM)

Table 8a: Onsite DPM Emissions

Vehicle	PM10 Emissions (lb/hr)	PM10 Emissions (lb/day)	PM10 Emissions (lb/yr)
LHD2	1.60E-04	1.60E-03	0.58
T6 Public Class 6	2.73E-07	2.73E-06	0.00
T7 SWCV Class 8 (Diesel)	1.86E-04	1.86E-03	0.67
T7 Tractor Class 8	2.18E-05	2.18E-04	0.08
Front-end Loader	1.61E-03	1.37E-02	4.95
Front-end Loader	1.61E-03	1.37E-02	4.95
Front-end Loader	1.61E-03	1.37E-02	4.95
Front-end Loader	1.61E-03	1.37E-02	4.95
Front-end Loader	1.61E-03	1.37E-02	4.95
Front-end Loader	1.61E-03	1.37E-02	4.95
Excavator	1.34E-03	1.14E-02	4.12
Forklift	2.60E-04	3.90E-04	0.14
Loader	8.74E-03	1.31E-02	4.74
Forklift (electric)	---	---	---
Loader	8.74E-03	1.31E-02	4.74
Total PM10 = DPM	0.029	0.124	44.782

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Table 9: TAC from Paved Road Dust

Table 9a: Road Dust PM10 Emissions

Source	Onsite (lb/hr)	Onsite (lb/day)	Onsite (lb/yr)
6. Onsite Paved Dust	0.35	2.98	1,078.40
Total	0.35	2.98	1,078.40

Table 9b: TAC from Onsite Paved Road Dust

TAC	Wt. Fraction[1]	TAC Emissions	
		lb/hr	lb/yr
Arsenic	0.000013	4.56E-06	1.40E-02
Cadmium	0.000003	1.05E-06	3.24E-03
Hexavalent Chromium[2]	0.00000085	2.98E-07	9.17E-04
Cobalt	0.000023	8.06E-06	2.48E-02
Copper	0.000148	5.19E-05	1.60E-01
Lead	0.000124	4.35E-05	1.34E-01
Manganese	0.0008	2.80E-04	8.63E-01
Nickel	0.000012	4.21E-06	1.29E-02
Mercury	0.000009	3.15E-06	9.71E-03
Selenium	0.000002	7.01E-07	2.16E-03
Vanadium (Fume Or Dust)	0.000071	2.49E-05	7.66E-02

Notes:

1. CARB speciation profile for Paved Roads (#471), accessed: https://ww2.arb.ca.gov/speciation-profiles-used-carb-modeling
2. Hexavalent chromium is assumed to be 5% of total chromium per SJVAPCD guidance.

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Table 1: NRRP Baseline Throughput and Vehicle Counts

Table 1a: Process Throughput [1]

Processing Step	2-Year Annual Average (TPY)	2-Year Daily Average (TPD)
Feedstock Inbound	105,510	291
Finished Compost Outbound	43,671	121
Wood Chips Outbound to Landfill	16,502	46
Transfer Tons Outbound	25,908	72
MRF Inbound	179,215	495
MRF Outbound	127,048	351

Table 1b: Truck Capacity

Material	Vehicle Description	Capacity (CY)	Material Density (lb/CY)	Capacity (ton/truck)
Greenwaste	Self haul pick-up trucks	4	500	1
Greenwaste	Collection Route Trucks	25	500	6.25
Greenwaste	Transfer Trucks	40	500	10
Wood Chips	Transfer Trucks	30	800	12
Compost	Transfer Trucks	20	800	8
MRF Inbound	Transfer Trucks	See footnote 6		
MRF Outbound	Transfer Trucks	---	---	20

Table 1c: Vehicle Requirements

Processing Step	Baseline Truck Count		Notes
	truck/year	truck/day	
Feedstock Inbound - self haul	24,254	67	1,2,3,8
Feedstock Inbound - Collection Route	26,064	72	1,2,3,8
Feedstock Inbound - Transfer	9,050	25	1,2,3,8
Finished Compost Outbound	5,459	16	1,2,3,8
Wood Chips Outbound to Landfill	1,376	4	4
Transfer Tons Outbound	2,591	8	5
MRF Inbound	14,188	41	6
MRF Outbound	6,352	18	7

Data and Parameters			Comment
Daily Operating Hours	24	hours/day	Project specification
Raw Material Receive Days	362	Day/year	Project specification
Operating Hours - Truck Travel	10	hours/day	Project specification
Operating hours - loader	8.5	Hours/day	Project specification
Operating hours - forklift	1.5	Hours/day	Assumption
Number of Existing Employees	50		NRWS provided
Conversion	2000	lb/ton	Constant
Mass Loss upon digestion	40%		Assumption
Total nBaseline Truck Count	204	truck/day	
Self haul pick-up trucks	41%	of greenwaste inbound	
Collection Route Trucks	44%	of greenwaste inbound	
Transfer Trucks	15%	of greenwaste inbound	

Notes:

1. Feedstock tonnage is reported at 30% moisture by weight.
2. Compost Facility Feedstock includes all materials (CASP feedstock, Transfer Tons, and woodchips, etc.), but does not include MRF.
3. Greenwaste density is used for calculating transportation requirements for inbound materials.
4. Wood chips are landfilled during baseline period (transportation required). Woodchips fed to conversion process for proposed Project (no transportation required).
5. Transfer tons shipped offsite during baseline period (transportation required). Transfer tons fed to AD for proposed Project (no transportation required).
6. Increased capacity trucking requirements, priovided by RCH:

100 tpd / (20 tons/truck) = 5 transport trucks (daily)
140 tpd / (10 tons/truck) = 14 collection trucks (daily)
240 tpd = 19 heavy trucks (daily)

Assume same ratio of small to large trucks for the existing MRF capacity.

42%	20 ton trucks
58%	10 ton trucks

Of the 14 10-ton collection trucks, 47% are assumed to be diesel, 53% are assumed to be NG. This ratio is applied to the baseline and to the proposed Project (not just the increase).

Table 1d: MRF Delivery Vehicle Breakdown

Period	Vehicle	Fuel	Percent of Vehicles	Ton/yr	Truck/year	Ton/day	Truck/day
Baseline	20-ton truck	Diesel	100%	74,673	3734	206.28	11
	10-ton truck	Diesel	47%	49,135	4913	135.73	14
	10-ton truck	NG	53%	55,407	5541	153.06	16

7. MRF is assumed to ship outbound in 20-ton loads.
8. Feedstock truck counts based on 204 average daily trucks m inus the MRF inbound of 41 trucks = 163 trucks per day. 41% of those are self haull, 44% collection vehicles and 15% transfer vehicles.

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Table 2: Onroad Mobile Sources - Vehicle Information

Table 2a: Vehicle Information and Mileage Calculation

Vehicle Type	Vehicle Use	Vehicle Weight (lb)			Days	Average Daily One-way Trips	Annual One-way Trips	Daily Onsite Milage (VMT/day)	Annual Onsite Mileage (VMT/yr)	Daily Offsite Milage (VMT/day)	Annual Offsite Mileage (VMT/yr)	Total Daily Milage (VMT/day)	Total Annual Mileage (VMT/yr)
		Gross	Empty	Average									
LHD2	Feedstock Inbound - self haul	10,500	8,500	9,500	362	134	48,508	21.57	7,809	2,680	970,160	2701.6	977,969
T7 SWCV Class 8 (Diesel)	Feedstock Inbound - Collection Route	45,501	33,001	39,251	362	144	52,128	23.18	8,392	2,880	1,042,560	2903.2	1,050,952
T7 SWCV Class 8 (Diesel)	Feedstock Inbound - Transfer	53,002	33,002	43,002	362	50	18,100	8.05	2,914	1,000	362,000	1008.0	364,914
T7 SWCV Class 8 (Diesel)	Finished Compost Outbound	49,001	33,001	41,001	362	32	10,918	5.15	1,758	640	218,360	645.2	220,118
T7 SWCV Class 8 (Diesel)	Wood Chips Outbound to Landfill	57,001	33,001	45,001	362	8	2,752	1.29	443	160	55,040	161.3	55,483
T7 SWCV Class 8 (Diesel)	Transfer Tons Outbound	35,001	33,001	34,001	362	16	5,182	2.58	834	320	103,640	322.6	104,474
T7 SWCV Class 8 (Diesel)	MRF Inbound	73,001	33,001	53,001	362	22	7,468	3.54	1,202	440	149,360	443.5	150,562
T7 SWCV Class 8 (Diesel)	MRF Inbound	53,001	33,001	43,001	362	28	9,826	4.51	1,582	560	196,520	564.5	198,102
T7 SWCV Class 8 (NG)	MRF Inbound	53,001	33,001	43,001	362	32	11,082	5.15	1,784	640	221,640	645.2	223,424
T7 SWCV Class 8 (Diesel)	MRF Outbound	73,001	33,001	53,001	362	18	6,352	2.90	1,023	360	127,048	362.9	128,071
LDA	Employees[1]	8,500	8,500	8,500	362	100	36,200	0.00	0	2,000	724,000	2000.0	724,000
LHD2	Miscellaneous Business	8,500	8,500	8,500	362	2	724	0.32	117	50	18,100	50.3	18,217
T6 Public Class 6	Fuels	54,000	26,000	40,000	52	2	104	0.32	17	30	1,560	30.3	1,577

Table 2b: Onsite/Offsite Vehicle Usage Information

Vehicle Type	Fuel	Average Daily One-way Trips	One-way Trips per Year	Onsite Total VMT/yr	Offsite Total VMT/yr	Total VMT/yr
LDA	gasoline	100	36,200	0	724,000	724,000
LHD2	diesel	136	49,232	7,926	988,260	996,186
T6 Public Class 6	diesel	2	104	17	1,560	1,577
T7 SWCV Class 8 (Diesel)	diesel	318	112,726	18,147	2,254,528	2,272,675
T7 SWCV Class 8 (NG)	natural gas	32	11,082	1,784	221,640	223,424
T7 Tractor Class 8	diesel	0	0	0	0	0

Data and Parameters

Onsite Travel Distance	850	feet	Google Earth, measured distance NRWS storage to new facilities
Onsite Travel Distance	0.16	miles, one way	Calculated
Number of employees	50	each	Project specification
Employee Travel Distance	20	mile/day, one way	Assumption
Miscellaneous Business	25	mile/day, one way	Assumption
Fuels	15	mile/day, one way	Assumption
Feedstock Shipment	20	miles, one way	Specified
Fuel Load	28,000	lbs	Calculated based on 4,000 gal and 7 lb/gal
Conversion	2,000	lb/ton	

Notes:

1. Employees are assumed not to drive personal vehicles onsite.

Vehicle Definitions

LDA - Light-duty vehicle is a vehicle weight category that includes cars and light trucks that weigh less than 8,500 lbs.

LHD2 - Light Heavy-Duty 2 (GVWR: 10,001 lb to 14,000 lb)

T6 public class 6 - refers to a vehicle with a Gross Vehicle Weight Rating (GVWR) between 19,501 and 26,000 pounds; this is considered a medium-duty truck classification according to the standard vehicle weight classes.

T7 Tractor Class 8 - typically weighs over 33,000 pounds as this is the minimum weight requirement for a Class 8 vehicle according to US truck classifications; meaning it falls into the heavy-duty truck category with a Gross Vehicle Weight Rating (GVWR) exceeding 33,001 pounds.

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Table 3: Onroad Mobile Sources Exhaust Emissions

Table 3a: Onroad Mobile Sources - Criteria Pollutant Exhaust Emissions

Pollutant	Vehicle Type	Running Exhaust EF (g/mile)	Idle EF (g/trip)	Start EF (g/trip)	Total Running Exhaust (lb/yr)	Total Idle (lb/yr)	Total Start (lb/yr)	Total Emissions (lb/yr)	Onsite Emissions (lb/yr)	Offsite Emissions (lb/yr)	Total Exhaust Emissions (lb/day)	Onsite Exhaust Emissions (lb/day)
NOx	LDA	0.039	0.000	0.252	62.58	0.00	20.15	82.73	0.00	82.73	0.229	0.00E+00
	LHD2	1.158	0.146	0.000	2,542.92	15.89	0.00	2,558.81	20.36	2,538.45	7.069	5.62E-02
	T6 Public Class 6	4.360	6.517	1.082	15.16	1.49	0.25	16.90	0.18	16.72	0.047	5.03E-04
	T7 SWCV Class 8 (Diesel)	7.694	8.746	2.120	38,549.98	2,173.55	526.94	41,250.46	329.38	40,921.08	113.952	9.10E-01
	T7 SWCV Class 8 (NG)	1.706	1.287	0.000	840.52	31.44	0.00	871.96	6.96	865.00	2.409	1.92E-02
	T7 Tractor Class 8	1.595	2.756	3.904	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00E+00
POC	LDA	0.008	0.024	0.318	13.03	1.89	25.39	40.31	0.00	40.31	0.111	0.00E+00
	LHD2	0.156	0.000	0.000	341.76	0.00	0.00	341.76	2.72	339.04	0.944	7.51E-03
	T6 Public Class 6	0.065	0.000	0.000	0.23	0.00	0.00	0.23	0.00	0.22	0.001	6.75E-06
	T7 SWCV Class 8 (Diesel)	0.033	0.054	0.000	163.72	13.48	0.00	177.20	1.41	175.78	0.489	3.91E-03
	T7 SWCV Class 8 (NG)	0.083	0.000	0.000	40.75	0.00	0.00	40.75	0.33	40.42	0.113	8.99E-04
	T7 Tractor Class 8	0.015	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00E+00
CO	LDA	0.683	0.000	3.167	1,090.81	0.00	252.75	1,343.56	0.00	1,343.56	3.711	0.00E+00
	LHD2	0.400	0.072	0.000	879.02	7.85	0.00	886.87	7.06	879.82	2.450	1.95E-02
	T6 Public Class 6	0.161	1.419	0.000	0.56	0.33	0.00	0.88	0.01	0.87	0.002	2.63E-05
	T7 SWCV Class 8 (Diesel)	0.085	2.116	0.000	428.05	525.93	0.00	953.98	7.62	946.36	2.635	2.10E-02
	T7 SWCV Class 8 (NG)	18.713	12.775	0.000	9,217.67	312.12	0.00	9,529.78	76.09	9,453.69	26.325	2.10E-01
	T7 Tractor Class 8	0.079	3.481	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00E+00
SOx	LDA	0.003	0.000	0.001	4.28	0.00	0.05	4.34	0.00	4.34	0.012	0.00E+00
	LHD2	0.007	0.000	0.000	15.72	0.02	0.00	15.74	0.13	15.62	0.043	3.46E-04
	T6 Public Class 6	0.012	0.006	0.000	0.04	0.00	0.00	0.04	0.00	0.04	0.000	1.24E-06
	T7 SWCV Class 8 (Diesel)	0.038	0.008	0.000	191.37	1.99	0.00	193.35	1.54	191.81	0.534	4.26E-03
	T7 SWCV Class 8 (NG)	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00E+00
	T7 Tractor Class 8	0.015	0.005	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00E+00
PM10	LDA	0.001	0.000	0.002	2.02	0.00	0.17	2.18	0.00	2.18	0.006	0.00E+00
	LHD2	0.033	0.002	0.000	72.45	0.24	0.00	72.69	0.58	72.12	0.201	1.60E-03
	T6 Public Class 6	0.026	0.011	0.000	0.09	0.00	0.00	0.09	0.00	0.09	0.000	2.73E-06
	T7 SWCV Class 8 (Diesel)	0.014	0.010	0.000	71.52	2.47	0.00	74.00	0.59	73.41	0.204	1.63E-03
	T7 SWCV Class 8 (NG)	0.002	0.000	0.000	1.07	0.00	0.00	1.07	0.01	1.06	0.003	2.36E-05
	T7 Tractor Class 8	0.023	0.001	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00E+00
PM2.5	LDA	0.001	0.000	0.002	1.86	0.00	0.15	2.01	0.00	2.01	0.006	0.00E+00
	LHD2	0.032	0.002	0.000	69.32	0.23	0.00	69.55	0.55	69.00	0.192	1.53E-03
	T6 Public Class 6	0.024	0.011	0.000	0.09	0.00	0.00	0.09	0.00	0.09	0.000	2.61E-06
	T7 SWCV Class 8 (Diesel)	0.014	0.010	0.000	68.43	2.36	0.00	70.79	0.57	70.23	0.196	1.56E-03
	T7 SWCV Class 8 (NG)	0.002	0.000	0.000	0.98	0.00	0.00	0.98	0.01	0.98	0.003	2.17E-05
	T7 Tractor Class 8	0.022	0.001	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00E+00

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NRRP Mobile Source Emission Calculations

Table 3b: Onroad Mobile Sources - Fugitive POC Emissions

Pollutant	Vehicle Type	Hot Soak EF (g/trip)	Running Loss EF (g/trip)	Diurnal EF (g/trip)	Total Hot Soak (lb/yr)	Total Running Loss (lb/yr)	Total Diurnal (lb/yr)	Total Emissions (lb/yr)	Onsite Emissions (lb/yr)	Offsite Emissions (lb/yr)	Total Emissions (lb/day)
POC	LDA	0.09	0.24	0.31	7.3	18.9	24.7	50.90	0.00	50.90	0.14
	LHD2	0.00	0.00	0.00	---	---	---	---	---	---	---
	T6 Public Class 6	0.00	0.00	0.00	---	---	---	---	---	---	---
	T7 SWCV Class 8 (Diesel)	0.00	0.00	0.00	---	---	---	---	---	---	---
	T7 SWCV Class 8 (NG)	0.00	0.00	0.00	---	---	---	---	---	---	---
	T7 Tractor Class 8	0.00	0.00	0.00	---	---	---	---	---	---	---

Table 3c: Onroad Mobile Sources - Fugitive PM Emissions

Pollutant	Vehicle Type	Tire Wear (g/mile)	Brake Wear (g/mile)	Total Tire Wear (lb/yr)	Total Brake Wear (lb/yr)	Total Emissions (lb/yr)	Onsite Emissions (lb/yr)	Offsite Emissions (lb/yr)	Onsite Emissions (lb/day)	Total Emissions (lb/day)
PM10	LDA	0.0080	0.0073	12.77	11.69	24.46	0.00	24.46	0.00E+00	0.068
	LHD2	0.0120	0.0910	26.35	199.86	226.21	1.80	224.41	4.97E-03	0.625
	T6 Public Class 6	0.0120	0.0462	0.04	0.16	0.20	0.00	0.20	6.02E-06	0.001
	T7 SWCV Class 8 (Diesel)	0.0360	0.2100	180.38	1,052.19	1,232.56	9.84	1,222.72	2.72E-02	3.405
	T7 SWCV Class 8 (NG)	0.0360	0.2100	17.73	103.44	121.17	0.97	120.20	2.67E-03	0.335
	T7 Tractor Class 8	0.0360	0.0784	0.00	0.00	0.00	0.00	0.00	0.00E+00	0.000
PM2.5	LDA	0.0020	0.0026	3.19	4.09	7.28	0.00	7.28	0.00E+00	0.020
	LHD2	0.0030	0.0319	6.59	69.95	76.54	0.61	75.93	1.68E-03	0.211
	T6 Public Class 6	0.0030	0.0162	0.01	0.06	0.07	0.00	0.07	1.98E-06	0.000
	T7 SWCV Class 8 (Diesel)	0.0090	0.0735	45.09	368.27	413.36	3.30	410.06	9.12E-03	1.142
	T7 SWCV Class 8 (NG)	0.0090	0.0735	4.43	36.20	40.64	0.32	40.31	8.96E-04	0.112
	T7 Tractor Class 8	0.0090	0.0275	0.00	0.00	0.00	0.00	0.00	0.00E+00	0.000

Table 3d: Summary of Criteria Pollutant Emissions from Onroad Operations Vehicles

Type	NO_x (lb/yr)	POC (lb/yr)	CO (lb/yr)	SO_x (lb/yr)	PM_{10} (lb/yr)	$PM_{2.5}$ (lb/yr)
Exhaust	44780.86	600.24	12715.08	213.47	150.04	143.42
Fugitive	---	50.90	---	---	1604.61	537.88
Total (Lb/Yr)	44780.86	651.13	12715.08	213.47	1754.64	681.31
Total (TPY)	22.39	0.33	6.36	0.11	0.88	0.34

Table 3e: Onroad Mobile Sources - Greenhouse Gas Exhaust Emissions

Pollutant	Vehicle Type	Running Exhaust EF (g/mile)	Idle EF (g/trip)	Start EF (g/trip)	Total Running Exhaust (MT/yr)	Total Idle (MT/yr)	Total Start (MT/yr)	Total Emissions (MT/yr)
CO2	LDA	271.499	0.000	68.869	196.6	0.000	2.5	199
	LHD2	755.564	16.552	0.000	752.7	0.815	0.0	753
	T6 Public Class 6	1217.310	646.023	0.000	1.9	0.067	0.0	2
	T7 SWCV Class 8 (Diesel)	4033.362	845.048	0.000	9,166.5	95.259	0.0	9,262
	T7 SWCV Class 8 (NG)	1571.488	1452.470	0.000	351.1	16.096	0.0	367
	T7 Tractor Class 8	1538.170	569.475	0.000	0.0	0.000	0.0	0
CH4	LDA	2.16E-03	0.00E+00	6.95E-02	1.56E-03	0.00E+00	2.52E-03	4.08E-03
	LHD2	7.23E-03	4.05E-04	0.00E+00	7.20E-03	2.00E-05	0.00E+00	7.22E-03
	T6 Public Class 6	3.03E-03	2.98E-03	0.00E+00	4.77E-06	3.10E-07	0.00E+00	5.08E-06
	T7 SWCV Class 8 (Diesel)	1.52E-03	1.14E-02	0.00E+00	3.45E-03	1.29E-03	0.00E+00	4.74E-03
	T7 SWCV Class 8 (NG)	3.37E+00	2.88E+00	0.00E+00	7.54E-01	3.19E-02	0.00E+00	7.86E-01
	T7 Tractor Class 8	6.81E-04	1.10E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
N2O	LDA	4.47E-03	0.00E+00	3.26E-02	3.23E-03	0.00E+00	1.18E-03	4.41E-03
	LHD2	1.19E-01	2.61E-03	0.00E+00	1.19E-01	1.28E-04	0.00E+00	1.19E-01
	T6 Public Class 6	1.92E-01	1.02E-01	0.00E+00	3.02E-04	1.06E-05	0.00E+00	3.13E-04
	T7 SWCV Class 8 (Diesel)	6.35E-01	1.33E-01	0.00E+00	1.44E+00	1.50E-02	0.00E+00	1.46E+00
	T7 SWCV Class 8 (NG)	3.20E-01	2.96E-01	0.00E+00	7.16E-02	3.28E-03	0.00E+00	7.49E-02
	T7 Tractor Class 8	2.42E-01	8.97E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CO2e	LDA							200
	LHD2							785
	T6 Public Class 6							2
	T7 SWCV Class 8 (Diesel)							9,649
	T7 SWCV Class 8 (NG)							411
	T7 Tractor Class 8							0
							Total	**11,047**

Table 3f: GHG Emissions from Onroad Mobile Source Activity

CO_2	CH_4	N_2O	Total CO_2e
(MT/Yr)	(Kg/Yr)	(Kg/Yr)	(MT/Yr)
10,584	801.62	1,657.49	11,047

Table 3g: Global Warming Potential

Pollutant	GWP
CO2	1
CH4	30
N2O	265

Data and Parameters

Operating days	362	day/yr
Conversion	453.59	gm/lb
Conversion	2000	lb/ton
Conversion	1.00E+06	gm/MT

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Table 4: Offroad Equipment - Criteria Pollutant and GHG Emissions

Table 4a: Emission Factors

Offroad Equipment	Project Element	Typical Model (or Equivalent)	Fuel	Engine Tier and Information			NOx (g/BHp-hr)	POC (g/BHp-hr)	CO (g/BHp-hr)	SOx (g/BHp-hr)	PM10 (g/BHp-hr)	PM2.5 (g/BHp-hr)	CO2 (kg/gal)	CH4 (kg/gal)	N2O (kg/gal)
				Tier	BHp	BSFC (lb/hp-hr)									
Front-end Loader	Compost Facility Ops	John Deere 624 P	Diesel	T4f	192	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Front-end Loader	Compost Facility Ops	John Deere 624 P	Diesel	T4f	192	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Front-end Loader	Compost Facility Ops	John Deere 624 P	Diesel	T4f	192	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Front-end Loader	Compost Facility Ops	John Deere 624 P	Diesel	T4f	192	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Front-end Loader	Compost Facility Ops	John Deere 624 P	Diesel	T4f	192	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Front-end Loader	Compost Facility Ops	John Deere 624 P	Diesel	T4f	192	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Excavator	Compost Facility Ops	Linkbelt 210x4	Diesel	T4f	160	0.3627	0.26	0.05	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05
Forklift	Compost Facility Ops	Cat DP30N	Diesel	T4f	59	0.3627	2.74	0.09	3.7	0.005	0.01	0.01	10.206	4.14E-04	8.28E-05

Table 4b: Total Daily Criteria Pollutant Emissions from Offroad Equipment

Offroad Equipment	Project Element	Typical Model (or Equivalent)	Engine Characteristics				Criteria Pollutant Exhaust Emissions (lb/day)					
			BHp	Op Load[1]	Hr/Day	Hr/Yr	NOx	POC	CO	SOx	PM10	PM2.5
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.50	3,077	0.36	0.07	5.06	0.01	0.01	0.01
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.50	3,077	0.36	0.07	5.06	0.01	0.01	0.01
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.50	3,077	0.36	0.07	5.06	0.01	0.01	0.01
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.50	3,077	0.36	0.07	5.06	0.01	0.01	0.01
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.50	3,077	0.36	0.07	5.06	0.01	0.01	0.01
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.50	3,077	0.36	0.07	5.06	0.01	0.01	0.01
Excavator	Compost Facility Ops	Linkbelt 210x4	160	0.38	8.50	3,077	0.30	0.06	4.22	0.01	0.01	0.01
Forklift	Compost Facility Ops	Cat DP30N	59	0.20	1.50	543	0.11	0.00	0.14	0.00	0.00	0.00
Total Emissions from offroad equipment (lb/day)							2.54	0.47	34.71	0.05	0.09	0.09

Table 4c: Total Annual Criteria Pollutant Emissions from Offroad Equipment

Offroad Equipment	Project Element	Typical Model (or Equivalent)	Engine Characteristics				Criteria Pollutant Exhaust Emissions (lb/yr)					
			BHp	Op Load[1]	Hr/Day	Hr/Yr	NOx	POC	CO	SOx	PM10	PM2.5
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.5	3077	128.68	24.75	1831.26	2.44	4.95	4.95
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.5	3077	128.68	24.75	1831.26	2.44	4.95	4.95
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.5	3077	128.68	24.75	1831.26	2.44	4.95	4.95
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.5	3077	128.68	24.75	1831.26	2.44	4.95	4.95
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.5	3077	128.68	24.75	1831.26	2.44	4.95	4.95
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	0.38	8.5	3077	128.68	24.75	1831.26	2.44	4.95	4.95
Excavator	Compost Facility Ops	Linkbelt 210x4	160	0.38	8.5	3077	107.24	20.62	1526.05	2.04	4.12	4.12
Forklift	Compost Facility Ops	Cat DP30N	59	0.2	1.5	543	38.71	1.27	52.27	0.07	0.14	0.14
Total Emissions from offroad equipment (lb/yr)							918.04	170.37	12565.89	16.77	33.96	33.96

Table 4d: Offroad Equipment - GHG Emissions[2]

Offroad Equipment	Project Element	Typical Model (or Equivalent)	Engine Information				Fuel (gal/yr)	CO2 (MT/yr)	CH4 (kg/yr)	N2O (kg/yr)	CO2e (MT/Yr)
			BHp	Operating Hours	BSFC (lb/hp-hr)	Op Load[1]					
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	3077	0.3627	0.38	11,468.19	117	4.75	0.95	117
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	3077	0.3627	0.38	11,468.19	117	4.75	0.95	117
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	3077	0.3627	0.38	11,468.19	117	4.75	0.95	117
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	3077	0.3627	0.38	11,468.19	117	4.75	0.95	117
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	3077	0.3627	0.38	11,468.19	117	4.75	0.95	117
Front-end Loader	Compost Facility Ops	John Deere 624 P	192	3077	0.3627	0.38	11,468.19	117	4.75	0.95	117
Excavator	Compost Facility Ops	Linkbelt 210x4	160	3077	0.3627	0.38	9,556.82	98	3.96	0.79	98
Forklift	Compost Facility Ops	Cat DP30N	59	543	0.3627	0.2	327.31	3	0.14	0.03	3
Total GHG Exhaust Emissions from Equipment								803	33	7	806

Table 4e: Brake Specific Fuel Consumption (BSFC) Conversion - Diesel

Parameter	Value	Unit of Measure	Basis
BSFC	7000	btu/hp-hr	Per EPA AP-42 Table 3,3-1, Footnote a
Heat Content	19,300	btu/lb	SDS
BSFC	0.3627	lb/hp-hr	calculated

Table 4f: Conversion of ppm S to gm/BHp-hr

Parameter	Value	Unit of Measure	Basis
Sulfur concentration	15	ppmw	Diesel Specification
BSFC	0.3627	lb/hp-hr	Calculated in Table 4e
Conversion	1,000,000		
Conversion	453.9	gm/lb	Constant
Molecular Wt. Conversion	2	unitless	Ratio of molecular weight of SO2 (64 lb/mol) to S (32 lb/mol)
Sulfur content	0.005	gm/Bhp-hr	Calculated

Table 4g: GWP[2]

Pollutant	GWP
CO2	1
CH4	30
N2O	265

Table 4h: CO2 Emission Factors[2]

Fuel	HHV (MMBtu/gal)	Default CO2 EF (kg CO2/MMBtu)	CO2 EF (kg/gal)	Default CH4 EF (kg/MMBtu)	CH4 EF (kg/gal)	Default N2O EF (kg/MMBtu)	N2O EF (kg/gal)
Diesel	0.138	73.96	10.20648	3.00E-03	4.14E-04	6.00E-04	8.28E-05
Gasoline	0.125	70.22	8.7775	3.00E-03	3.75E-04	6.00E-04	7.50E-05

Data and Parameters

Operating Days	362	day/yr
Conversion	453.59	gram/lb
Conversion	1000000	gm/MT
Conversion	1000	Kg/MT
Conversion	1000	gram/Kg
Fuel Density Diesel	7.1	lb/gal

Notes:

1. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 3.3.
2. Ref: 40 CFR 98, Subpart C, Tables C-1 and C-2

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Table 5: Onroad Offsite Mobile Source Paved Road Dust

Table 5a: Paved Road PM_{10} Emission Factors[1]

Vehicle	Average Vehicle Weight (ton)	Pollutant	Freeway (lb/VMT)	Major (lb/VMT)	Collector (lb/VMT)	Local (lb/VMT)
		sL (g/m^2)^2 -->	0.020	0.035	0.035	0.320
Fleet Average	2.40	PM10	1.49E-04	2.48E-04	2.48E-04	1.86E-03
		PM2.5	3.72E-05	6.20E-05	6.20E-05	4.64E-04

$$E = k\,(sL)^{0.91} \times (W)^{1.02} * C_f$$

Variable	Value	UOM
k (PM10)	1.00	g/VMT
k(PM2.5)	0.25	g/VMT
Rain Days[3]	38.4	day/yr
C_f	0.974	

Table 4b: Fraction of VMT by Functional Type of Roadway[2]

Freeway	Major	Collector	Local
33.25%	38.97%	27.59%	0.19%

Table 5c: Summary of Onroad VMT by Phase and Road Type

EMFAC Vehicle Type	Activity	Unit of Measure	Freeway	Major	Collector	Local	Total VMT
LDA	Employees	VMT/day	665.0	779.4	551.8	3.8	2000.0
		VMT/Yr	240730.0	282142.8	199751.6	1375.6	724000.0
LHD2	Vendor/Delivery	VMT/day	907.7	1063.9	753.2	5.2	2730.0
		VMT/Yr	328596.5	385124.9	272660.9	1877.7	988260.0
T6 Public Class 6	Fuel Delivery	VMT/day	1.4	1.7	1.2	0.0	4.3
		VMT/Yr	518.7	607.9	430.4	3.0	1560.0
T7 SWCV Class 8 (Diesel)	Material Delivery/Shipment	VMT/day	2070.8	2427.0	1718.3	11.8	6228.0
		VMT/Yr	749630.6	878589.6	622024.3	4283.6	2254528.0
T7 SWCV Class 8 (NG)	Material Delivery/Shipment	VMT/day	203.6	238.6	168.9	1.2	612.3
		VMT/Yr	73695.3	86373.1	61150.5	421.1	221640.0
T7 Tractor Class 8	Onsite Transport	VMT/day	0.0	0.0	0.0	0.0	0.0
		VMT/Yr	0.0	0.0	0.0	0.0	0.0

Table 5d: Entrained Road Dust Emissions from Travel on Paved Roads (lb/day)

EMFAC Vehicle Type	Activity	Pollutant	Freeway	Major	Collector	Local	Total
LDA	Employees	PM10	9.91E-02	1.93E-01	1.37E-01	7.06E-03	4.36E-01
		PM2.5	2.48E-02	4.83E-02	3.42E-02	1.76E-03	1.09E-01
LHD2	Vendor/Delivery	PM10	1.35E-01	2.64E-01	1.87E-01	9.63E-03	5.95E-01
		PM2.5	3.38E-02	6.59E-02	4.67E-02	2.41E-03	1.49E-01
T6 Public Class 6	Fuel Delivery	PM10	2.13E-04	4.16E-04	2.95E-04	1.52E-05	9.40E-04
		PM2.5	5.34E-05	1.04E-04	7.37E-05	3.80E-06	2.35E-04
T7 SWCV Class 8 (Diesel)	Material Delivery/Shipment	PM10	3.09E-01	6.02E-01	4.26E-01	2.20E-02	1.36E+00
		PM2.5	7.71E-02	1.50E-01	1.06E-01	5.49E-03	3.40E-01
T7 SWCV Class 8 (NG)	Material Delivery/Shipment	PM10	3.03E-02	5.92E-02	4.19E-02	2.16E-03	1.34E-01
		PM2.5	7.58E-03	1.48E-02	1.05E-02	5.40E-04	3.34E-02
T7 Tractor Class 8	Onsite Transport	PM10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		PM2.5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	All	PM10	0.57	1.12	0.79	0.04	2.52
		PM2.5	0.14	0.28	0.20	0.01	0.63

Table 5e: Entrained Road Dust Emissions from Travel on Paved Roads (lb/yr)

EMFAC Vehicle Type	Activity	Pollutant	Freeway	Major	Collector	Local	Total
LDA	Employees	PM10	35.86	69.94	49.52	2.55	157.88
		PM2.5	8.97	17.49	12.38	0.64	39.47
LHD2	Vendor/Delivery	PM10	48.95	95.47	67.59	3.49	215.51
		PM2.5	12.24	23.87	16.90	0.87	53.88
T6 Public Class 6	Incoming Materials	PM10	0.08	0.15	0.11	0.01	0.34
		PM2.5	0.02	0.04	0.03	0.00	0.09
T7 SWCV Class 8 (Diesel)	Material Delivery/Shipment	PM10	111.68	217.81	154.20	7.96	491.64
		PM2.5	27.92	54.45	38.55	1.99	122.91
T7 SWCV Class 8 (NG)	Material Delivery/Shipment	PM10	10.98	21.41	15.16	0.78	48.33
		PM2.5	2.74	5.35	3.79	0.20	12.08
T7 Tractor Class 8	Onsite Transport	PM10	0.00	0.00	0.00	0.00	0.00
		PM2.5	0.00	0.00	0.00	0.00	0.00
Total	All	PM10	207.55	404.79	286.58	14.79	913.71
		PM2.5	51.89	101.20	71.65	3.70	228.43

Notes:

1. Methodology per AP-42, 13.2.1 Paved Roads

2. SJVAPCD, Appendix A: Comments and Responses Rule 9510 and 3180 December 15, 2005; also Proposed Revisions to AP-42 Chapter 13.2, accessed at: https://www.google.com/search?q=PROPOSED+REVISIONS+TO+ROADWAY+FUGITIVE+DUST+ESTIMATIONS+USING+AP-42+CHAPTER+13&rlz=1C1GCEU_enUS909US909&oq=PROPOSED+REVISIONS+TO+ROADWAY+FUGITIVE+DUST+ESTIMATIONS+USING++AP-42+CHAPTER+13&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIGCAEQRRg80gEJMjYyMGowajE1qAIAsAIA&sourceid=chrome&ie=UTF-8

3. CalEEMod, Appendix G_v2022.1.1.3, Table G-2 for Napa County Airport lists 38.4 days of >0.1" precipitation

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Table 6: Onsite Mobile Source Paved Road Dust

Table 6a: Paved Road PM_{10} Emission Factors[1]

Vehicle	Average Vehicle Weight (ton)	Pollutant	Emission Factor (lb/VMT)
Fleet Average	16.39	PM10	2.30E-01
		PM2.5	5.74E-02

$$E = k\,(sL)^{0.91} \times (W)^{1.02} * C_f$$

Variable	Value	UOM
k (PM10)	1.00	g/VMT
k(PM2.5)	0.25	g/VMT
Rain Days[3]	38.4	day/yr
C_f	0.974	---
Silt Loading[2]	7.4	g/m^2

Table 6b: Onsite Equipment Operating Hours and VMT

Equipment Description and Use			Operating Hours (hr/day)	Operating Hours (hr/yr)	Ave. Speed (MPH)	Total Travel (VMT/day)	Total Travel (VMT/yr)
Front-end Loader	Compost Facility Ops	John Deere 624 P	8.5	3,077	0.5	4.3	1,539
Front-end Loader	Compost Facility Ops	John Deere 624 P	8.5	3,077	0.5	4.3	1,539
Front-end Loader	Compost Facility Ops	John Deere 624 P	8.5	3,077	0.5	4.3	1,539
Front-end Loader	Compost Facility Ops	John Deere 624 P	8.5	3,077	0.5	4.3	1,539
Front-end Loader	Compost Facility Ops	John Deere 624 P	8.5	3,077	0.5	4.3	1,539
Front-end Loader	Compost Facility Ops	John Deere 624 P	8.5	3,077	0.5	4.3	1,539
Excavator	Compost Facility Ops	Linkbelt 210x4	8.5	3,077	0.5	4.3	1,539
Forklift	Compost Facility Ops	Cat DP30N	1.5	543	0.5	0.8	272

Napa Recycling and Waste Services
NRRP Mobile Source Emission Calculations

Table 6c: Summary of Onroad VMT

EMFAC Vehicle Type	Activity	VMT/day	VMT/Yr
LHD2	Vendor/Delivery	21.90	7926
T6 Public Class 6	Incoming Materials	0.05	17
T7 SWCV Class 8 (Diese	Material Delivery/Shipment	50.13	18147
T7 SWCV Class 8 (NG)	Material Delivery/Shipment	4.93	1784
T7 Tractor Class 8	Onsite Transport	0.00	0

Table 6d: Onroad and Offroad Equipment Paved Road Dust Emissions

Equipment Description and Use			Uncontrolled (lb/day)		Controlled (lb/day)		Uncontrolled (lb/yr)		Controlled (lb/yr)	
			PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Front-end Loader	Compost Facility Ops	John Deere 624 P	0.98	0.24	0.09	0.02	353	88	32.7	8.2
Front-end Loader	Compost Facility Ops	John Deere 624 P	0.98	0.24	0.09	0.02	353	88	32.7	8.2
Front-end Loader	Compost Facility Ops	John Deere 624 P	0.98	0.24	0.09	0.02	353	88	32.7	8.2
Front-end Loader	Compost Facility Ops	John Deere 624 P	0.98	0.24	0.09	0.02	353	88	32.7	8.2
Front-end Loader	Compost Facility Ops	John Deere 624 P	0.98	0.24	0.09	0.02	353	88	32.7	8.2
Front-end Loader	Compost Facility Ops	John Deere 624 P	0.98	0.24	0.09	0.02	353	88	32.7	8.2
Excavator	Compost Facility Ops	Linkbelt 210x4	0.98	0.24	0.09	0.02	353	88	32.7	8.2
Forklift	Compost Facility Ops	Cat DP30N	0.17	0.04	0.02	0.00	62	16	5.8	1.4
LHD2	Vendor/Delivery	LHD2	5.03	1.26	0.46	0.12	1821	455	168.2	42.1
T6 Public Class 6	Incoming Materials	T6 Public Class 6	0.01	0.00	0.00	0.00	4	1	0.4	0.1
T7 SWCV Class 8 (Diese	Material Delivery/Shipment	T7 SWCV Class 8 (Diesel)	11.51	2.88	1.06	0.27	4168	1042	385.2	96.3
T7 SWCV Class 8 (NG)	Material Delivery/Shipment	T7 SWCV Class 8 (NG)	1.13	0.28	0.10	0.03	410	102	37.9	9.5
T7 Tractor Class 8	Onsite Transport	T7 Tractor Class 8	0.00	0.00	0.00	0.00	0	0	0.0	0.0
Total Dust from Equip. On Paved Areas (Lb/Day or Lb/yr)			24.69	6.17	2.28	0.57	8,938.87	2,234.72	825.95	206.49

Overall Control Efficiency	91%	
Control for watering	70%	Ref 4, 5
Control for vehicle speed	44%	Ref 6
Control for sweeping	45%	Ref 7

Notes:

1. Methodology per AP-42, 13.2.1 Paved Roads
2. AP-42, 13.2.1 Paved Roads, Table 13.2.1-3
3. CalEEMod, Appendix G_v2022.1.1.3, Table G-2 for Napa Co. Airport lists 38.4 days of > 0.1" precipitation
4. Mojave Desert Air Quality Management District, Emissions Inventory Guidance, Mineral Handling and Processing Industries, April 2010, page 19.
5. U.S. Environmental Protection Agency, Office of Air and Radiation, Office of Air Quality Planning and Standards, Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, EPA-450/2-92-004, September 1992, Table 3-1.
6. Assumes twice daily watering and limiting travel speed to 25 mph; http://www.aqmd.gov/docs/default-source/ceqa/handbook/mitigation-measures-and-control-efficiencies/fugitive-dust/fugitive-dust-table-xi-d.doc?sfvrsn=2.
7. Chow, Judith C., et. al., "Evaluation of Regenerative-air Vacuum Street Sweeping on Geological Contributions to PM10", Journal of the Air & Waste Management Association, published online 06 Mar 2012.

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Table 7: Summary of Emissions

Table 7a: Summary of Daily Criteria Pollutant Emissions

Activity	NOx (lb/day)	POC (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
3. Onroad Vehicle Exhaust	123.70	1.80	35.12	0.59	4.85	1.88
4. Offroad Equipment Exhaust	2.54	0.47	34.71	0.05	0.09	0.09
5. Onroad Vehicle Paved Road Dust	---	---	---	---	2.52	0.63
6. Onsite Paved Dust	---	---	---	---	2.28	0.57
Total	126.24	2.27	69.84	0.64	9.75	3.18

Table 7b: Summary of Annual Criteria Pollutant Emissions

Activity	NOx (lb/yr)	POC (lb/yr)	CO (lb/yr)	SOx (lb/yr)	PM10 (lb/yr)	PM2.5 (lb/yr)
3. Onroad Vehicle Exhaust	44,780.9	651.1	12,715.1	213.5	1754.6	681.3
4. Offroad Equipment Exhaust	918.0	170.4	12,565.9	16.8	34.0	34.0
5. Onroad Vehicle Paved Road Dust	---	---	---	---	913.7	228.4
6. Onsite Paved Dust	---	---	---	---	826.0	206.5
Total	45,698.9	821.5	25,281.0	230.2	3528.3	1150.2
Total (TPY)	22.85	0.41	12.64	0.12	1.76	0.58

Table 7c: Summary of Annual GHG Emissions

Activity	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/Yr)
3. Onroad Vehicle Exhaust	10,584	8.02E-01	1.66E+00	11,047
4. Offroad Equipment Exhaust	803	33	7	806
5. Onroad Vehicle Paved Road Dust	---	---	---	---
6. Offroad Unpaved	---	---	---	---
Total	**11,387**	**33**	**8**	**11,853**

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Table 8: Engine Exhaust TAC Emissions

Table 8a: Onsite DPM Emissions

Vehicle	PM10 Emissions (lb/hr)	PM10 Emissions (lb/day)	PM10 Emissions (lb/yr)
LHD2	1.60E-04	1.60E-03	0.58
T6 Public Class 6	2.73E-07	2.73E-06	0.00
T7 SWCV Class 8 (Diesel)	1.63E-04	1.63E-03	0.59
T7 Tractor Class 8	0.00E+00	0.00E+00	0.00
Front-end Loader	1.61E-03	1.37E-02	4.95
Front-end Loader	1.61E-03	1.37E-02	4.95
Front-end Loader	1.61E-03	1.37E-02	4.95
Front-end Loader	1.61E-03	1.37E-02	4.95
Front-end Loader	1.61E-03	1.37E-02	4.95
Front-end Loader	1.61E-03	1.37E-02	4.95
Excavator	1.34E-03	1.14E-02	4.12
Forklift	2.60E-04	3.90E-04	0.14
Total PM10 = DPM	0.007	0.058	20.97

Notes:

1. SJVAPCD, AB 2588 “Hot Spots” Air Toxics Profiles, March 27, 2017, District Toxic

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Table 9: TAC from Paved Road Dust

Table 9a: Road Dust PM10 Emissions

Source	Onsite (lb/hr)	Onsite (lb/day)	Onsite (lb/yr)
6. Onsite Paved Dust	0.27	2.28	825.95
Total	0.27	2.28	825.95

Table 9b: TAC from Onsite Paved Road Dust

TAC	Wt. Fraction[1]	TAC Emissions	
		lb/hr	lb/yr
Arsenic	0.000013	3.49E-06	1.07E-02
Cadmium	0.000003	8.05E-07	2.48E-03
Hexavalent Chromium[2]	0.00000085	2.28E-07	7.02E-04
Cobalt	0.000023	6.17E-06	1.90E-02
Copper	0.000148	3.97E-05	1.22E-01
Lead	0.000124	3.33E-05	1.02E-01
Manganese	0.0008	2.15E-04	6.61E-01
Nickel	0.000012	3.22E-06	9.91E-03
Mercury	0.000009	2.42E-06	7.43E-03
Selenium	0.000002	5.37E-07	1.65E-03
Vanadium (Fume Or Dust)	0.000071	1.91E-05	5.86E-02

Notes:

1. CARB speciation profile for Paved Roads (#471), accessed: https://ww2.arb.ca.gov/speciation-profiles-used-carb-modeling
2. Hexavalent chromium is assumed to be 5% of total chromium per SJVAPCD guidance.

ATTACHMENT 3 – BIOMASS CONVERSION EMISSION CALCULATION WORKSHEETS

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Table 1: Biomass Conversion Process Throughput

Table 1a: Process Throughput

Processing Step	Annual Throughput (TPY)	Maximum Daily Throughput[2] (TPD)
Feedstock[1]	15,960	53
Biochar	3,273	11

Data and Parameters

Daily Operating Hours	24	hours/day
Raw Material Receive Days	362	Day/year
Operating hours	9	Hours/day

Note:

1. Feedstock tonnage is reported at 30% moisture by weight.
2. Maximum daily throughput is estimated as 120% of average daily throughput to allow for fluctuations in daily operations.

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Table 2: Material Handling PM Emissions

Table 2a: Material Handling PM Emission Factors

Variable	Value		Note
	PM10	PM2.5	
Particle Size Multiplier (dimensionless)	0.35	0.053	1
Mean Wind Speed (MPH)	3.60	3.60	2
Material Moisture Content (%)	4.80	4.80	1
Emission Factor (lb/ton/drop point)	2.15E-04	3.25E-05	calculated

Table 2b: Material Handling PM Emissions

Process Step	Annual Throughput (ton/yr)	Peak Daily Throughput (ton/day)	No. of Drop Points	Annual Emissions (lb/yr)		Daily Emissions (lb/day)		Hourly Emissions (lb/hr)	
				PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Feedstock	15,960	53	2	6.85	1.04	2.27E-02	3.44E-03	2.52E-03	3.82E-04
Grinding	15,960	53	2	6.85	1.04	2.27E-02	3.44E-03	2.52E-03	3.82E-04
Load Dryer	15,960	53	2	6.85	1.04	2.27E-02	3.44E-03	9.46E-04	1.43E-04
Load Material into Biomass Gasification Process[3]	12,768	42	1	2.74	0.41	9.08E-03	1.37E-03	3.78E-04	5.73E-05
Biochar Storage	3,273	11	2	1.40	0.21	4.66E-03	7.05E-04	5.17E-04	7.83E-05
Truck Loadout	3,273	11	1	0.70	0.11	2.33E-03	3.52E-04	2.59E-04	3.92E-05
			Total	25.39	3.84	0.084	0.013	0.007	0.001
			Total (TPY)	0.01	0.00				

Data and Parameters

Operating Schedule: Dryer, Conversion	24	hr/day
Operating schedule: Feedstock, Biochar, Loadout	9	
Moisture mass loss upon drying[3]	20%	

Notes:

1. AP-42, Chapter 13.2.4 Aggregate Handling and Storage Piles. Moisture content used is the maximum allowed by the method. Actual moisture content will be higher, thus these emission factors are conservative (i.e., will tend to over-estimate emissions).
2. CalEEMod User Guide, Appendix G Default Data Tables, Table G-1 (Napa Airport), 2021.
3. There will be a 20% mass loss upon drying - raw feedstock to dryer is 30% moisture, dried material is no more than 10% moisture.

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Table 3: Grinding Emissions

Table 3a: Grinding Emission Factors[1,2]

Process Operation	Value (lb/ton)		
	PM10	PM2.5	POC
Grinding	0.0144	0.002	0.005

Table 3b: Grinding Emissions

Operation	Annual Throughput (ton/yr)	Peak Daily Throughput (ton/day)	Annual Emissions (lb/yr)			Daily Emissions (lb/day)			Hourly Emissions (lb/hr)		
			PM10	PM2.5	POC	PM10	PM2.5	POC	PM10	PM2.5	POC
Grinding	15960	53	115	16	80	0.38	0.05	0.26	0.04	0.01	0.03
		Total (TPY)	0.0575	0.0080							

Data and Parameters

Operating Hours	9	hrs/day
Watering control	50%	Ref. 3

Notes:

1. The PM10 and PM2.5 emission factors for grinding are based on guidance provided in the BAAQMD permit manual for wood grinders, which is derived from the since de-listed EPA emission factor for "log debarking". EPA Chapter 10.9 currently lists debarking as "non-detect;" however, emission factors from previous versions are still available in EPA's archive.
2. POC emission factor based on AP-42, Section 10.6.4 Hardboard and Fiberboard Manufacturing (EPA 2002).
3. Mojave Desert Air Quality Management District, Emissions Inventory Guidance, Mineral Handling and Processing Industries, Material Handling Table 6, April.

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Table 4: Drying Emissions

Table 4a: Drying POC Emissions

Operation	Annual Throughput (ton/yr)	Peak Daily Throughput (ton/day)	POC Emission Factor[1] (lb/ton)	Annual Emissions (lb/yr)	Peak Daily Emissions (lb/day)	Peak Hourly Emissions (lb/hr)
Drying	15,960	53	0.494	7,878	26.115	1.088
		Total (TPY)		3.94		

Table 4b: Drying PM10 Emissions

Operation	Airflow per Bunker (m^3/hr)	Number of Bunkers (each)	Total Dust Concentration (mg/m^3)	Annual Emissions (lb/yr)	Peak Daily Emissions (lb/day)	Peak Hourly Emissions (lb/hr)
Drying	30,000	3	0.34	592	1.62	0.07

Data and Parameters

Operating Hours	24	hr/day	
Emission Factor (TSP)	0.643333333	mg/m3	Ref: Syncraft Study, Date: 10/24/2023
PM10 fraction of TSP	52.9	%	Ref: AP-42, Appendix B-1, Table 10.5
Emission Factor PM10	0.340323333	mg/m3	Calculated
Operating Hours	8760	hr/yr	
Conversion	1000	mg/gram	
Conversion	453.59	gram/lb	

Notes:

1. Emission factor calculated per ODEQ equation for western red cedar: 0.0107(T)-1.3789 = lb POC per mbf
2. Assuming negligible PM2.5 emissions from wood drying

POC EF =	0.5043	lb POC per mbf
Dryer Temperature	176	°F
1 bf =	144	in^3
mbf =	144000	in^3
mbf =	83.33	ft^3
Density wood =	25	lb/ft^3
mbf =	2083.33	lb
mbf =	1.04	ton
POC EF =	0.4936	lb/ton

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Table 5: Fuel Gas Composition Properties Calculation Tool

Component Gas	Chemical Formula	nC	nH	Molecular Weight	Boiling Point (°F)	HHV (BTU/scf)	HHV (mmBTU/ mole)	Fuel Gas Composition					Stack Gas CO_2 Content		
								Volume %	mole fract.	lb/mole	Weight %	BTU/scf	lb/mole	lb/mmBTU	lb/mmBTU
Hydrogen	H_2	0	2	2.016	-423.200	324.084	0.123	19	0.1900	0.383	1.517	61.58	0.00	0.00	0.00
Nitrogen	N_2	0	0	28.014	-320.40	0	0.000	43.75	0.4375	12.256	48.551	0.00	0.00	0.00	0.00
Oxygen	O_2	0	0	31.998	-297.40	0	0.000		0.0000	0.000	0.000	0.00	0.00	0.00	0.00
Carbon Dioxide	CO_2	1	0	44.009	-109.30	0	0.000	16	0.1600	7.041	27.894	0.00	44.01	0.00	*121.98*
Carbon Monoxide	CO	1	0	28.010	-312.70	321	0.122	18	0.1800	5.042	19.972	57.72	44.01	361.62	65.09
Methane	CH_4	1	4	16.043	-258.69	1,010	0.383	3.25	0.0325	0.521	2.065	32.82	44.01	114.85	3.73
Ethane	C_2H_6	2	6	30.070	-127.48	1,769	0.671		0.0000	0.000	0.000	0.00	88.02	131.12	0.00
Propane	C_3H_8	3	8	44.097	-43.67	2,518	0.955		0.0000	0.000	0.000	0.00	132.03	138.19	0.00
Iso-Butane	C_4H_{10}	4	10	58.124	10.90	3,253	1.234		0.0000	0.000	0.000	0.00	176.04	142.61	0.00
N-Butane	C_4H_{10}	4	10	58.124	31.10	3,262	1.238		0.0000	0.000	0.000	0.00	176.04	142.20	0.00
Iso-Pentane	C_5H_{12}	5	12	72.151	82.12	4,000	1.518		0.0000	0.000	0.000	0.00	220.05	144.95	0.00
N-Pentane	C_5H_{12}	5	12	72.151	96.92	4,010	1.522		0.0000	0.000	0.000	0.00	220.05	144.61	0.00
Hexane (C6+)	C_6H_{14}	6	14	86.178	155.72	4,756	1.805		0.0000	0.000	0.000	0.00	264.05	146.29	0.00
Total Reduced S	S	0	0	32.064		333	0.126		0.0000	0.000	0.000	0.00	0.00	0.00	0.00
Hydrogen Sulfide	H_2S	0	2	34.080		637	0.242		0.0000	0.000	0.000	0.00	0.00	0.00	0.00
TOTALS								**100.0000**	**1.000**	**25.24**	**100.00**	**152.11**			**190.80**

Ref: J.H. Gary & G.E Hendwerk, Petroleum Refining - Technology & Economics, Appendix B, 2nd Edition, Marcel Dekker, New York, 1984. (all published values at 60°F = 520 °R)

Fuel Gas Standard Molar Volume (reference)		
Standard Temperature	60	°F (choose from list)
Standard Temperature	15.56	°C
Gas Constant	0.082057338	L atm K^{-1} mol^{-1}
Standard Molar Volume	23.691	liter/g-mole
	379.5	**dscf/lb-mole**

Calculated GHG Emission Factor (CO_2e)	
Biogas	Fuel Gas Type (choose from list)
190.80	lb CO_2/mmBTU (calculated from composition)
0.00705	lb CH_4/mmBTU (40 CFR 98 Table C-2)
0.00139	lb N_2O/mmBTU (40 CFR 98 Table C-2)
191.37	**lb CO_2e/mmBTU (IPCC 2014 AR5 GWPs)**

Higher Heating Values (HHV)	
152.1	**BTU/scf**
25.24	MW, lb/lb-mole
2,287	**BTU/lb**
0.058	mmBTU/mole

Dry Fd Factor Calculation - EPA Method 19 (68°F) - Weight Percent Basis

Stack Gas Component	K Factor, scf/lb	H_2	N_2	O_2	CO_2	CO	CH_4	C_2H_6	C_3H_8	C_4H_{10}	C_5H_{12}	C_6H_{14}	S
Carbon	1.53	—	—	—	—	13.104	2.366	0.000	0.000	0.000	0.000	0.000	—
Hydrogen (dry)	3.64	5.523	—	—	—	—	1.890	0.000	0.000	0.000	0.000	0.000	—
Carbon Dioxide	0.321	—	—	—	8.954	—	—	—	—	—	—	—	—
Nitrogen	0.14	—	6.797	—	—	—	—	—	—	—	—	—	—
Oxygen	0.46	—	—	0.000	—	5.248	—	—	—	—	—	—	—
Sulfur	0.57	—	—	—	—	—	—	—	—	—	—	—	0.000

Dry Fd Factor Result	
∑ Components, dscf/lb	43.881
K, BTU/mmBTU	1.00E+06
GCV (HHV), BTU/lb	2,287
Fd, dscf/mmBTU @ 68 °F	**19,190**
Fd, dscf/mmBTU @ Temp	**18,899**

40 CFR 98 Table C-2 (lb/mmBTU) & IPCC 2014 GWPs				
AR5 GWP	**1**	**28**	**265**	**Default**
Fuel Type	**DF CO_2**	**CH_4**	**N_2O**	**CO_2e**
Natural Gas	116.89	0.00220	0.00022	117.01
Biogas	114.80	0.00705	0.00139	115.36
LPG	138.85	0.00661	0.00132	139.38

gas	prime	dup	avg
N_2	15.2	15.3	15.25
O_2	0.543	0.529	0.536
CO_2	35.6	36.5	36.05
CH_4	48.6	47.6	48.1
TRS	0.0007859	0.000727	0.0007565

Composition Data Source: E-mail from Julius Prikbauer, Syncraft, dated 3/31/2025

- Our syngas composition:
  - CH4 = 1,5-5%
  - H2 = 18-20%
  - CO = 16-20%
  - CO2 = 12 - 18%
  - H2O = saturated @ ~35°C 95°F
  - N2 = rest

Notes:

F-factor and heating value based on average concentration of each constitutent.

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Table 6: Engine Criteria Pollutant Emission Calculations - Normal Operations

Table 6a: IC Engine Criteria Pollutant Emission Calculations - Normal Operations

Pollutant	Emission Factor[1] (ppm)	Emission Factor (g/BHp-hr)	Emission Factor (lb/MMBtu)	One Engine			Three Engines		
				Hourly Emissions (lb/hr)	Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)	Daily Emissions (lb/day)	Annual Emissions (lb/yr)
NOx	9	0.18	0.074	0.34	8.12	2,962.8	1.01	24.4	8,888.3
SOx	5	0.221	0.057	0.26	6.28	2,292.2	0.78	18.8	6,876.6
CO	100	1.20	0.502	2.29	54.90	20,037.9	6.86	164.7	60,113.8
POC	25	0.17	0.072	0.33	7.84	2,862.6	0.98	23.5	8,587.7
PM_{10}	-	0.03	0.008	0.04	0.85	311.7	0.11	2.6	935.2
$PM_{2.5}$	-	0.03	0.008	0.04	0.85	311.7	0.11	2.6	935.2

Table 6b: IC Engine GHG Calculations - Normal Operations

Pollutant	Emission Factor lb/MMBtu	Annual Emissions - One Engine (lb/yr)	Annual Emissions - One Engine (MT/yr)	AR5 GWP	Annual Emissions - Three Engines (MT CO2e/yr)
CO2	190.80	7622889.64	3458.661	1	10,376.0
CH4	7.05E-03	281.85	0.128	28	10.7
N2O	1.39E-03	55.49	0.025	265	20.0
Total CO2e	191.37	7645486.39	3468.914	---	10,406.7

Data and Parameters			Basis
Number engines	3	each	Project Specification
Engine Output	500	kW	Project Specification
Process Flow - Syngas	849	m^3/hr	Per Engine, Project Specification
Conversion Factor	35.31	cf/m^3	Constant, EPA Method 19
Process Flow - Syngas	29,982	scf/hr	Calculated
Syngas Heating Value	1.6	kWh/m^3	Project Specification
Conversion Factor	3412.14	Btu/kWh	Constant, EPA Method 19
Syngas Heating Value	152.11	Btu/scf	Calculated based on syngas composition, see Table 5
Process Flow - Syngas	4.56	MMBtu/hr	Calculated
Process Flow - Syngas	109.46	MMBtu/day	Calculated
Process Flow - Syngas	39,952	MMBtu/yr	Calculated
Syngas F-factor	19,190	dscf/MMBtu	Calculated based on syngas composition, see Table 5
Molar Volume	379.5	scf/lbmol	Constant, EPA Method 19
Constant	393.236	Hp-hr/MMBtu	SJVAPCD Default
Engine Efficiency	30%		Assumption
Conversion	453.59	g/lb	Constant
MW NOx	46	lb/lbmol	Constant
MW SO2	64.06	lb/lbmol	Constant
MW CO	28	lb/lbmol	Constant
MW POC	16	lb/lbmol	Constant
Stack Oxygen	15.0	%	Rule Specification
Conversion Factor	2204.0	lb/MT	Constant

Notes:

1. Emission factors per SJVAPCD permit C-8980-1/2-0
2. All CO2e emissions from engine operation are biogenic and are not calculated.

$$\frac{lb}{MMBtu} = ppm * 10^{-6} * \frac{1}{molar\ volume} * Molar\ Weight * F_d * \frac{20.9}{(20.9 - \%O_2)}$$

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Table 7: Engine Criteria Pollutant Emission Calculations - Commissioning Year

Table 7a: IC Engine Criteria Pollutant Emission Calculations - Commissioning Period

Pollutant	Emission Factor[1] (ppm)	Emission Factor (g/BHp-hr)	Emission Factor (lb/MMBtu)	One Engine			Three Engines		
				Hourly Emissions (lb/hr)	Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)	Daily Emissions (lb/day)	Annual Emissions (lb/yr)
NOx	32	1.00	0.264	1.20	3.17	361.3	3.6	9.5	1,083.9
SOx	5	0.0003	0.057	0.26	0.69	78.5	0.8	2.1	235.5
CO	763	14.50	3.829	17.46	45.95	5,238.7	52.4	137.8	15,716.2
POC	40	0.43	0.114	0.52	1.36	155.4	1.6	4.1	466.1
PM_{10}		0.03	0.008	0.04	0.09	10.7	0.1	0.3	32.0
$PM_{2.5}$		0.03	0.008	0.04	0.09	10.7	0.1	0.3	32.0

Table 7b: IC Engine Criteria Pollutant Emission Calculations - Balance of Commissioning Year

Pollutant	Emission Factor[1] (ppm)	Emission Factor (g/BHp-hr)	Emission Factor (lb/MMBtu)	One Engine			Three Engines		
				Hourly Emissions (lb/hr)	Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)	Daily Emissions (lb/day)	Annual Emissions (lb/yr)
NOx	9	0.18	0.074	0.34	8.12	2,759.8	1.01	24.4	8,279.5
SOx	5	0.221	0.057	0.26	6.28	2,135.2	0.78	18.8	6,405.6
CO	100	1.20	0.502	2.29	54.90	18,665.5	6.86	164.7	55,996.4
POC	25	0.17	0.072	0.33	7.84	2,666.5	0.98	23.5	7,999.5
PM_{10}	-	0.03	0.008	0.04	0.85	290.4	0.11	2.6	871.1
$PM_{2.5}$	-	0.03	0.008	0.04	0.85	290.4	0.11	2.6	871.1

Table 7c: IC Engine Criteria Pollutant Emission Calculations - Total Emissions - Commissioning Year

Pollutant	One Engine			Three Engines		
	Hourly Emissions (lb/hr)	Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)	Daily Emissions (lb/day)	Annual Emissions (lb/yr)
NOx	1.20	8.12	3,121.1	3.61	24.4	9,363.3
SOx	0.26	6.28	2,213.7	0.78	18.8	6,641.1
CO	17.46	54.90	23,904.2	52.39	164.7	71,712.6
POC	0.52	7.84	2,821.9	1.55	23.5	8,465.6
PM_{10}	0.04	0.85	301.0	0.11	2.6	903.1
$PM_{2.5}$	0.04	0.85	301.0	0.11	2.6	903.1

Data and Parameters			Basis
Number engines	3	each	Project Specification
Conversion Factor	35.31	kW	Project Specification
Process Flow - Syngas	849	m^3/hr	Per Engine, Project Specification
	35.31	cf/m^3	Constant, EPA Method 19
	29,982	scf/hr	Calculated
Syngas Heating Value	1.6	kWh/m^3	Project Specification
Conversion Factor	3412.14	Btu/kWh	Constant, EPA Method 19
Syngas Heating Value	152.11	Btu/scf	Calculated based on syngas composition, see Table 5
Process Flow - Syngas	4.56	MMBtu/hr	Calculated
Process Flow - Syngas	109.46	MMBtu/day	Calculated
Process Flow - Syngas	39,952	MMBtu/yr	Calculated
Syngas F-factor	19,190	dscf/MMBtu	Calculated based on syngas composition, see Table 5
Molar Volume	379.5	scf/lbmol	Constant, EPA Method 19
Constant	393.236	Hp-hr/MMBtu	SJVAPCD Default
Engine Efficiency	30%		Assumption
Conversion	453.59	g/lb	Constant
MW NOx	46	lb/lbmol	Constant
MW SO2	64.06	lb/lbmol	Constant
MW CO	28	lb/lbmol	Constant
MW POC	16	lb/lbmol	Constant
Stack Oxygen	15.0	%	Rule Specification
Commissioning Hours	12.0	hr/day	
Commissioning Days	25	day/yr	
Commissioning Hours	300.0	hr/yr	
Commisioning Period	600	Hr/yr	
Normal Operating Hours	24	Hr/day	
Normal Op Hrs - Comm Yr	8160	hr/yr	

Notes

1. Emission factors per SJVAPCD permit C-8980-1/2-0

$$\frac{lb}{MMBtu} = ppm * 10^{-6} * \frac{1}{molar\ volume} * Molar\ Weight * F_d * \frac{20.9}{(20.9 - \%O_2)}$$

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Table 8: Flare Pilot Emissions Estimates

Table 8a: Flare Pilot Criteria Pollutant Emissions

Pollutant	Emission Factor[1] (lb/mmcf)	One Flare			Three Flares		
		lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr
NOx	100	5.00E-03	0.120	2.500	1.50E-02	3.60E-01	7.50E+00
SOx	0.6	3.00E-05	0.001	0.015	9.00E-05	2.16E-03	4.50E-02
CO	84	4.20E-03	0.101	2.100	1.26E-02	3.02E-01	6.30E+00
POC	5.5	2.75E-04	0.007	0.138	8.25E-04	1.98E-02	4.13E-01
PM10	7.6	3.80E-04	0.009	0.190	1.14E-03	2.74E-02	5.70E-01
PM2.5	7.6	3.80E-04	0.009	0.190	1.14E-03	2.74E-02	5.70E-01

Table 8c: Flare Pilot GHG Emissions

Pollutant	Emission Factor[2] (kg/mmcf)	One Flare (MT/yr)	Three Flares (MT/yr)
CO2	53.06	0.001	3.98E-03
CH4	0.001	2.50E-05	7.50E-05
N20	0.0001	2.50E-06	7.50E-06
CO2e	---	0.00	0.01

Table 8c: Global Warming Potential

Pollutant	GWP
CO2	1
CH4	30
N2O	265

Data and Parameters

Number of Flares	3	each	Project Specification
Gas Flow	50	scf/hr	Assumption
Gas Flow	0.00005	MMscf/hr	Calculated
Hours/day	24	hrs/day	Constant
Operating Hours	500	hrs/yr	Constant
Conversion	2.204	lb/kg	Constant

Notes

1. Default emission factors from 2024 SCAQMD AER Help and Support

2. EPA 2025. U.S. Environmental Protection Agency, Emission Factors for Greenhouse Gas Inventories, Accessed: https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf

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Table 9: Flare Criteria Pollutant Emission Calculations

Table 9a: Flare Criteria Pollutant Emissions

Pollutant	Emission Factor[1] (lb/MMBtu)	One Flare			Three Flares		
		Hourly Emissions (lb/hr)	Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)	Daily Emissions (lb/day)	Annual Emissions (lb/yr)
NOx	0.200	0.91	9.86	456.1	2.74	29.58	1368.22
SOx	0.0574	0.26	2.83	130.8	0.78	8.49	392.50
CO	0.310	1.41	15.28	706.9	4.24	45.85	2120.74
POC	0.063	0.29	3.11	143.7	0.86	9.32	430.99
PM_{10}	0.008	0.04	0.38	17.8	0.11	1.15	53.38
$PM_{2.5}$	0.008	0.04	0.38	17.8	0.11	1.15	53.38

Table 9b: Flare GHG Calculations

Pollutant	Emission Factor[2] (lb/MMBtu)	Annual Emissions - One Flare (lb/yr)	Annual Emissions - One Flare (MT/yr)	AR5 GWP	Annual Emissions - Three Flares (MT CO2e/yr)
CO2	190.80	435096.44	197.412	1	592.2
CH4	0.01	16.09	0.007	28	0.6
N2O	0.00	3.17	0.001	265	1.1
Total CO2e	191.37	436386.21	197.997		594.0

Data and Parameters			Notes
Number of Flares	3	each	Project Specification
Process Flows - Syngas	4.56	MMBtu/hr	Project Specification, per flare
	49.3	MMBtu/day	Project Specification
	2,280	MMBtu/yr	Calculated
Operating Schedule	24	hr/day	Project Specification
	500	hr/yr	Project Specification
Syngas F-factor	19,190	dscf/MMBtu	Calculated based on syngas composition, see Table 5
Syngas Heating Value	152.11	Btu/scf	Calculated based on syngas composition, see Table 5
Standard Temp	68	F	Constant
Constant	460	R	Constant
Conversion	2204	lb/MT	Constant

Notes

1. NOx EF per vendor; all other EF per SJVAPCD permit C-8980-3-0
2. U.S. EPA, Center for Corporate Climate Leadership, Emission Factors for Greenhouse Gas Inventories, 19 November 2015.

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Table 10: Energy Requirements for Water

Table 10a: Energy Requirements for Water

Category	Intensity Factor (kWh/MMgal)	Energy Requirement (kWh/yr)
Supply	1,182	1,035
Treat	754	661
Distribute	2,998	2,626
Wastewater	1,542	1,351
Total	---	5,673

Table 10b: GHG From Water Consumption

Greenhouse Gases	Global Warming Potential	Intensity Factor (lb/MWh)	Electric Power Consumption (MWh/yr)	Indirect Emissions (MT/yr)
CO_2	1	203.98	6	0.5
CH_4	30	0.033		0.0
N_2O	265	0.004		0.0
CO_2e	—	**206**		0.5

Data and Parameters

Water Consumption	2400	GPD
	876,000	Gal/yr
	0.88	MMGal/yr

Notes:

GHG intensity factors for San Francisco (CalEEMod 2022 Appendix G-32)

GWPs per IPCC Fourth Assessment Report (AR4, 2007); used in CalEEMod 2022

Assumes continuous PTE operation (8,760 hrs/yr)

Sources: Applicant 2025, CalEEMod version 2022.1.1.29

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Table 11: GHG Emission Benefit from Electrical Energy Production

Table 11a: Electrical Energy Production

Device Description	Rated Output	Operating Load	Total Electrical Production
	kW	%	(MWh/yr)
Engine 1	500	100%	4380.0
Engine 2	500	100%	4380.0
Engine 3	500	100%	4380.0
		Total	13140.0

Table 11b: Avoided GHG Emissions due to Electricity Production

Greenhouse Gases	Global Warming Potential	Intensity Factor (lbs/MWh)	Electric Power Production (MWh/yr)	Avoided Emissions (MT/yr)
CO_2	1	203.98	13,140	1,216
CH_4	30	0.033		6
N_2O	265	0.004		6
CO_2e	—	**206**		1,228

Data and Parameters

Operating Hours	8760	hr/yr
Conversion	1000	kW/MW

Notes:

1. GHG intensity factors for PG&E 2019-2050 (CalEEMod 2022 Appendix G-3)
2. GWPs per IPCC Fourth Assessment Report (AR4, 2007); used in CalEEMod 2022
3. Assumes continuous PTE operation (8,760 hrs/yr)

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Table 12: Summary of Emissions

Table 12a: Summary of Daily Criteria Pollutant Emissions

Activity	NOx (lb/day)	POC (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
2. Material Handling	---	---	---	---	0.084	0.013
3. Grinding	---	0.26	---	---	0.38	0.05
4. Dryer	---	26.11	---	---	1.62	1.62
6. Engine Normal	24.35	23.53	164.70	18.84	2.56	2.56
8. Flare Pilot	0.36	0.02	0.30	0.00	0.03	0.03
9. Flare	29.58	9.32	45.85	8.49	1.15	1.15
Total	54.29	59.24	210.85	27.33	5.83	5.43

Table 12b: Summary of Annual Criteria Pollutant Emissions

Activity	NOx (lb/yr)	POC (lb/yr)	CO (lb/yr)	SOx (lb/yr)	PM10 (lb/yr)	PM2.5 (lb/yr)
2. Material Handling	---	---	---	---	25.39	3.84
3. Grinding	---	79.80	---	---	114.91	15.96
4. Dryer	---	7,877.90	---	---	591.53	591.53
6. Engine Normal	8,888.26	8,587.69	60,113.82	6,876.59	935.17	935.17
8. Flare Pilot	7.50	0.41	6.30	0.05	0.57	0.57
9. Flare	1,368.22	430.99	2,120.74	392.50	53.38	53.38
Total	10,263.97	16,976.79	62,240.85	7,269.14	1,720.95	1,600.45
Total (TPY)	5.13	8.49	31.12	3.63	0.86	0.80

Table 12c: Summary of Annual GHG Emissions

Activity	CO_2 (MT/yr)	CH_4 (MT/yr)	N_2O (MT/yr)	CO2e (MT/Yr)
2. Material Handling	---	---	---	---
3. Grinding	---	---	---	---
4. Dryer	---	---	---	---
6. Engine Normal	10,376	11	20	10,407
8. Flare Pilot	0.00	0.00	0.00	0.01
9. Flare	592.24	0.61	1.14	593.99
10. Water Use GHG	0.53	0.00	0.00	0.53
11. Energy GHG	-1216.11	-5.90	-6.32	-1228.33
Total	**9,753**	**5**	**15**	**9,773**

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Table 13: Material Handling and Grinding TAC

Table 13a: PM10 Emission Summary - Material Handling and Grinding

Process	PM10 Emissions (lb/hr)	PM10 Emissions (lb/yr)
2. Material Handling	0.007	3.84
3. Grind	0.042	114.91
4. Dryer	0.068	591.53
Total	0.117	710.28

Table13b: Material Handling and Grinding TAC Emissions

TAC	Pollutant Concentration (mg/kg)	Emission Factor[1] (lb/lb)	TAC Emissions	
			lb/hr	lb/yr
Chlorine	24.7	2.47E-05	2.89E-06	1.75E-02
Mercury	0.000792	7.92E-10	9.27E-11	5.63E-07
Vanadium	0.022	2.20E-08	2.57E-09	1.56E-05
Hexavalent Chromium[2]	0.0012	1.20E-09	1.40E-10	8.52E-07
Manganese	70.6	7.06E-05	8.26E-06	5.01E-02
Cobalt	0.029	2.90E-08	3.39E-09	2.06E-05
Nickel	0.362	3.62E-07	4.24E-08	2.57E-04
Copper	1.32	1.32E-06	1.54E-07	9.38E-04
Zinc	5.93	5.93E-06	6.94E-07	4.21E-03
Arsenic	0.05	5.00E-08	5.85E-09	3.55E-05
Selenium	0.043	4.30E-08	5.03E-09	3.05E-05
Cadmium	0.0048	4.80E-09	5.62E-10	3.41E-06
Lead	0.249	2.49E-07	2.91E-08	1.77E-04

Notes:

1. Speciation profile for wood chips, median values: New York State Energy Research and Development Authority, Elemental Analysis of Wood Fuels, Final Report, NYSERDA Report 13-13, June 2013.

2. 5% of Chromium considered Hexavalent Chromium (SJVAPCD Policy)

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Table 14: TAC from Dryer Operation

Table 14: Dryer POC Emissions Information

Pollutant	lb/hr	lb/yr
POC	1.09	7,878

Table 14b: Dryer TAC Emissions

TAC	EF (lb/mbf)[1]	EF (lb/ton)	TAC Emissions	
			lb/hr	lb/yr
Acetaldehyde	5.50E-02	5.28E-02	0.12	842.69
Formaldehyde	2.02E-03	2.02E-03	0.004	32.24
Methanol	1.10E-01	1.10E-01	0.24	1,747.63

Notes:

1. State of Oregon Department of Environmental Quality (DEQ) - Profile for Western True Firs and Western Red Cedar

Dryer Temperature 176 °F

Western True Firs[1] and Western Red Cedar

Temperature (°F)	VOC (lb/mbf)	Methanol (lb/mbf)	Formaldehyde (lb/mbf)	Acetaldehyde (lb/mbf)	Propionaldehyde (lb/mbf)	Acrolein (lb/mbf)
Equations	0.0107x - 1.3789	0.005x-0.7705	0.00022x - 0.0367			
170	0.4401	0.0795	0.0007			
175	0.4936	0.1045	0.0018			
180	0.5471	0.1295	0.0029			
185	0.6006	0.1545	0.004			
190	0.6541	0.1795	0.0051	0.0550	no data	no data
195	0.7076	0.2045	0.0062			
200	0.7611	0.2295	0.0073			
205	0.8146	0.2545	0.0084			
210	0.8681	0.2795	0.0095			
215	0.9216	0.3045	0.0106			
220	0.9751	0.3295	0.0117			

[1] Western true firs consist of the following seven species classified in the same Abies genus: bristlecone fir, California red fir, grand fir, noble fir, pacific silver fir, subalpine fir and white fir.

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Table 15: IC Engine TAC Emission Calculations

Table 15: Syngas TAC Emissions per Engine

Pollutant	CAS No.	Natural Gas Emission Factor[1] (lb/MMscf)	Natural Gas Emission Factor (lb/MMBtu)	Syn Gas Emission Factor[2] (lb/MMBtu)	One Engine		Three Engines	
					Hourly Emissions (lb/hr)	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)	Annual Emissions (lb/yr)
1,1,2,2-Tetrachloroethane	79345	9.60E-03	9.41E-06	1.40E-06	6.40E-06	5.61E-02	1.92E-05	1.68E-01
1,1,2-Trichloroethane	79005	7.63E-03	7.48E-06	1.12E-06	5.09E-06	4.46E-02	1.53E-05	1.34E-01
1,1-Dichloroethane	75343	5.66E-03	5.55E-06	8.28E-07	3.77E-06	3.31E-02	1.13E-05	9.92E-02
1,2,4-Trimethylbenzene	95636	3.43E-03	3.36E-06	5.01E-07	2.29E-06	2.00E-02	6.86E-06	6.01E-02
1,3-Butadiene	106990	6.41E-02	6.28E-05	9.37E-06	4.27E-05	3.74E-01	1.28E-04	1.12E+00
2,2,4-Trimethylpentane	540841	6.00E-02	5.88E-05	8.77E-06	4.00E-05	3.50E-01	1.20E-04	1.05E+00
2-Methyl naphthalene	91576	7.97E-03	7.81E-06	1.17E-06	5.31E-06	4.66E-02	1.59E-05	1.40E-01
Acenaphthene	83329	3.00E-04	2.94E-07	4.39E-08	2.00E-07	1.75E-03	6.00E-07	5.26E-03
Acenaphthylene	208968	1.33E-03	1.30E-06	1.94E-07	8.87E-07	7.77E-03	2.66E-06	2.33E-02
Acetaldehyde	75070	2.01E+00	1.97E-03	2.94E-04	1.34E-03	1.17E+01	4.02E-03	3.52E+01
Acrolein	107028	1.23E+00	1.21E-03	1.80E-04	8.20E-04	7.18E+00	2.46E-03	2.16E+01
Benzene	71432	1.06E-01	1.04E-04	1.55E-05	7.07E-05	6.19E-01	2.12E-04	1.86E+00
Benzo[b]fluoranthene	205992	3.98E-05	3.90E-08	5.82E-09	2.65E-08	2.32E-04	7.96E-08	6.97E-04
Benzo[e]pyrene	192972	9.96E-05	9.76E-08	1.46E-08	6.64E-08	5.82E-04	1.99E-07	1.75E-03
Benzo[g,h,i]perylene	191242	9.94E-05	9.75E-08	1.45E-08	6.63E-08	5.81E-04	1.99E-07	1.74E-03
Biphenyl	92524	5.09E-02	4.99E-05	7.44E-06	3.39E-05	2.97E-01	1.02E-04	8.92E-01
Carbon tetrachloride	56235	8.81E-03	8.64E-06	1.29E-06	5.87E-06	5.15E-02	1.76E-05	1.54E-01
Chlorobenzene	108907	7.30E-03	7.16E-06	1.07E-06	4.87E-06	4.26E-02	1.46E-05	1.28E-01
Chloroform	67663	6.84E-03	6.71E-06	1.00E-06	4.56E-06	4.00E-02	1.37E-05	1.20E-01
Chrysene	218019	1.66E-04	1.63E-07	2.43E-08	1.11E-07	9.70E-04	3.32E-07	2.91E-03
Ethyl benzene	100414	9.53E-03	9.34E-06	1.39E-06	6.35E-06	5.57E-02	1.91E-05	1.67E-01
Ethylene dibromide {EDB}	106934	1.06E-02	1.04E-05	1.55E-06	7.07E-06	6.19E-02	2.12E-05	1.86E-01
Ethylene dichloride {EDC}	107062	5.66E-03	5.55E-06	8.28E-07	3.77E-06	3.31E-02	1.13E-05	9.92E-02
Fluoranthene	206440	2.66E-04	2.61E-07	3.89E-08	1.77E-07	1.55E-03	5.32E-07	4.66E-03
Fluorene	86737	1.36E-03	1.33E-06	1.99E-07	9.07E-07	7.94E-03	2.72E-06	2.38E-02
Formaldehyde	50000	1.27E+01	1.25E-02	1.86E-03	8.47E-03	7.42E+01	2.54E-02	2.23E+02
Hexane	110543	2.66E-01	2.61E-04	3.89E-05	1.77E-04	1.55E+00	5.32E-04	4.66E+00
Methanol	67561	6.00E-01	5.88E-04	8.77E-05	4.00E-04	3.50E+00	1.20E-03	1.05E+01
Methylene chloride {Dichlorometh	75092	4.80E-03	4.71E-06	7.02E-07	3.20E-06	2.80E-02	9.60E-06	8.41E-02
Naphthalene	91203	1.79E-02	1.75E-05	2.62E-06	1.19E-05	1.05E-01	3.58E-05	3.14E-01
PAHs, total, w/o individ. compone	1151	1.86E-03	1.82E-06	2.72E-07	1.24E-06	1.09E-02	3.72E-06	3.26E-02
Phenanthrene	85018	2.50E-03	2.45E-06	3.66E-07	1.67E-06	1.46E-02	5.00E-06	4.38E-02
Phenol	108952	5.76E-03	5.65E-06	8.42E-07	3.84E-06	3.36E-02	1.15E-05	1.01E-01
Pyrene	129000	3.26E-04	3.20E-07	4.77E-08	2.17E-07	1.90E-03	6.52E-07	5.71E-03
Styrene	100425	5.66E-03	5.55E-06	8.28E-07	3.77E-06	3.31E-02	1.13E-05	9.92E-02
Toluene	108883	9.79E-02	9.60E-05	1.43E-05	6.53E-05	5.72E-01	1.96E-04	1.72E+00
Vinyl chloride	75014	3.58E-03	3.51E-06	5.23E-07	2.39E-06	2.09E-02	7.16E-06	6.27E-02
Xylenes (mixed)	1330207	4.42E-02	4.33E-05	6.46E-06	2.95E-05	2.58E-01	8.84E-05	7.75E-01

Data and Parameters

Number of engines	3	each	Project specification
Process Flows - Syngas	4.56	MMBtu/hr	Project specification, per engine
	39,952	MMBtu/yr	Project specification
Syngas F-factor	19,190	dscf/MMBtu	Calculated based on syngas composition, see Table 5
Molar Volume	29,982	scf/lbmol	Constant, EPA Method 19
Syngas Heating Value	152.11	Btu/scf	Calculated based on syngas composition, see Table 5
HHV of Natural Gas	1020	Btu/scf	Constant

Notes

1. SJVAPCD AB 2588 "Hot Spots" Air Toxics Profiles, March 27, 2017, District Profile 239 for NG Internal Combustion 4SLB Engine CAT RED, which notes: The emission factors derived from Table 3.2-2 (pg. 11), "Uncontrolled Emission Factors For 4-Stroke Lean-Burn Engines" in July 2000 AP 42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources, Section 2: Natural Gas-Fired Reciprocating Engine. Assumes 1,000 Btu per scf natural gas 76% TAC reduction applied by use of catalyst.

2. Published emission factors are for natural gas. Natural gas EF are adjusted for syngas by taking a ratio of the HHV of syn gas to the HHV of natural gas.

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Table 16: Flare TAC Emission Calculations

Table 16a: Flare Pilot TAC Emissions

Pollutant	Emission Factor <10MMBtu/hr[1] (lb/mmcf)	One Flare Pilot		Three Flares Pilot	
		lb/hr	lb/yr	lb/hr	lb/yr
Benzene	0.008	4.00E-07	2.00E-04	1.20E-06	6.00E-04
Formaldehyde	0.017	8.50E-07	4.25E-04	2.55E-06	1.28E-03
PAH (excl. Naphthalene)	0.0001	5.00E-09	2.50E-06	1.50E-08	7.50E-06
Naphthalene	0.0003	1.50E-08	7.50E-06	4.50E-08	2.25E-05
Acetaldehyde	0.0043	2.15E-07	1.08E-04	6.45E-07	3.23E-04
Acrolein	0.0027	1.35E-07	6.75E-05	4.05E-07	2.03E-04
Ammonia	3.2	1.60E-04	8.00E-02	4.80E-04	2.40E-01
Ethyl benzene	0.0095	4.75E-07	2.38E-04	1.43E-06	7.13E-04
Hexane	0.0063	3.15E-07	1.58E-04	9.45E-07	4.73E-04
Toluene	0.0366	1.83E-06	9.15E-04	5.49E-06	2.75E-03
Xylenes	0.0272	1.36E-06	6.80E-04	4.08E-06	2.04E-03
Propylene	0.731	3.66E-05	1.83E-02	1.10E-04	5.48E-02

Table 16b: Flare Syngas TAC Emissions

Pollutant	CAS No.	Digester Gas Emission Factor[2] (lb/MMscf)	Digester Gas Emission Factor (lb/MMBtu)	Syn Gas Emission Factor[3] (lb/MMBtu)	One Flare		Three Flares	
					Hourly Emissions (lb/hr)	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)	Annual Emissions (lb/yr)
Ammonia	7664417	3.72E-03	6.20E-06	1.57E-06	7.17E-06	6.28E-02	2.15E-05	1.88E-01
Benzene	71432	1.33E-03	2.22E-06	5.62E-07	2.56E-06	2.25E-02	7.69E-06	6.74E-02
Chlorobenzene	108907	3.08E-04	5.13E-07	1.30E-07	5.94E-07	5.20E-03	1.78E-06	1.56E-02
Ethyl Benzene	100414	2.61E-02	4.35E-05	1.10E-05	5.03E-05	4.41E-01	1.51E-04	1.32E+00
Formaldehyde	50000	1.46E+00	2.43E-03	6.17E-04	2.81E-03	2.46E+01	8.44E-03	7.39E+01
Hydrogen Sulfide	7783064	1.17E+00	1.95E-03	4.94E-04	2.25E-03	1.98E+01	6.76E-03	5.93E+01
Methyl Chloroform	71556	4.19E-03	6.98E-06	1.77E-06	8.07E-06	7.07E-02	2.42E-05	2.12E-01
Methylene Chloride	75092	8.67E-02	1.45E-04	3.66E-05	1.67E-04	1.46E+00	5.01E-04	4.39E+00
Perchloroethylene	127184	2.43E-03	4.05E-06	1.03E-06	4.68E-06	4.10E-02	1.40E-05	1.23E-01
Toluene	108883	9.59E-03	1.60E-05	4.05E-06	1.85E-05	1.62E-01	5.54E-05	4.86E-01
Vinyl Chloride	75014	1.32E-03	2.20E-06	5.58E-07	2.54E-06	2.23E-02	7.63E-06	6.68E-02
Vinylidene Chloride	75354	3.08E-04	5.13E-07	1.30E-07	5.94E-07	5.20E-03	1.78E-06	1.56E-02
Xylenes	1330207	5.57E-02	9.28E-05	2.35E-05	1.07E-04	9.40E-01	3.22E-04	2.82E+00

Data and Parameters

Number of Flares	3	each	
Process Flows - Syngas	4.56	MMBtu/hr	Project Specification, per flare
	109.46	MMBtu/day	Calculated
	39,951.91	MMBtu/yr	Calculated
Syngas F-factor	19,190	dscf/MMBtu	Calculated based on syngas composition, see Table 5
Molar Volume	29,982	scf/lbmol	Constant, EPA Method 19
Syngas Heating Value	152.11	Btu/scf	Calculated based on syngas composition, see Table 5
HHV of Digester Gas[2]	600	Btu/scf	Assumption
Pilot Gas Flow	50	scf/hr	Assumption
Pilot Gas Flow	0.00005	MMscf/hr	Calculated
Pilot Hours/day	24	hrs/day	Project specification
Pilot Operating Hours	500	hrs/yr	Project specification

Notes

1. Default emission factors from 2024 SCAQMD AER Help and Support

2. SJVAPCD AB 2588 “Hot Spots” Air Toxics Profiles, March 27, 2017, District Profile 230, which notes: "Digester Gas External and Internal Combustion Factors as developed by San Diego Country Air Pollution Control District" in the November 1993 memo from SDAPCD.

3. Published emission factors are for digester gas. Digester gas EF are adjusted for syngas by taking a ratio of the HHV of syn gas to the HHV of digester gas.

ATTACHMENT 4 – ANAEROBIC DIGESTION EMISSION CALCULATION WORKSHEETS

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NRWS Anaerobic Digestion
Emission Calculations

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Table 1: Anaerobic Digester Process Throughput

Processing Step	Throughput	
	TPY	TPD[1]
Foodwaste	13,000	43
Greenwaste	9,000	30
Grape Pomace	10,000	33
Total	32,000	105

Data and Parameters

Daily Operating Hours	24	hours/day
Raw Material Receive Days	365	Day/year
Operating hours	9	Hours/day

Notes:

1. A "compliance margin" of 20% is included to allow minor fluctuations in daily throughput.

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Table 2: Material Handling PM10 Emissions

Table 2a: Material Handling PM10 Emissions

Pollutant	Emission Factor[1] (lb/ton)	Emissions		
		lb/hr	lb/day	lb/yr
PM10	2.15E-04	0.004	0.09	27.46
PM2.5	3.22E-05	0.001	0.01	4.12

Table 2b: TAC from Material Handling

TAC	Concentration (lb/lb Dust)[4]	TAC Emissions	
		(lb/hr)	(lb/yr)
Arsenic	6.20E-06	2.33E-08	1.70E-04
Cadmium	2.00E-06	7.52E-09	5.49E-05
Hexavalent Chrome[5]	2.45E-06	9.22E-09	6.73E-05
Cobalt	8.80E-06	3.31E-08	2.42E-04
Copper	6.90E-05	2.60E-07	1.89E-03
Lead	2.00E-04	7.52E-07	5.49E-03
Manganese	4.40E-04	1.65E-06	1.21E-02
Mercury	1.00E-06	3.76E-09	2.75E-05
Nickel	9.50E-05	3.57E-07	2.61E-03
Selenium	1.00E-06	3.76E-09	2.75E-05

PM10 Emission Factor Derivation:

From AP-42, Chapter 13.2.4:

EF (lb/ton)	2.15E-04		
k	0.35	dimensionless	
U	3.6	miles/hr	Note 2
M	4.8	%	Note 3

Data and Parameters

Throughput	32,000	tons/yr
Operating days	365	day/year
Throughput	105	tons/day
Throughput	4.4	tons/hr
Number of transfer points	4	each
Ratio of PM2.5 to PM10	15%	

Notes:

1. Emission factor derived from AP-42, Ch. 13.2.4.
2. Average daily windspeed at the Napa Airport is 3.6 MPH (ref: CalEEMod User Guide, Appendix G, Table G-1).
3. The moisture content of feedstock is higher than 4.8%; therefore, this factor is expected to be conservative.
4. SJVAPCD Toxic Emission Factors for fugitive dust from "PM10 based Emissions from Operations generating Dust from Greenwaste Composting" (June 7, 2016), accessed: https://www.valleyair.org/busind/pto/emission_factors/emission_factors_idx.htm
5. Hexavalent chromium is assumed to be 5% of total chromium per SJVAPCD guidance.

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Table 3: Digestate Dewatering

Methodology and Descripton of Operations: Digestate is anaerobically digested greenwaste, foodwaste, and grape pomace. Raw digestate shares many properties with compost. Emission factors are not available for many aspects of digestate management. Compost management emission factors are used as surrogates for digestate management. Digestate dewatering is conducted in a bunker vented to a biofilter for emissions control. Curing takes place in NRWS' existing curing piles (blended with CASP compost). Cured digestate is stored with cured compost prior to shipment.

Table 3a: Criteria Pollutant Emission Factors

Pollutant	Digestate Management Phase	Equivalent Composting Process Step	Emission Factor (lb/ton)	Note
POC	Digestate Dewatering	Composting	0.22	1
POC	Curing (=10% of compost factor)	Curing (=10% of compost factor)	0.022	1, 2
POC	Cured Digestate Storage	Cured Compost Storage	0.020	3
NH_3	Digestate dewatering	Composting + curing	0.1780	4
NH_3	Cured Digestate Storage	Cured Compost Storage	0.00038	5

Table 3b: POC and NH3 Emissions

Pollutant	Process Step	Emission Factor	Biofilter Control Efficiency	Emissions		
				lb/hr	lb/day	lb/yr
POC	Digestate Dewatering	0.220 lb/ton	90%	0.06	1.39	422.40
POC	Curing (=10% of compost emission factor)	0.022 lb/ton	0	0.06	1.39	422.4
POC	Cured Digestate Storage	0.02 lb/ton	0	0.05	1.26	384.0
Total POC				**0.17**	**4.04**	**1228.80**
NH_3	Composting + curing	0.1780 lb/ton	80%	0.09	2.25	683.5
NH_3	Cured Compost Storage	0.00038 lb/ton	0	0.001	0.02	7.30
Total NH3				**0.09**	**2.27**	**690.82**

Table 3c: Digestate Dewatering TAC Emissions

TAC	Speciation[6] (% wt)	Emissions	
		(lb/hr)	(lb/yr)
Acetone	7.23E-02	4.18E-03	3.05E+01
1,4-Dichlorobenzene	2.22E-04	1.28E-05	9.38E-02
2-Propanol (Isopropyl alcohol, IPA)	2.59E-04	1.50E-05	1.09E-01
Acetaldehyde	4.29E-02	2.48E-03	1.81E+01
Allyl Chloride (3-Chloropropene)	1.08E-04	6.25E-06	4.56E-02
Benzene	1.60E-04	9.26E-06	6.76E-02
Carbon disulfide	3.74E-04	2.16E-05	1.58E-01
Chloroethane	8.30E-05	4.80E-06	3.51E-02
Chloroform	1.63E-04	9.43E-06	6.89E-02
Ethylbenzene	3.50E-04	2.03E-05	1.48E-01
Ethylene Dichloride (1,2-dichloroethane)	5.37E-04	3.11E-05	2.27E-01
Hexane	3.18E-04	1.84E-05	1.34E-01
Methanol (Methyl alcohol)	4.88E-02	2.82E-03	2.06E+01
Methyl Ethyl Ketone (2-butanone)	7.82E-02	4.52E-03	3.30E+01
Naphthalene	7.14E-04	4.13E-05	3.02E-01
Propylene	5.89E-03	3.41E-04	2.49E+00
Styrene	3.53E-04	2.04E-05	1.49E-01
Toluene	6.30E-04	3.65E-05	2.66E-01
Vinyl acetate	3.01E-03	1.74E-04	1.27E+00
Xylenes	4.36E-04	2.52E-05	1.84E-01

Table 3c: Digestate Curing TAC Emissions

TAC	Speciation[6] (% wt)	Emissions	
		(lb/hr)	(lb/yr)
Acetone	1.08E-01	6.25E-03	45.619
1,4-Dichlorobenzene	6.10E-04	3.53E-05	0.258
2-Propanol (Isopropyl alcohol, IPA)	7.37E-04	4.26E-05	0.311
Acetaldehyde	2.83E-02	1.64E-03	11.954
Allyl Chloride (3-Chloropropene)	8.75E-04	5.06E-05	0.370
Benzene	5.42E-04	3.14E-05	0.229
Carbon disulfide	1.30E-03	7.52E-05	0.549
Chloroethane	2.68E-04	1.55E-05	0.113
Chloroform	4.99E-04	2.89E-05	0.211
Ethylbenzene	8.06E-04	4.66E-05	0.340
Ethylene Dichloride (1,2-dichloroethane)	5.78E-04	3.34E-05	0.244
Hexane	6.42E-04	3.71E-05	0.271
Methanol (Methyl alcohol)	3.07E-02	1.78E-03	12.968
Methyl Ethyl Ketone (2-butanone)	3.77E-02	2.18E-03	15.924
Naphthalene	1.12E-03	6.48E-05	0.473
Propene (Propylene)	3.21E-02	1.86E-03	13.559
Styrene	6.34E-04	3.67E-05	0.268
Toluene	2.54E-03	1.47E-04	1.073
Vinyl acetate	7.67E-04	4.44E-05	0.324
Xylenes	1.24E-03	7.18E-05	0.524

Table 3d: Digestate Storage TAC Emissions

TAC	Speciation[6] (% wt)	Emissions	
		(lb/hr)	(lb/yr)
Acetone	4.86E-02	2.56E-03	18.662
1,4-Dichlorobenzene	3.56E-03	1.87E-04	1.367
2-Propanol (Isopropyl alcohol, IPA)	1.46E-03	7.68E-05	0.561
Acetaldehyde	1.86E-02	9.78E-04	7.142
Allyl Chloride (3-Chloropropene)	1.86E-03	9.78E-05	0.714
Benzene	1.89E-03	9.94E-05	0.726
Carbon disulfide	7.75E-03	4.08E-04	2.976
Chloroethane	1.56E-03	8.21E-05	0.599
Chloroform	2.89E-03	1.52E-04	1.110
Ethylbenzene	2.57E-03	1.35E-04	0.987
Ethylene Dichloride (1,2-dichloroethane)	2.40E-03	1.26E-04	0.922
Hexane	2.09E-03	1.10E-04	0.803
Methanol (Methyl alcohol)	7.77E-04	4.09E-05	0.298
Methyl Ethyl Ketone (2-butanone)	1.75E-03	9.21E-05	0.672
Naphthalene	3.11E-03	1.64E-04	1.194
Propene (Propylene)	6.87E-02	3.61E-03	26.381
Styrene	2.53E-03	1.33E-04	0.972
Toluene	6.96E-03	3.66E-04	2.673
Vinyl acetate	2.09E-03	1.10E-04	0.803
Xylenes	5.15E-03	2.71E-04	1.978

Data and Parameters

Mass Loss Upon Digestion	40%	
Days in Dewatering	1	day
Daily Throughput	63.12	TPD
Annual Throughput	19200	TPY
Operating Hours	24	hrs/day
Biofilter POC Control Efficiency	90%	
Biofilter NH3 Control Efficiency	80%	

Notes:

1. Compost emission factor from: SOURCE TEST REPORT, 2020 QUARTERLY COMPOST EMISSIONS TESTING - 4TH QUARTER NAPA RECYCLING & WASTE SERVICES, INC.
2. Assumption that curing EF is 10% of composting EF from: San Joaquin Valley Air Pollution Control District, Compost ROG Emission Factors, September 15, 2010, Table 4.
3. Storage EF from SJVAPCD Compost ROG Emission Factors, Sept 15, 2010, App C, Table 4.3 which is based on 15 days storage.
4. Ammonia emission factor is an average of five source test results from Napa Recycling and Waste Services. Tests were conducted between 2020 and 2022 pursuant to a BAAQMD-approved protocol. NRWS operates a CASP system with positive aeration using greenwaste as feedstock.
5. SJVAPCD Compost VOC Emission Factors, Sept 15, 2010, App C, Table 4.3 which is based on 15 days storage.
6. TAC emission factors from the BAAQMD Permit Handbook, Section 11.16, Tables 1-1, 1-4, and 1-5.

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Table 4: Boiler Emission Estimates

Table 4a: Boiler Criteria Pollutant Emissions

Pollutant	Emission Factor[1] (lb/mmcf)	Emissions		
		lb/hr	lb/day	lb/yr
POC	5.5	0.006	0.14	49.60
NOx	24.66	0.025	0.61	222.36
SOx	0.6	0.001	0.01	5.41
CO	37.52	0.039	0.93	338.37
PM10	7.6	0.008	0.19	68.53
PM2.5	7.6	0.008	0.19	68.53

Table 4b: Boiler PPM to lb/MMSCF Conversion

Pollutant	Emission Standard (ppm)	Molecular Weight (lb/lb-mol)	Emission Factor (lb/MMBtu)	Emission Factor (lb/MMscf)
NOx	20	46	0.0242	24.66
CO	50	28	0.0368	37.52

$$lb/MMBtu = ppmv \times 10^{-6} \times [20.9/(20.9-O2\%)] \times F_D \times Molecular\ Weight / (R \times T)$$

Table 4c: Boiler TAC Emission Estimates

Pollutant	Emission Factor <10MMBtu/hr[2] (lb/mmcf)	Emissions	
		lb/hr	lb/yr
Benzene	0.008	8.24E-06	0.07
Formaldehyde	0.017	1.75E-05	0.15
PAH (excl. Naphthalene)	0.0001	1.03E-07	0.001
Naphthalene	0.0003	3.09E-07	0.003
Acetaldehyde	0.0043	4.43E-06	0.04
Acrolein	0.0027	2.78E-06	0.02
Ammonia	3.2	3.29E-03	28.86
Ethyl benzene	0.0095	9.78E-06	0.09
Hexane	0.0063	6.49E-06	0.06
Propylene	0.731	7.53E-04	6.59
Toluene	0.0366	3.77E-05	0.33
Xylenes	0.0272	2.80E-05	0.25

NRWS Anaerobic Digestion
Emission Calculations

Table 4d: Boiler GHG Emissions

Pollutant	Emission Factor[3] (kg/mmBtu)	Emissions (MT/yr)
CO2	53.06	488.046
CH4	0.001	0.276
N20	0.0001	0.244
CO2e	---	560.917

Table 4e: Global Warming Potential

Pollutant	GWP
CO2	1
CH4	30
N2O	265

Data and Parameters

Maximum Heat Input	1.05	MMBtu/hr	
Heat Rate NG	1,020	Btu/scf	
Maximum Heat Input	0.001	MMCF/hr	
Operating hours per year	8,760	hr/yr	
Operating hours per day	24	hr/day	
O2 standard	3	%	Rule requirement
F_D Natural Gas	8,710	scf/MMBtu	40CFR60 App A
R	0.730240507	$atm \cdot ft^3 \cdot lbmol^{-1} \cdot °R^{-1}$	Constant
Conversion	460	°R	Constant
Temperature	70	°F	Assumption
Conversion	1,000	gram/kg	
Conversion	1,000	kg/MT	

Notes

1. Default combustion emission factors for SOx, PM10 and POC from 2024 SCAQMD AER Help and Support
2. Default emission factors from 2024 SCAQMD AER Help and Support

3. EPA 2025. U.S. Environmental Protection Agency, Emission Factors for Greenhouse Gas Inventories, Accessed: https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf

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Table 5: Flare Pilot Emissions Estimates - Commissioning Year

Table 5a: Flare Pilot Criteria Pollutant Emissions - Commissioning Year

Pollutant	Emission Factor[1] (lb/mmcf)	Emissions		
		lb/hr	lb/day	lb/yr
POC	5.5	2.75E-04	0.007	0.605
NOx	100	5.00E-03	0.120	11.000
SOx	0.6	3.00E-05	0.001	0.066
CO	84	4.20E-03	0.101	9.240
PM10	7.6	3.80E-04	0.009	0.836
PM2.5	7.6	3.80E-04	0.009	0.836

Table 5b: Flare Pilot TAC Emissions - Commissioning Year

Pollutant	Emission Factor <10MMBtu/hr[2] (lb/mmcf)	Emissions	
		lb/hr	lb/yr
Benzene	0.008	4.00E-07	8.80E-04
Formaldehyde	0.017	8.50E-07	1.87E-03
PAH (excl. Naphthalene)	0.0001	5.00E-09	1.10E-05
Naphthalene	0.0003	1.50E-08	3.30E-05
Acetaldehyde	0.0043	2.15E-07	4.73E-04
Acrolein	0.0027	1.35E-07	2.97E-04
Ammonia	3.2	1.60E-04	3.52E-01
Ethyl benzene	0.0095	4.75E-07	1.05E-03
Hexane	0.0063	3.15E-07	6.93E-04
Toluene	0.0366	1.83E-06	4.03E-03
Xylenes	0.0272	1.36E-06	2.99E-03
Propylene	0.731	3.66E-05	8.04E-02

Data and Parameters

Gas Flow	50	scf/hr	Assumption
Gas Flow	0.00005	MMscf/hr	
Hours/day	24	hrs/day	
Operating Hours	2,200	hrs/yr	

Notes

1. Default emission factors from 2024 SCAQMD AER Help and Support
2. Default emission factors from 2024 SCAQMD AER Help and Support
3. EPA 2025. U.S. Environmental Protection Agency, Emission Factors for Greenhouse Gas Inventories, Accessed: https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf

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Table 7: Flare Pilot Emissions Estimates - Normal Operations

Table 7a: Flare Pilot Criteria Pollutant Emissions - Normal Operations

Pollutant	Emission Factor[1] (lb/mmcf)	Emissions		
		lb/hr	lb/day	lb/yr
POC	5.5	2.75E-04	0.007	0.055
NOx	100	5.00E-03	0.120	1.000
SOx	0.6	3.00E-05	0.001	0.006
CO	84	4.20E-03	0.101	0.840
PM10	7.6	3.80E-04	0.009	0.076
PM2.5	7.6	3.80E-04	0.009	0.076

Table 7b: Flare Pilot TAC Emissions - Normal Operations

Pollutant	Emission Factor <10MMBtu/hr[2] (lb/mmcf)	Emissions	
		lb/hr	lb/yr
Benzene	0.008	4.00E-07	8.00E-05
Formaldehyde	0.017	8.50E-07	1.70E-04
PAH (excl. Naphthalene)	0.0001	5.00E-09	1.00E-06
Naphthalene	0.0003	1.50E-08	3.00E-06
Acetaldehyde	0.0043	2.15E-07	4.30E-05
Acrolein	0.0027	1.35E-07	2.70E-05
Ammonia	3.2	1.60E-04	3.20E-02
Ethylbenzene	0.0095	4.75E-07	9.50E-05
Hexane	0.0063	3.15E-07	6.30E-05
Toluene	0.0366	1.83E-06	3.66E-04
Xylenes	0.0272	1.36E-06	2.72E-04
Propylene	0.731	3.66E-05	7.31E-03

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Emission Calculations

Table 7c: Flare Pilot GHG Emissions

Pollutant	Emission Factor[3] (kg/mmBtu)	Emissions (MT/yr)
CO2	53.06	5.41E-01
CH4	0.001	1.02E-05
N20	0.0001	1.02E-06
CO2e	---	5.42E-01

Table 7d: Global Warming Potential

Pollutant	GWP
CO2	1
CH4	30
N2O	265

Data and Parameters

Gas Flow	50	scf/hr	Project Specification
Gas Flow	0.00005	MMscf/hr	
Heat Rate NG	1,020	Btu/scf	
	0.051	MMBtu/hr	
Hours/day	24	hrs/day	
Operating Hours	200	hrs/yr	
Conversion	1,000	gram/kg	
Conversion	1,000	kg/MT	

Notes

1. Default emission factors from 2024 SCAQMD AER Help and Support
2. Default emission factors from 2024 SCAQMD AER Help and Support
3. EPA 2025. U.S. Environmental Protection Agency, Emission Factors for Greenhouse Gas Inventories, Accessed: https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf

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Table 6: Commissioning Year Flare Emissions - Digester Gas

Table 6a: Flare Criteria Pollutant Emissions - Digester Gas

Pollutant	Natural Gas Emission Factor[1] (lb/MMscf)	Emission Factor (lb/MMBtu)	Emissions		
			lb/hr	lb/day	lb/yr
POC	5.5	0.009	0.10	2.40	219.82
NOx	36	0.060	0.65	15.70	1438.80
SOx	6.615	0.006	0.07	1.70	155.52
CO	84	0.082	0.90	21.54	1974.82
PM10	7.6	0.007	0.08	1.95	178.67
PM2.5	7.6	0.007	0.08	1.95	178.67

Table 6b: Flare TAC Emissions - Digester Gas

Compound	Emission Factor[2] (lb/MMscf)	Emissions	
		lb/hr	lb/yr
Benzene	0.0058	1.05E-04	2.32E-01
Formaldehyde	0.0123	2.23E-04	4.92E-01
PAH (excl. Naphthalene)	0.0001	1.82E-06	4.00E-03
Naphthalene	0.0003	5.45E-06	1.20E-02
Acetaldehyde	0.0031	5.63E-05	1.24E-01
Acrolein	0.0027	4.91E-05	1.08E-01
Ammonia	3.2	5.81E-02	1.28E+02
Ethylbenzene	0.0069	1.25E-04	2.76E-01
Hexane	0.0046	8.36E-05	1.84E-01
Toluene	0.0265	4.81E-04	1.06E+00
Xylene	0.0197	3.58E-04	7.87E-01
Propylene	0.53	9.63E-03	2.12E+01

SOx Emission Factor Calculation

E.F. (SOx) = (ppm S / 10^6) x (1 / 387 scf/lb-mol) x (1 mol SO_2 / 1 mol H_2S) x (64 lb SO_2/lbmol)

Reference	Sulfur Concentration (ppmv)	Emission Factor (lb/mmscf)
Specification	40	6.615

Data and Parameters

Gas Flow	10.9	MMBtu/hr
Heating Value DG	600	Btu/scf
Heating Value NG	1,020	Btu/scf
Gas Flow	0.0182	MMscf/hr
Hours/day	24	hrs/day
Maximum Hours	2,200	hrs/yr
Molar Volume	387	scf/lb-mol @ 70F
MW SO2	64	lb/lb-mol

References:

1. Default emission factors for PM10, CO and POC, BACT for NOx, SOx based on 40 ppm
2. Default emission factors from 2024 SCAQMD AER Help and Support

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Table 8: Flare Emissions - Digester Gas - Normal Operations

Table 8a: Flare Criteria Pollutant Emissions - Digester Gas Only - Normal Operations

Pollutant	Natural Gas Emission Factor[1] (lb/MMscf)	Emission Factor (lb/MMBtu)	Emissions		
			lb/hr	lb/day	lb/yr
POC	5.5	0.009	0.10	2.40	19.98
NOx	36	0.060	0.65	15.70	130.80
SOx	6.615	0.006	0.07	1.70	14.14
CO	84	0.082	0.90	21.54	179.53
PM10	7.6	0.007	0.08	1.95	16.24
PM2.5	7.6	0.007	0.08	1.95	16.24

Table 8b: Flare TAC Emissions - Digester Gas Only - Normal Operations

Compound	Emission Factor[2] (lb/MMscf)	Emissions	
		lb/hr	lb/yr
Benzene	0.0058	1.05E-04	2.11E-02
Acetaldehyde	0.0031	5.63E-05	1.13E-02
Acrolein	0.0027	4.91E-05	9.81E-03
Ammonia	3.2	5.81E-02	1.16E+01
Ethylbenzene	0.0069	1.25E-04	2.51E-02
Formaldehyde	0.0123	2.23E-04	4.47E-02
Hexane	0.0046	8.36E-05	1.67E-02
Naphthalene	0.0003	5.45E-06	1.09E-03
PAH (excl. Naphthalene)	0.0001	1.82E-06	3.63E-04
Propylene	0.53	9.63E-03	1.93E+00
Toluene	0.0265	4.81E-04	9.63E-02
Xylenes	0.0197	3.58E-04	7.16E-02

Table 8c: FlareGHG Emissions

Pollutant	Natural Gas Emission Factor[3] (kg/mmBtu)	Flare Emissions (MT CO2e /yr)
CO2	52.07	113.51
CH4	0.0032	0.20
N20	0.00063	0.36
CO2e	---	114.07

Table 8d: Global Warming Potential

Pollutant	GWP
CO2	1
CH4	28
N2O	265

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Emission Calculations

SOx Emission Factor Calculation

E.F. (SOx) = (ppm S / 10^6) x (1 / 387 scf/lb-mol) x (1 mol SO_2 / 1 mol H_2S) x (64 lb SO_2/lbmol)

Reference	Sulfur Concentration (ppmv)	Emission Factor (lb/mmscf)
Specification	40	6.615

Data and Parameters

Gas Flow	10.9	MMBtu/hr
Heating Value DG	600	Btu/scf
Heating Value NG	1,020	Btu/scf
Gas Flow	0.0182	MMscf/hr
Hours/day	24	hrs/day
Maximum Hours	200	hrs/yr
Molar Volume	387	scf/lb-mol @ 70F
MW SO2	64	lb/lb-mol
Conversion	1,000	gram/kg
Conversion	1,000	kg/MT

References:

1. Default emission factors for PM10, CO and POC, BACT for NOx, SOx based on 40 ppm
2. Default emission factors from 2024 SCAQMD AER Help and Support
3. EPA 2025. U.S. Environmental Protection Agency, Emission Factors for Greenhouse Gas Inventories, Accessed: https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf

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Table 9: Emergency Engine Emission Estimates

Table 9a: Emergency Engine Criteria Pollutant Emissions

Pollutant	Emission Factor[1] (lb/mmcf)	Emission Factor[2] (g/BHp)	Emissions		
			lb/hr	lb/day	lb/yr
POC	---	1.00	0.384	0.384	76.72
NOx	---	1.00	0.384	0.384	76.72
SOx	0.6	---	0.001	0.001	0.18
CO	---	2.75	1.055	1.055	210.98
PM10	10	---	0.015	0.015	2.99
PM2.5	10	---	0.015	0.015	2.99

Table 9b: Emergency Engine TAC Emission Estimates

Pollutant	Emission Factor[3] (lb/MMBtu)	Emissions	
		lb/hr	lb/yr
1,1,2,2-Tetrachloroethane	2.53E-05	3.86E-05	7.72E-03
1,1,2-Trichloroethane	7.65E-06	1.17E-05	2.33E-03
1,1-Dichloroethane	5.65E-06	8.62E-06	1.72E-03
1,3-Butadiene	1.02E-04	1.56E-04	3.11E-02
Acetaldehyde	8.66E-04	1.32E-03	2.64E-01
Acrolein	5.36E-04	8.18E-04	1.64E-01
Benzene (no control)	1.87E-03	2.85E-03	5.71E-01
Carbon Tetrachloride	8.85E-06	1.35E-05	2.70E-03
Chlorobenzene	6.45E-06	9.84E-06	1.97E-03
Chloroform	6.85E-06	1.05E-05	2.09E-03
Ethylbenzene	1.14E-05	1.74E-05	3.48E-03
Ethylene Dibromide	1.07E-05	1.63E-05	3.27E-03
Formaldehyde (no control)	2.30E-03	3.51E-03	7.02E-01
Methanol	3.06E-03	4.67E-03	9.34E-01
Methylene Chloride	4.12E-05	6.29E-05	1.26E-02
Naphthalene	7.50E-05	1.14E-04	2.29E-02
PAH	2.12E-07	3.23E-07	6.47E-05
Propylene	1.57E-02	2.40E-02	4.79E+00
Styrene	5.95E-06	9.08E-06	1.82E-03
Toluene	1.05E-03	1.60E-03	3.20E-01
Vinyl Chloride	3.59E-06	5.48E-06	1.10E-03
Xylene (total)	6.45E-04	9.84E-04	1.97E-01

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Emission Calculations

Table 9c: Emergency Engine GHG Emissions

Pollutant	Emission Factor[3] (kg/mmBtu)	Emissions (MT CO2e/yr)
CO2	53.06	16.193
CH4	0.001	9.16E-03
N2O	0.0001	8.09E-03
CO2e	---	16.210

Table 9d: Global Warming Potential

Pollutant	GWP
CO2	1
CH4	30
N2O	265

Data and Parameters

Maximum Heat Input	1,496	scf/hr
HHV Natural Gas	1,020	Btu/scf
Maximum Heat Input	1.53	MMBtu/hr
Engine Power	174	BHp
Non-emergency Operating hours per year	200	hr/yr
Operating hours per day	1	hr/day
Concversion	454	gm/lb
Conversion	1,000	kg.MT

Notes

1. Default emission factors from 2024 SCAQMD AER Help and Support, 4-SRB, Natural Gas-fired
2. BAAQMD BACT Handbook for IC Engine – Spark Ignition, Natural Gas Fired Emergency Engine, Doc. 96.3.4
2. Default emission factors from 2024 SCAQMD AER Help and Support, 4-SRB, Natural Gas-fired
3. EPA 2025. U.S. Environmental Protection Agency, Emission Factors for Greenhouse Gas Inventories, Accessed: https://www.epa.gov/system/files/documents/2025-01/ghg-emission-factors-hub-2025.pdf

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Table 10: GHG Emissions from Electrical Energy Consumption

Table 10a: Electrical Energy Consumption

Device Description	Rated Power	Operating Load	Total Electrical Load	
	(hp)	(hp)	(kW)	
Paddle Mix Motor	30	24	17.90	
Biofilter Blower	50	40	29.83	
Gas Upgrade System	10	8	5.97	
RNG Compressor	200	160	119.31	
Boiler (combustion blower)	2	1.6	1.19	
Conveyor motors	10	8	5.97	
		Total	180.16	kW
		Total Annual	1,578,211	kW-hr/yr

Table 10b: GHG Emissions from Electricity Consumption

Greenhouse Gases	Global Warming Potential	Intensity Factor (lbs/MWh)	Electric Power Load (kW)	Electric Power Consumption (MWh/yr)	Indirect Emissions (MT/yr)
CO_2	1	203.98	180.16	1,578	146.1
CH_4	30	0.033			0.7
N_2O	265	0.004			0.8
CO_2e	—	**206**			147.5

Data and Parameters

Hp to kW Conversion	0.7457	kW/Hp
Operating Hours	8,760	hr/yr
Assumed Load	80.00%	

Notes:

1. GHG intensity factors for PG&E 2019-2050 (CalEEMod 2022 Appendix G-3)
2. GWPs per IPCC Fourth Assessment Report (AR4, 2007); used in CalEEMod 2022
3. Assumes continuous PTE operation (8,760 hrs/yr)

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Table 11: Summary of Project Emissions

Table 11a: Summary of Daily Project Emissions - Commissioning Year

Source	NOx (lb/day)	SOx (lb/day)	CO (lb/day)	POC (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
2. Greenwaste Loading	---	---	---	---	0.09	0.01
3. Digestate Dewatering	---	---	---	4.04	---	---
4. Boiler	0.61	0.01	0.93	0.14	0.19	0.19
5. Flare Pilot Yr 1	0.12	0.00	0.10	0.01	0.01	0.01
6. Flare DG Yr 1	15.70	1.70	21.54	2.40	1.95	1.95
8. Emergency Engine	0.38	0.00	1.05	0.38	0.01	0.01
Total (lb/day)	16.81	1.71	23.63	6.96	2.25	2.17

Table 11b: Summary of Annual Project Emissions - Commissioning Year

Source	NOx (lb/yr)	SOx (lb/yr)	CO (lb/yr)	POC (lb/yr)	PM10 (lb/yr)	PM2.5 (lb/yr)
2. Greenwaste Loading	---	---	---	---	27.46	4.12
3. Digestate Dewatering	---	---	---	1,228.80	---	---
4. Boiler	222.36	5.41	338.37	49.60	68.53	68.53
5. Flare Pilot Yr 1	11.00	0.07	9.24	0.61	0.84	0.84
6. Flare DG Yr 1	1,438.80	155.52	1,974.82	219.82	178.67	178.67
8. Emergency Engine	76.72	0.18	210.98	76.72	2.99	2.99
Total (lb/yr)	1,748.88	161.17	2,533.42	1,575.54	278.49	255.16
Total (TPY)	0.87	0.08	1.27	0.79	0.14	0.13

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Table 11c: Summary of Daily Project Emissions - Normal Operations

Source	NOx (lb/day)	SOx (lb/day)	CO (lb/day)	POC (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
2. Greenwaste Loading	---	---	---	---	0.09	0.01
3. Digestate Dewatering	---	---	---	4.04	---	---
4. Boiler	0.61	0.01	0.93	0.14	0.19	0.19
7. Flare Pilot Normal	0.12	0.00	0.10	0.01	0.01	0.01
8. Flare DG Normal	15.70	1.70	21.54	2.40	1.95	1.95
9. Emergency Engine	0.38	0.00	1.05	0.38	0.01	0.01
Total (lb/day)	16.81	1.71	23.63	6.96	2.25	2.17

Table 11d: Summary of Annual Project Emissions - Normal Operations

Source	NOx (lb/yr)	SOx (lb/yr)	CO (lb/yr)	POC (lb/yr)	PM10 (lb/yr)	PM2.5 (lb/yr)
2. Greenwaste Loading	---	---	---	---	27.46	4.12
3. Digestate Dewatering	---	---	---	422.40	---	---
4. Boiler	222.36	5.41	338.37	49.60	68.53	68.53
7. Flare Pilot Normal	1.00	0.01	0.84	0.06	0.08	0.08
8. Flare DG Normal	130.80	14.14	179.53	19.98	16.24	16.24
9. Emergency Engine	76.72	0.18	210.98	76.72	2.99	2.99
Total (lb/yr)	430.88	19.73	729.72	568.76	115.30	91.96
Total (TPY)	0.22	0.01	0.36	0.28	0.06	0.06

Table 11e: Summary of GHG Emissions - Normal Operations

Activity	CO_2 (MT/yr)	CH_4 (MT/yr)	N_2O (MT/yr)	CO2e (MT/Yr)
2. Greenwaste Loading	---	---	---	---
3. Digestate Dewatering	---	---	---	---
4. Boiler	488.05	0.28	0.24	560.92
7. Flare Pilot	5.41E-01	1.02E-05	1.02E-06	5.42E-01
8. Flare DG Normal	113.51	0.20	0.36	114.07
9. Emergency Engine	16.19	0.01	0.01	16.21
10.Energy Consumption	146.06	0.71	0.76	147.53
Total	**764.36**	**1.19**	**1.37**	**839.27**

ATTACHMENT 5 – BASELINE AND PROJECT COMPOSTING EMISSION WORKSHEETS

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NRWS Compost Facility Project Emission Calculations

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Table 1: Compost Process Throughput

Table 1: Process Throughput Calculations

Processing Step	2023 (TPY)	2024 (TPY)	2-Year Average (TPY)	2-Year Average (TPD)
CASP S-6	65,300.26	61,516.86	63,409	175
Stock Pile Yardwaste	85,673.36	82,917.44	84,295	233
Stock Pile Food Waste Building	12,761.73	10,819.81	11,791	33
Stock Pile Wood	8,841.85	9,965.96	9,404	26
Transfer tons Yardwaste	19,785.03	32,030.29	25,908	72
Grinder				
Yardwaste	26,139.08	19,380.69	22,760	63
Wood	8,841.85	9,592.00	9,217	25
Trommel Screen				
Food Depackager	12,761.73	10,819.81	11,791	33
Curing (80% of CASP)	52,240.20	49,213.49	50,727	140
Finish Screen	52,240.20	49,213.49	50,727	140

Data and Parameters		Notes
Daily Operating Hours	9	hours/day
Raw Material Receive Days	362	Day/year

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Table 2: Compost Process Emission Factors

Table 2a: Emission Factors

Pollutant	Phase	Emission Factor	Note
POC	Feedstock Storage	0.2 lb/wet ton/day	1
POC	Composting + Curing	1.60 lb/ton	2
POC	Storage	0.02 lb/ton	3
NH_3	Feedstock Storage	0.02 lb/ton/day	1
NH_3	Composting + curing	0.1780 lb/ton	4
NH_3	Storage	0.00038 lb/ton	5
GHG - CO2	Composting	0.44	6
GHG - CH4	Composting	0.0040	6
GHG - N2O	Composting	0.0003	6

Table 2b: Uncontrolled Grinding and Screening PM Emission Factors

Process Operation	Emission Factor		Note
	PM10 (lb/ton)	PM2.5 (lb/ton)	
Grinding	0.0144	0.00216	7
Screening	0.0144	0.00216	8

Table 2c: Material Handling PM Emission Factors

Variable	Emission Factor		Note
	PM10	PM2.5	
Particle Size Multiplier (dimensionless)	0.35	0.053	9
Mean Wind Speed (MPH)	3.60	3.60	10
Material Moisture Content (%)	4.80	4.80	9
Emission Factor (lb/ton/drop point)	2.15E-04	3.25E-05	calculated

Table 2d: Wind Erosion PM Emission Factors[11]

Variable	PM10	PM2.5	Note
Particulate aerodynamic factor	0.50	0.20	11
Average silt loading of storage pile in percent (%),	0.50	0.50	Assumed
Average number of days during the year with at least 0.01 inches of precipitation	38.40	38.40	12
Percentage of time with unobstructed wind speed >12 mph in percent (%)	5.41	5.41	13
Wind Erosion EF (lb/acre/day)	1.42E-01	5.68E-02	Calculated

Notes:

1. SJVAPCD Compost Emission Factor Report, Originally Published September 15, 2010, Revised March 21, 2023, Table 7.
2. San Joaquin Valley Air Pollution Control District, Compost ROG Emission Factors, September 15, 2010, Table 4.
3. Storage EF from SJVAPCD Compost ROG Emission Factors, Sept 15, 2010, App C, Table 4.3 which is based on 15 days storage.
4. Ammonia emission factor is an average of five source test results from Napa Recycling and Waste Services. Tests were conducted between 2020 and 2022 pursuant to a BAAQMD-approved protocol. NRWS operates a CASP system with positive aeration using greenwaste as feedstock.
5. SJVAPCD Compost VOC Emission Factors, Sept 15, 2010, App C, Table 4.3 which is based on 15 days storage.
6. Greenhouse Gas Emissions Estimation Methodologies for Biogenic Emissions from Selected Source Categories: Solid Waste Disposal Wastewater Treatment Ethanol Fermentation Submitted to: U.S. Environmental Protection Agency Sector Policies and Programs Division Measurement Policy Group, December 14, 2010
7. BAAQMD, Title V Permit Evaluation, Guadalupe Rubbish Disposal Co., Site A3294. BAAQMD references AP-42 for log debarking. Assume 15% fraction of PM2.5.
8. AP-42 section 10.3 Plywood Veneer and Layout Operations Table 10.3-1 (4th Edition) for log debarking, assuming 60% of emissions are PM10 with a 15% fraction of PM2.5.
9. AP-42, Chapter 13.2.4 Aggregate Handling and Storage Piles. Moisture content used is the maximum allowed by the method. Actual moisture content will be higher, thus these emission factors are conservative.
10. CalEEMod 2021. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1
11. Mojave Desert Air Quality Management District, "Emissions Inventory Guidance, Mineral Handling and Processing Industries", Section G, Wind Erosion from Storage Piles, April 2000.
12. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1 has 38.4 days with precipitation > 0.1 inches for Napa County Airport.
13. Average per met data 2007 - 2010.

Ammonia Source Test Results - NRWS

Q2-2022	0.47
Q3-2020	0.07
Q2-2020	0.23
Q4-2020	0.09
Q1-2021	0.03
Average	0.178

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Table 3: Grinding and Screening PM Emissions

Table 3a: Emission Factors

Process Operation	Value	
	PM10	PM2.5
Grinding	0.0144	0.00216
Screening	0.0144	0.00216

Table 3b: Grinding and Screening PM Emissions

Operation	Annual Throughput (TPY)	Peak Daily Throughput (TPD)	Annual Emissions (lb/yr)		Average Daily Emissions (lb/day)		Average Hourly Emissions (lb/hr)	
			PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Grinding	31977	88	115.12	17.27	0.32	0.05	0.04	0.01
Screening	113244	313	407.68	61.15	1.13	0.17	0.13	0.02
		Total	522.80	78.42	1.44	0.22	0.16	0.02
		Total (TPY)	0.26	0.04				

Data and Parameters

Operating Hours	9	hrs/day
Control Efficiency for Watering	75%	Ref: 1

References:

1. Mojave Desert Air Quality Management District, "Emissions Inventory Guidance, Mineral Handling and Processing Industries", Material Handling Table 5, April 2000.

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Table 4: Material Handling PM Emissions

Table 4: Material Handling PM Emissions

Material	Description of Processing	Annual Throughput (ton/yr)	Average Daily Throughput (ton/day)	No. of Drop Points	Annual Emissions (lb/yr)		Average Daily Emissions (lb/day)		Average Hourly Emissions (lb/hr)	
					PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
CASP S-6	Load CASP	63,409	175	2	27.20	4.12	0.08	0.01	0.008	0.001
Stock Pile Yardwaste	Load pile	84,295	233	2	36.16	5.48	0.10	0.02	0.011	0.002
Stock Pile Food Waste Building	Load pile	11,791	33	2	5.06	0.77	0.01	0.00	0.002	0.000
Stock Pile Wood	Load pile	9,404	26	2	4.03	0.61	0.01	0.00	0.001	0.000
Transfer tons Yardwaste	Load pile, load truck	25,908	72	2	11.12	1.68	0.03	0.00	0.003	0.001
Yardwaste	Load grinder, unload, transfer to next operation	22,760	63	3	14.65	2.22	0.04	0.01	0.004	0.001
Wood	Load grinder, unload, transfer to next operation	9,217	25	3	5.93	0.90	0.02	0.00	0.002	0.000
Food Depackager	Load screen, unload, transfer to next operation	11,791	33	3	7.59	1.15	0.02	0.00	0.002	0.000
Curing (80% of CASP)	Load screen, unload, transfer to next operation	50,727	140	3	32.64	4.94	0.09	0.01	0.010	0.002
				Total (lb/yr)	144.39	21.86	0.40	0.06	0.04	0.01
				Total (TPY)	0.07	0.01				

Data and Parameters

Operating Schedule	9	hr/day
Days per year	362	day/yr
PM10 EF	2.15E-04	lb/ton/drop
PM2.5 EF	3.25E-05	lb/ton/drop

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Table 5: Wind Erosion PM Emissions

Table 5a: Wind Erosion Dimensions/Area

Area	Acres	
CASP	1.71	
Curing Pile	1.57	
Stock Pile Yardwaste	1	
Stock Pile Food Waste Building	0	Indoors, no wind erosion
Stock Pile Wood	0.5	
Transfer tons Yardwaste	1	

Table 5b: Wind Erosion PM Emission Factors

Variable	PM10 lb/acre/day	PM2.5 lb/acre/day
Inactive Day Wind Erosion EF	1.42E-01	5.68E-02

Table 5c: Wind Erosion PM Emissions

Area	Acres	Operating Days	Annual Emissions (lb/yr)		Average Daily Emissions (lb/day)		Average Hourly Emissions (lb/hr)	
			PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
CASP	1.71	365	22.16	8.86	0.06	0.02	0.00	0.00
Curing Pile	1.57	365	20.35	8.14	0.06	0.02	0.00	0.00
Stock Pile Yardwaste	1.00	365	12.96	5.18	0.04	0.01	0.00	0.00
Stock Pile Food Waste Building	0.00	365	0.00	0.00	0.00	0.00	0.00	0.00
Stock Pile Wood	0.50	365	6.48	2.59	0.02	0.01	0.00	0.00
Transfer tons Yardwaste	1.00	365	12.96	5.18	0.04	0.01	0.00	0.00
		Total	74.91	29.96	0.21	0.08	0.01	0.00
		Total (TPY)	0.04	0.01				

Data and Parameters	Value	UOM	Notes:
1. Control by watering per MDAQMD Mineral Guidance	75%		All piles are watered for dust suppression or moisture control, or both.
	52	weeks/yr	Constant
Days per year	365	day/yr	Constant
Constant	24	hr/day	Constant

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Table 6: Composting POC and GHG Emissions

Table 6a: Composting POC Emissions

Process Unit	Annual Throughput (ton/yr)	Average Daily Throughput (ton/day)	Emission Factor	Annual Emissions (lb/yr)	Average Daily Emissions (lb/day)	Average Hourly Emissions (lb/hr)
Feedstock Storage	121,994	291	0.2 lb/wet ton/day	48,798	133.69	5.57
Composting + Curing	63,409	175	1.60 lb/ton	101,454	277.96	11.58
Finished Compost Storage	50,727	140	0.02 lb/ton	1,015	2.78	0.12
			Total (lb/yr)	151,266	414.43	17.27
			Total (TPY)	75.63		

Table 6a: Composting GHG Emissions

Pollutant	Emission Factor[1] (kg/dry ton)	GWP	Emissions (MT CO2e)
CO2	0.44	1	19,530
CH4	0.0040	28	4,971
N2O	0.0003	265	3,529

Data and Parameters			Notes
Daily Hours of Emissions	24	hr/day	Constant
Feedstock Storage Duration	2	days	Project Description
Raw Material Processed in Receiving Storage	100%		Assumption
Days per year	365	days per year	
Curing as a % of CASP	80%		Per NRWS
Moisture Content	30%		Assumed

Notes:

1. Greenhouse Gas Emissions Estimation Methodologies for Biogenic Emissions from Selected Source Categories: Solid Waste Disposal Wastewater Treatment Ethanol Fermentation Submitted to: U.S. Environmental Protection Agency Sector Policies and Programs Division Measurement Policy Group, December 14, 2010

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Table 7: Summary of Emissions

Table 7a: Summary of Daily Criteria Pollutant Emissions

Activity	NOx (lb/day)	POC (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
3. Grind and Screen	---	---	---	---	1.44	0.22
4. Material Handling	---	---	---	---	0.40	0.06
5. Wind Erosion	---	---	---	---	0.21	0.08
6. Composting POC	---	414.43	---	---	---	---
Total	0.00	0.00	0.00	0.00	2.05	0.36

Table 7b: Summary of Annual Criteria Pollutant Emissions

Activity	NOx (lb/yr)	POC (lb/yr)	CO (lb/yr)	SOx (lb/yr)	PM10 (lb/yr)	PM2.5 (lb/yr)
3. Grind and Screen	---	---	---	---	522.80	78.42
4. Material Handling	---	---	---	---	144.39	21.86
5. Wind Erosion	---	---	---	---	74.91	29.96
6. Composting POC	---	151,266	---	---	---	---
Total	0.00	151,266	0.00	0.00	742.09	130.25
Total (TPY)	0.00	75.63	0.00	0.00	0.37	0.07

Table 7c: Composting GHG Emissions

Pollutant	Emissions (MT CO2e)
CO2	19,530
CH4	4,971
N2O	3,529
Total CO2e	28,030

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Table 8: TAC from Composting Dust

Table 8a: Material Handling and Wind Erosion Dust Emissions

Source	lb/hr	lb/yr
Grinding and Screening	0.16	522.80
Material Handling	0.04	144.39
Wind Erosion	0.01	74.91
Total PM10	**0.21**	**742.09**

Table 8b: TAC from Material Handling and Wind Erosion

TAC	Concentration (lb/lb Dust)	TAC Emissions (lb/hr)	TAC Emissions (lb/yr)
Arsenic	6.20E-06	1.32E-06	4.60E-03
Cadmium	2.00E-06	4.27E-07	1.48E-03
Hexavalent Chromium	2.45E-06	5.23E-07	1.82E-03
Cobalt	8.80E-06	1.88E-06	6.53E-03
Copper	6.90E-05	1.47E-05	5.12E-02
Lead	2.00E-04	4.27E-05	1.48E-01
Manganese	4.40E-04	9.39E-05	3.27E-01
Mercury	1.00E-06	2.13E-07	7.42E-04
Nickel	9.50E-05	2.03E-05	7.05E-02
Selenium	1.00E-06	2.13E-07	7.42E-04
			0.613

Notes:

1. SJVAPCD Toxic Emission Factors for fugitive dust from "PM10 based Emissions from Operations generating Dust from Greenwaste Composting" (June 7, 2016), accessed: https://www.valleyair.org/busind/pto/emission_factors/emission_factors_idx.htm
2. Hexavalent chromium is assumed to be 5% of total chromium per SJVAPCD guidance.

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Table 9: NH3 Emissions

Table 9: NH3 Emissions

Process Unit	Annual Throughput (ton/yr)	Daily Throughput (ton/day)	Emission Factor (lb/ton)	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)
Feedstock Storage	121,994	291	0.02 lb/ton/day	4,880	0.56
Composting & Curing	63,409	175	0.178 lb/ton	11,287	1.29
Finished Compost Storage	50,727	140	0.0004 lb/ton	19	0.00
				16,186	1.85

Data and Parameters

Daily Hours of Emissions	24	hr/day
Days of feedstock storage	2	days
Annual hours of operation	8,760	hr/yr

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Table 10: Organic TAC Emissions

Table 10a: POC Emissions

Feedstock Storage		Composting + Curing		Finished Compost Storage	
(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)
5.57	48,798	11.58	101,454	0.12	1,015

Table 10b: Organic TAC Emissions

TAC	Feedstock Storage			Composting			Finished Compost Storage		
	Speciation[1]	Emissions		Speciation[2]	Emissions		Speciation[3]	Emissions	
	lb TAC/lb POC	lb/hr	lb/yr	lb TAC/lb POC	lb/hr	lb/yr	lb TAC/lb POC	lb/hr	lb/yr
Acetone	8.25E-03	4.60E-02	4.03E+02	7.23E-02	8.37E-01	7.34E+03	4.86E-02	5.63E-03	4.93E+01
1,4-Dichlorobenzene	4.21E-04	2.35E-03	2.05E+01	2.22E-04	2.57E-03	2.25E+01	3.56E-03	4.12E-04	3.61E+00
Isopropyl alcohol (IPA)	1.13E-03	6.29E-03	5.51E+01	2.59E-04	3.00E-03	2.63E+01	1.46E-03	1.69E-04	1.48E+00
Acetaldehyde	8.96E-02	4.99E-01	4.37E+03	4.29E-02	4.97E-01	4.35E+03	1.86E-02	2.15E-03	1.89E+01
Allyl Chloride (3-Chloropropene)	2.19E-04	1.22E-03	1.07E+01	1.08E-04	1.25E-03	1.10E+01	1.86E-03	2.15E-04	1.89E+00
Benzene	2.24E-04	1.25E-03	1.09E+01	1.60E-04	1.85E-03	1.62E+01	1.89E-03	2.19E-04	1.92E+00
Carbon disulfide	2.18E-04	1.21E-03	1.06E+01	3.74E-04	4.33E-03	3.79E+01	7.75E-03	8.98E-04	7.86E+00
Chloroethane	1.85E-04	1.03E-03	9.03E+00	8.30E-05	9.61E-04	8.42E+00	1.56E-03	1.81E-04	1.58E+00
Chloroform	3.42E-04	1.91E-03	1.67E+01	1.63E-04	1.89E-03	1.65E+01	2.89E-03	3.35E-04	2.93E+00
Ethylbenzene	3.04E-04	1.69E-03	1.48E+01	3.50E-04	4.05E-03	3.55E+01	2.57E-03	2.98E-04	2.61E+00
Ethylene Dichloride (1,2-dichloroethan	2.84E-04	1.58E-03	1.39E+01	5.37E-04	6.22E-03	5.45E+01	2.40E-03	2.78E-04	2.43E+00
Hexane	7.86E-03	4.38E-02	3.84E+02	3.18E-04	3.68E-03	3.23E+01	2.09E-03	2.42E-04	2.12E+00
Methanol	9.68E-02	5.39E-01	4.72E+03	4.88E-02	5.65E-01	4.95E+03	7.77E-04	9.00E-05	7.88E-01
Methyl ethyl ketone	5.36E-02	2.99E-01	2.62E+03	7.82E-02	9.06E-01	7.93E+03	1.75E-03	2.03E-04	1.78E+00
Naphthalene	2.81E-04	1.57E-03	1.37E+01	7.14E-04	8.27E-03	7.24E+01	3.11E-03	3.60E-04	3.16E+00
Propene (Propylene)	9.45E-05	5.26E-04	4.61E+00	5.89E-03	6.82E-02	5.98E+02	6.87E-02	7.96E-03	6.97E+01
Styrene	2.98E-04	1.66E-03	1.45E+01	3.53E-04	4.09E-03	3.58E+01	2.53E-03	2.93E-04	2.57E+00
Toluene	2.64E-04	1.47E-03	1.29E+01	6.30E-04	7.30E-03	6.39E+01	6.96E-03	8.06E-04	7.06E+00
Vinyl acetate	1.45E-02	8.08E-02	7.08E+02	3.01E-03	3.49E-02	3.05E+02	2.09E-03	2.42E-04	2.12E+00
Xylenes	3.15E-04	1.75E-03	1.54E+01	4.36E-04	5.05E-03	4.42E+01	5.15E-03	5.96E-04	5.22E+00

Notes:

1. TAC emission factors from the BAAQMD Permit Handbook, Section 11.16, Table 1-2
2. TAC emission factors from the BAAQMD Permit Handbook, Section 11.16, Table 1-3
3. TAC emission factors from the BAAQMD Permit Handbook, Section 11.16, Table 1-5

NRWS Compost Facility Baseline Emission Calculations

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Table 1: Compost Process Throughput

Table 1: Process Throughput Calculations

Processing Step	2023 (TPY)	2024 (TPY)	2-Year Average (TPY)	2-Year Average (TPD)
CASP S-6	65,300.26	61,516.86	63,409	175
Stock Pile Yardwaste	85,673.36	82,917.44	84,295	233
Stock Pile Food Waste Building	12,761.73	10,819.81	11,791	33
Stock Pile Wood	8,841.85	9,965.96	9,404	26
Transfer tons Yardwaste	19,785.03	32,030.29	25,908	72
Grinder				
Yardwaste	26,139.08	19,380.69	22,760	63
Wood	8,841.85	9,592.00	9,217	25
Trommel Screen				
Food Depackager	12,761.73	10,819.81	11,791	33
Curing (80% of CASP)	52,240.20	49,213.49	50,727	140
Finish Screen	52,240.20	49,213.49	50,727	140

Data and Parameters

Daily Operating Hours	9	hours/day
Raw Material Receive Days	362	Day/year

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Table 2: Compost Process Emission Factors

Table 2a: Emission Factors

Pollutant	Phase	Emission Factor	Note
POC	Feedstock Storage	0.2 lb/wet ton/day	1
POC	Composting + Curing	1.60 lb/ton	2
POC	Storage	0.02 lb/ton	4
NH_3	Feedstock Storage	0.02 lb/ton/day	1
NH_3	Composting + curing	0.1780 lb/ton	5
NH_3	Storage	0.00038 lb/ton	6
GHG - CO2	Composting	0.44	6
GHG - CH4	Composting	0.0040	6
GHG - N2O	Composting	0.0003	6

Table 2b: Uncontrolled Grinding and Screening PM Emission Factors

Process Operation	Emission Factor		Note
	PM10 (lb/ton)	PM2.5 (lb/ton)	
Grinding	0.0144	0.00216	7
Screening	0.0144	0.00216	8

Table 2c: Material Handling PM Emission Factors

Variable	Emission Factor		Note
	PM10	PM2.5	
Particle Size Multiplier (dimensionless)	0.35	0.053	9
Mean Wind Speed (MPH)	3.60	3.60	10
Material Moisture Content (%)	4.80	4.80	9
Emission Factor (lb/ton/drop point)	2.15E-04	3.25E-05	calculated

Table 2d: Wind Erosion PM Emission Factors[11]

Variable	PM10	PM2.5	Note
Particulate aerodynamic factor	0.50	0.20	11
Average silt loading of storage pile in percent (%),	0.50	0.50	Assumed
Average number of days during the year with at least 0.01 inches of precipitation	38.40	38.40	12
Percentage of time with unobstructed wind speed >12 mph in percent (%)	5.41	5.41	13
Wind Erosion EF (lb/acre/day)	1.42E-01	5.68E-02	Calculated

Notes:

1. SJVAPCD Compost Emission Factor Report, Originally Published September 15, 2010, Revised March 21, 2023, Table 7.
2. San Joaquin Valley Air Pollution Control District, Compost ROG Emission Factors, September 15, 2010, Table 4.
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9. AP-42, Chapter 13.2.4 Aggregate Handling and Storage Piles. Moisture content used is the maximum allowed by the method. Actual moisture content will be higher,
10. CalEEMod 2021. http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=6, Table 1.1
11. Mojave Desert Air Quality Management District, "Emissions Inventory Guidance, Mineral Handling and Processing Industries", Section G, Wind Erosion from Storage Piles, April 2000.
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13. Average per met data 2007 - 2010.

Ammonia Source Test Results - NRWS	lb/ton
Q2-2022	0.47
Q3-2020	0.07
Q2-2020	0.23
Q4-2020	0.09
Q1-2021	0.03
Average	0.178

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Table 3a: Emission Factors

Process Operation	Value	
	PM10	PM2.5
Grinding	0.0144	0.00216
Screening	0.0144	0.00216

Table 3b: Grinding and Screening PM Emissions

Operation	Annual Throughput (TPY)	Peak Daily Throughput (TPD)	Annual Emissions (lb/yr)		Average Daily Emissions (lb/day)		Average Hourly Emissions (lb/hr)	
			PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Grinding	31977	88	115.12	17.27	0.32	0.05	0.04	0.01
Screening	113244	313	407.68	61.15	1.13	0.17	0.13	0.02
		Total	522.80	78.42	1.44	0.22	0.16	0.02
		Total (TPY)	0.26	0.04				

Data and Parameters

Operating Hours	9	hrs/day
Control Efficiency for Watering	75%	Ref: 1

References:

1. Mojave Desert Air Quality Management District, "Emissions Inventory Guidance, Mineral Handling and Processing Industries", Material Handling Table 5, April 2000.

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Table 4: Material Handling PM Emissions

Table 4: Material Handling PM Emissions

Material	Description of Processing	Annual Throughput (ton/yr)	Average Daily Throughput (ton/day)	No. of Drop Points	Annual Emissions (lb/yr)		Average Daily Emissions (lb/day)		Average Hourly Emissions (lb/hr)	
					PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
CASP S-6	Load CASP	63,409	175	2	27.20	4.12	0.08	0.01	0.008	0.001
Stock Pile Yardwaste	Load pile	84,295	233	2	36.16	5.48	0.10	0.02	0.011	0.002
Stock Pile Food Waste Building	Load pile	11,791	33	2	5.06	0.77	0.01	0.00	0.002	0.000
Stock Pile Wood	Load pile	9,404	26	2	4.03	0.61	0.01	0.00	0.001	0.000
Transfer tons Yardwaste	Load pile, load truck	25,908	72	2	11.12	1.68	0.03	0.00	0.003	0.001
Yardwaste	Load grinder, unload, transfer to next operation	22,760	63	3	14.65	2.22	0.04	0.01	0.004	0.001
Wood	Load grinder, unload, transfer to next operation	9,217	25	3	5.93	0.90	0.02	0.00	0.002	0.000
Food Depackager	Load screen, unload, transfer to next operation	11,791	33	3	7.59	1.15	0.02	0.00	0.002	0.000
Curing (80% of CASP)	Load screen, unload, transfer to next operation	50,727	140	3	32.64	4.94	0.09	0.01	0.010	0.002
				Total (lb/yr)	144.39	21.86	0.40	0.06	0.04	0.01
				Total (TPY)	0.07	0.01				

Data and Parameters

Operating Schedule	9	hr/day
Days per year	362	day/yr
PM10 EF	2.15E-04	lb/ton/drop
PM2.5 EF	3.25E-05	lb/ton/drop

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Table 5: Wind Erosion PM Emissions

Table 5a: Wind Erosion Dimensions/Area

Area	Acres	
CASP	1.71	
Curing Pile	1.57	
Stock Pile Yardwaste	1	
Stock Pile Food Waste Building	0	Indoors, no wind erosion
Stock Pile Wood	0.5	
Transfer tons Yardwaste	1	

Table 5b: Wind Erosion PM Emission Factors

Variable	PM10 lb/acre/day	PM2.5 lb/acre/day
Inactive Day Wind Erosion EF	1.42E-01	5.68E-02

Table 5c: Wind Erosion PM Emissions

Area	Acres	Operating Days	Annual Emissions (lb/yr)		Average Daily Emissions (lb/day)		Average Hourly Emissions (lb/hr)	
			PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
CASP	1.71	365	22.16	8.86	0.06	0.02	0.00	0.00
Curing Pile	1.57	365	20.35	8.14	0.06	0.02	0.00	0.00
Stock Pile Yardwaste	1.00	365	12.96	5.18	0.04	0.01	0.00	0.00
Stock Pile Food Waste Building	0.00	365	0.00	0.00	0.00	0.00	0.00	0.00
Stock Pile Wood	0.50	365	6.48	2.59	0.02	0.01	0.00	0.00
Transfer tons Yardwaste	1.00	365	12.96	5.18	0.04	0.01	0.00	0.00
		Total	74.91	29.96	0.21	0.08	0.01	0.00
		Total (TPY)	0.04	0.01				

Data and Parameters	Value	UOM	Notes:
1. Control by watering per MDAQMD Mineral Guidance	75%		All piles are watered for dust suppression or moisture control, or both.
	52	weeks/yr	Constant
Days per year	365	day/yr	Constant
Constant	24	hr/day	Constant

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Table 6: Composting POC Emissions

Table 6: Composting POC Emissions

Process Unit	Annual Throughput (ton/yr)	Average Daily Throughput (ton/day)	Emission Factor	Annual Emissions (lb/yr)	Average Daily Emissions (lb/day)	Average Hourly Emissions (lb/hr)
Feedstock Storage	121,994	291	0.2 lb/wet ton/day	48,798	133.69	5.57
Composting + Curing	63,409	175	1.60 lb/ton	101,454	277.96	11.58
Finished Compost Storage	50,727	140	0.02 lb/ton	1,015	2.78	0.12
			Total (lb/yr)	151,266	414.43	17.27
			Total (TPY)	75.63		

Table 6a: Composting GHG Emissions

Pollutant	Emission Factor[1] (kg/dry ton)	GWP	Emissions (MT CO2e)
CO2	0.44	1	19,530
CH4	0.0040	28	4,971
N2O	0.0003	265	3,529

Data and Parameters			Notes
Daily Hours of Emissions	24	hr/day	Constant
Feedstock Storage Duration	2	days	Project Description
Raw Material Processed in Receiving Storage	100%		Assumption
Days per year	365	days per year	
Curing as a % of CASP	80%		Per NRWS
Moisture Content	30%		Assumed

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Table 7: Summary of Emissions

Table 7a: Summary of Daily Criteria Pollutant Emissions

Activity	NOx (lb/day)	POC (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
3. Grind and Screen	---	---	---	---	1.44	0.22
4. Material Handling	---	---	---	---	0.40	0.06
5. Wind Erosion	---	---	---	---	0.21	0.08
6. Composting POC	---	414.43	---	---	---	---
Total	0.00	414.43	0.00	0.00	2.05	0.36

Table 7b: Summary of Annual Criteria Pollutant Emissions

Activity	NOx (lb/yr)	POC (lb/yr)	CO (lb/yr)	SOx (lb/yr)	PM10 (lb/yr)	PM2.5 (lb/yr)
3. Grind and Screen	---	---	---	---	522.80	78.42
4. Material Handling	---	---	---	---	144.39	21.86
5. Wind Erosion	---	---	---	---	74.91	29.96
6. Composting POC	---	151,266	---	---	---	---
Total	0.00	151,266	0.00	0.00	742.09	130.25
Total (TPY)	0.00	75.63	0.00	0.00	0.37	0.07

Table 7c: Composting GHG Emissions

Pollutant	Emissions (MT CO2e)
CO2	19,530
CH4	4,971
N2O	3,529
Total CO2e	28,030

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Table 8: TAC from Composting Dust

Table 8a: Material Handling and Wind Erosion Dust Emissions

Source	lb/hr	lb/yr
Grinding and Screening	0.16	522.80
Material Handling	0.04	144.39
Wind Erosion	0.01	74.91
Total PM10	**0.21**	**742.09**

Table 8b: TAC from Material Handling and Wind Erosion

TAC	Concentration (lb/lb Dust)	TAC Emissions (lb/hr)	TAC Emissions (lb/yr)
Arsenic	6.20E-06	1.32E-06	4.60E-03
Cadmium	2.00E-06	4.27E-07	1.48E-03
Hexavalent Chromium	2.45E-06	5.23E-07	1.82E-03
Cobalt	8.80E-06	1.88E-06	6.53E-03
Copper	6.90E-05	1.47E-05	5.12E-02
Lead	2.00E-04	4.27E-05	1.48E-01
Manganese	4.40E-04	9.39E-05	3.27E-01
Mercury	1.00E-06	2.13E-07	7.42E-04
Nickel	9.50E-05	2.03E-05	7.05E-02
Selenium	1.00E-06	2.13E-07	7.42E-04
			0.613

Notes:

1. SJVAPCD Toxic Emission Factors for fugitive dust from "PM10 based Emissions from Operations generating Dust from Greenwaste Composting" (June 7, 2016), accessed: https://www.valleyair.org/busind/pto/emission_factors/emission_factors_idx.htm
2. Hexavalent chromium is assumed to be 5% of total chromium per SJVAPCD guidance.

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Table 9: NH3 Emissions

Table 9: NH3 Emissions

Process Unit	Annual Throughput (ton/yr)	Daily Throughput (ton/day)	Emission Factor (lb/ton)	Annual Emissions (lb/yr)	Hourly Emissions (lb/hr)
Feedstock Storage	121,994	291	0.0200 lb/ton/day	4,880	0.56
Composting & Curing	63,409	175	0.1780 lb/ton	11,287	1.29
Finished Compost Storage	50,727	140	0.0004 lb/ton	19	0.00
				16,186	1.85

Data and Parameters

Daily Hours of Emissions	24	hr/day
Days of feedstock storage	2	days
Annual hours of operation	8,760	hr/yr

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Table 10: Organic TAC Emissions

Table 10a: POC Emissions

Feedstock Storage		Composting + Curing		Finished Compost Storage	
(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)
5.57	48797.53	11.58	101,454	0.12	1,015

Table 10b: Organic TAC Emissions

TAC	Feedstock Storage			Composting			Finished Compost Storage		
	Speciation1	Emissions		Speciation2	Emissions		Speciation3	Emissions	
	lb TAC/lb POC	lb/hr	lb/yr	lb TAC/lb POC	lb/hr	lb/yr	lb TAC/lb POC	lb/hr	lb/yr
Acetone	8.25E-03	4.60E-02	4.03E+02	7.23E-02	8.37E-01	7.34E+03	4.86E-02	5.63E-03	4.93E+01
1,4-Dichlorobenzene	4.21E-04	2.35E-03	2.05E+01	2.22E-04	2.57E-03	2.25E+01	3.56E-03	4.12E-04	3.61E+00
Isopropyl alcohol (IPA)	1.13E-03	6.29E-03	5.51E+01	2.59E-04	3.00E-03	2.63E+01	1.46E-03	1.69E-04	1.48E+00
Acetaldehyde	8.96E-02	4.99E-01	4.37E+03	4.29E-02	4.97E-01	4.35E+03	1.86E-02	2.15E-03	1.89E+01
Allyl Chloride (3-Chloropropene)	2.19E-04	1.22E-03	1.07E+01	1.08E-04	1.25E-03	1.10E+01	1.86E-03	2.15E-04	1.89E+00
Benzene	2.24E-04	1.25E-03	1.09E+01	1.60E-04	1.85E-03	1.62E+01	1.89E-03	2.19E-04	1.92E+00
Carbon disulfide	2.18E-04	1.21E-03	1.06E+01	3.74E-04	4.33E-03	3.79E+01	7.75E-03	8.98E-04	7.86E+00
Chloroethane	1.85E-04	1.03E-03	9.03E+00	8.30E-05	9.61E-04	8.42E+00	1.56E-03	1.81E-04	1.58E+00
Chloroform	3.42E-04	1.91E-03	1.67E+01	1.63E-04	1.89E-03	1.65E+01	2.89E-03	3.35E-04	2.93E+00
Ethylbenzene	3.04E-04	1.69E-03	1.48E+01	3.50E-04	4.05E-03	3.55E+01	2.57E-03	2.98E-04	2.61E+00
Ethylene Dichloride (1,2-dichloroethan	2.84E-04	1.58E-03	1.39E+01	5.37E-04	6.22E-03	5.45E+01	2.40E-03	2.78E-04	2.43E+00
Hexane	7.86E-03	4.38E-02	3.84E+02	3.18E-04	3.68E-03	3.23E+01	2.09E-03	2.42E-04	2.12E+00
Methanol	9.68E-02	5.39E-01	4.72E+03	4.88E-02	5.65E-01	4.95E+03	7.77E-04	9.00E-05	7.88E-01
Methyl ethyl ketone	5.36E-02	2.99E-01	2.62E+03	7.82E-02	9.06E-01	7.93E+03	1.75E-03	2.03E-04	1.78E+00
Naphthalene	2.81E-04	1.57E-03	1.37E+01	7.14E-04	8.27E-03	7.24E+01	3.11E-03	3.60E-04	3.16E+00
Propene (Propylene)	9.45E-05	5.26E-04	4.61E+00	5.89E-03	6.82E-02	5.98E+02	6.87E-02	7.96E-03	6.97E+01
Styrene	2.98E-04	1.66E-03	1.45E+01	3.53E-04	4.09E-03	3.58E+01	2.53E-03	2.93E-04	2.57E+00
Toluene	2.64E-04	1.47E-03	1.29E+01	6.30E-04	7.30E-03	6.39E+01	6.96E-03	8.06E-04	7.06E+00
Vinyl acetate	1.45E-02	8.08E-02	7.08E+02	3.01E-03	3.49E-02	3.05E+02	2.09E-03	2.42E-04	2.12E+00
Xylenes	3.15E-04	1.75E-03	1.54E+01	4.36E-04	5.05E-03	4.42E+01	5.15E-03	5.96E-04	5.22E+00

Notes:

1. TAC emission factors from the BAAQMD Permit Handbook, Section 11.16, Table 1-2
2. TAC emission factors from the BAAQMD Permit Handbook, Section 11.16, Table 1-3
3. TAC emission factors from the BAAQMD Permit Handbook, Section 11.16, Table 1-5

ATTACHMENT 6 – WOODCHIP MANAGEMENT GHG EMISSIONS

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USER INPUTS

Landfill Name or Identifier: Potrero Hills

(Optional): Utilize data submitted to Greenhouse Gas Reporting Program (GHGRP) to auto-fill Landfill Name and Characte

GHGRP ID	Optional

TRUE

1: PROVIDE LANDFILL CHARACTERISTICS

Landfill Open Year	2000	
Landfill Closure Year	2079	
Have Model Calculate Closure Year?	No	
Waste Design Capacity		Metric tons

2: DETERMINE MODEL PARAMETERS

Methane Generation Rate, k (*year*$^{-1}$)

Conventional NSPS - 0.05

Methane Generation Potential, L_0 (*m^3/Mg*)

NSPS - 170

NMOC Concentration (*ppmv as hexane*)

NSPS Tier 1 - 4,000

Methane Content (*% by volume*)

50

3: SELECT GASES/POLLUTANTS

Gas / Pollutant #1 **Default pollutant parameters are currently being used by model.**

Total landfill gas

Gas / Pollutant #2

Methane

Gas / Pollutant #3

Carbon Dioxide

Gas / Pollutant #4

NMOC

Description/Comments:

4: ENTER WASTE ACCEPTANCE RATES

Input Units: US tons/year

Year	Input Units *(Short tons/yr)*	Calculated Units *(Mg/yr)*
2000		0
2001		0
2002		0
2003		0
2004		0
2005		0
2006		0
2007		0
2008		0
2009		0
2010		0
2011		0
2012		0
2013		0
2014		0
2015		0
2016		0
2017		0
2018		0
2019		0
2020		0
2021		0
2022		0
2023		0
2024		0
2025		0
2026		0
2027	15,960	14,479
2028	15,960	14,479
2029	15,960	14,479
2030	15,960	14,479
2031	15,960	14,479
2032	15,960	14,479
2033	15,960	14,479
2034	15,960	14,479
2035	15,960	14,479
2036	15,960	14,479
2037	15,960	14,479
2038	15,960	14,479
2039	15,960	14,479

4: ENTER WASTE ACCEPTANCE RATES

Input Units: US tons/year

Year	Input Units *(Short tons/yr)*	Calculated Units *(Mg/yr)*
2040	15,960	14,479
2041	15,960	14,479
2042	15,960	14,479
2043	15,960	14,479
2044	15,960	14,479
2045	15,960	14,479
2046	15,960	14,479
2047	15,960	14,479
2048	15,960	14,479
2049	15,960	14,479
2050	15,960	14,479
2051	15,960	14,479
2052	15,960	14,479
2053		0
2054		0
2055		0
2056		0
2057		0
2058		0
2059		0
2060		0
2061		0
2062		0
2063		0
2064		0
2065		0
2066		0
2067		0
2068		0
2069		0
2070		0
2071		0
2072		0
2073		0
2074		0
2075		0
2076		0
2077		0
2078		0
2079		0

RESULTS

Landfill Name or Identifier: Potrero Hills

Closure Year (with 80-year limit) = 2079

Methane = 50 *% by volume*

Please choose a third unit of measure to represent all of the emission rates below.

User-specified Unit: av ft^3/min

Year	Waste Accepted		Waste-In-Place		Total landfill gas			Methane			Carbon Dioxide			NMOC		
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2002	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2003	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2004	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2005	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2006	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2007	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2008	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2009	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2010	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2011	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2012	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2013	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2014	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2015	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2016	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2017	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2018	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2019	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2020	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2021	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2022	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2023	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2024	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2025	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2026	0	0	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2027	14,479	15,960	0	0	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2028	14,479	15,960	14,479	15,960	3.006E+02	2.407E+05	1.617E+01	8.029E+01	1.203E+05	8.086E+00	2.203E+02	1.203E+05	8.086E+00	3.451E+00	9.628E+02	6.469E-02
2029	14,479	15,960	28,958	31,920	5.866E+02	4.696E+05	3.155E+01	1.567E+02	2.348E+05	1.578E+01	4.298E+02	2.348E+05	1.578E+01	6.734E+00	1.879E+03	1.262E-01
2030	14,479	15,960	43,436	47,880	8.586E+02	6.874E+05	4.619E+01	2.293E+02	3.437E+05	2.309E+01	6.292E+02	3.437E+05	2.309E+01	9.856E+00	2.750E+03	1.848E-01
2031	14,479	15,960	57,915	63,840	1.117E+03	8.946E+05	6.011E+01	2.984E+02	4.473E+05	3.005E+01	8.188E+02	4.473E+05	3.005E+01	1.283E+01	3.578E+03	2.404E-01
2032	14,479	15,960	72,394	79,800	1.363E+03	1.092E+06	7.335E+01	3.641E+02	5.458E+05	3.667E+01	9.991E+02	5.458E+05	3.667E+01	1.565E+01	4.367E+03	2.934E-01
2033	14,479	15,960	86,873	95,760	1.598E+03	1.279E+06	8.594E+01	4.267E+02	6.395E+05	4.297E+01	1.171E+03	6.395E+05	4.297E+01	1.834E+01	5.116E+03	3.438E-01
2034	14,479	15,960	101,352	111,720	1.820E+03	1.457E+06	9.792E+01	4.862E+02	7.287E+05	4.896E+01	1.334E+03	7.287E+05	4.896E+01	2.090E+01	5.830E+03	3.917E-01
2035	14,479	15,960	115,831	127,680	2.032E+03	1.627E+06	1.093E+02	5.427E+02	8.135E+05	5.466E+01	1.489E+03	8.135E+05	5.466E+01	2.333E+01	6.508E+03	4.373E-01
2036	14,479	15,960	130,309	143,640	2.234E+03	1.788E+06	1.202E+02	5.965E+02	8.942E+05	6.008E+01	1.637E+03	8.942E+05	6.008E+01	2.564E+01	7.153E+03	4.806E-01
2037	14,479	15,960	144,788	159,600	2.425E+03	1.942E+06	1.305E+02	6.477E+02	9.709E+05	6.524E+01	1.777E+03	9.709E+05	6.524E+01	2.784E+01	7.767E+03	5.219E-01
2038	14,479	15,960	159,267	175,560	2.608E+03	2.088E+06	1.403E+02	6.964E+02	1.044E+06	7.014E+01	1.911E+03	1.044E+06	7.014E+01	2.993E+01	8.351E+03	5.611E-01
2039	14,479	15,960	173,746	191,520	2.781E+03	2.227E+06	1.496E+02	7.428E+02	1.113E+06	7.480E+01	2.038E+03	1.113E+06	7.480E+01	3.193E+01	8.907E+03	5.984E-01
2040	14,479	15,960	188,225	207,480	2.946E+03	2.359E+06	1.585E+02	7.868E+02	1.179E+06	7.924E+01	2.159E+03	1.179E+06	7.924E+01	3.382E+01	9.435E+03	6.339E-01
2041	14,479	15,960	202,703	223,440	3.103E+03	2.484E+06	1.669E+02	8.287E+02	1.242E+06	8.346E+01	2.274E+03	1.242E+06	8.346E+01	3.562E+01	9.938E+03	6.677E-01
2042	14,479	15,960	217,182	239,400	3.252E+03	2.604E+06	1.750E+02	8.686E+02	1.302E+06	8.748E+01	2.383E+03	1.302E+06	8.748E+01	3.733E+01	1.042E+04	6.998E-01
2043	14,479	15,960	231,661	255,360	3.394E+03	2.718E+06	1.826E+02	9.065E+02	1.359E+06	9.130E+01	2.487E+03	1.359E+06	9.130E+01	3.896E+01	1.087E+04	7.304E-01
2044	14,479	15,960	246,140	271,320	3.529E+03	2.826E+06	1.899E+02	9.426E+02	1.413E+06	9.493E+01	2.586E+03	1.413E+06	9.493E+01	4.052E+01	1.130E+04	7.595E-01
2045	14,479	15,960	260,619	287,280	3.658E+03	2.929E+06	1.968E+02	9.769E+02	1.464E+06	9.839E+01	2.680E+03	1.464E+06	9.839E+01	4.199E+01	1.171E+04	7.871E-01
2046	14,479	15,960	275,098	303,240	3.780E+03	3.027E+06	2.034E+02	1.010E+03	1.513E+06	1.017E+02	2.770E+03	1.513E+06	1.017E+02	4.339E+01	1.211E+04	8.134E-01
2047	14,479	15,960	289,576	319,200	3.896E+03	3.120E+06	2.096E+02	1.041E+03	1.560E+06	1.048E+02	2.855E+03	1.560E+06	1.048E+02	4.473E+01	1.248E+04	8.384E-01
2048	14,479	15,960	304,055	335,160	4.007E+03	3.208E+06	2.156E+02	1.070E+03	1.604E+06	1.078E+02	2.936E+03	1.604E+06	1.078E+02	4.600E+01	1.283E+04	8.622E-01
2049	14,479	15,960	318,534	351,120	4.112E+03	3.292E+06	2.212E+02	1.098E+03	1.646E+06	1.106E+02	3.013E+03	1.646E+06	1.106E+02	4.721E+01	1.317E+04	8.849E-01
2050	14,479	15,960	333,013	367,080	4.212E+03	3.372E+06	2.266E+02	1.125E+03	1.686E+06	1.133E+02	3.087E+03	1.686E+06	1.133E+02	4.835E+01	1.349E+04	9.064E-01
2051	14,479	15,960	347,492	383,040	4.308E+03	3.449E+06	2.317E+02	1.150E+03	1.724E+06	1.159E+02	3.156E+03	1.724E+06	1.159E+02	4.945E+01	1.379E+04	9.269E-01
2052	14,479	15,960	361,970	399,000	4.398E+03	3.521E+06	2.366E+02	1.175E+03	1.761E+06	1.183E+02	3.223E+03	1.761E+06	1.183E+02	5.049E+01	1.408E+04	9.464E-01
2053	14,479	15,960	376,449	414,960	4.484E+03	3.590E+06	2.412E+02	1.198E+03	1.795E+06	1.206E+02	3.286E+03	1.795E+06	1.206E+02	5.147E+01	1.436E+04	9.649E-01
2054	14,479	15,960	390,928	430,920	4.566E+03	3.656E+06	2.456E+02	1.219E+03	1.828E+06	1.228E+02	3.346E+03	1.828E+06	1.228E+02	5.242E+01	1.462E+04	9.825E-01
2055	14,479	15,960	405,407	446,880	4.644E+03	3.718E+06	2.498E+02	1.240E+03	1.859E+06	1.249E+02	3.403E+03	1.859E+06	1.249E+02	5.331E+01	1.487E+04	9.993E-01
2056	14,479	15,960	419,886	462,840	4.718E+03	3.777E+06	2.538E+02	1.260E+03	1.889E+06	1.269E+02	3.457E+03	1.889E+06	1.269E+02	5.416E+01	1.511E+04	1.015E+00
2057	14,479	15,960	434,365	478,800	4.789E+03	3.834E+06	2.576E+02	1.279E+03	1.917E+06	1.288E+02	3.509E+03	1.917E+06	1.288E+02	5.497E+01	1.534E+04	1.030E+00
2058	14,479	15,960	448,843	494,760	4.856E+03	3.888E+06	2.612E+02	1.297E+03	1.944E+06	1.306E+02	3.558E+03	1.944E+06	1.306E+02	5.574E+01	1.555E+04	1.045E+00
2059	14,479	15,960	463,322	510,720	4.920E+03	3.939E+06	2.646E+02	1.314E+03	1.969E+06	1.323E+02	3.605E+03	1.969E+06	1.323E+02	5.647E+01	1.575E+04	1.059E+00
2060	14,479	15,960	477,801	526,680	4.980E+03	3.987E+06	2.679E+02	1.330E+03	1.994E+06	1.340E+02	3.649E+03	1.994E+06	1.340E+02	5.717E+01	1.595E+04	1.072E+00
2061	14,479	15,960	492,280	542,640	5.038E+03	4.034E+06	2.710E+02	1.345E+03	2.017E+06	1.355E+02	3.692E+03	2.017E+06	1.355E+02	5.783E+01	1.613E+04	1.084E+00
2062	14,479	15,960	506,759	558,600	5.093E+03	4.078E+06	2.740E+02	1.360E+03	2.039E+06	1.370E+02	3.732E+03	2.039E+06	1.370E+02	5.846E+01	1.631E+04	1.096E+00
2063	14,479	15,960	521,237	574,560	5.145E+03	4.119E+06	2.768E+02	1.374E+03	2.060E+06	1.384E+02	3.770E+03	2.060E+06	1.384E+02	5.906E+01	1.648E+04	1.107E+00
2064	14,479	15,960	535,716	590,520	5.195E+03	4.159E+06	2.795E+02	1.387E+03	2.080E+06	1.397E+02	3.807E+03	2.080E+06	1.397E+02	5.963E+01	1.664E+04	1.118E+00
2065	14,479	15,960	550,195	606,480	5.242E+03	4.197E+06	2.820E+02	1.400E+03	2.098E+06	1.410E+02	3.841E+03	2.098E+06	1.410E+02	6.018E+01	1.679E+04	1.128E+00
2066	14,479	15,960	564,674	622,440	5.287E+03	4.233E+06	2.844E+02	1.412E+03	2.116E+06	1.422E+02	3.874E+03	2.116E+06	1.422E+02	6.069E+01	1.693E+04	1.138E+00
2067	14,479	15,960	579,153	638,400	5.330E+03	4.267E+06	2.867E+02	1.423E+03	2.134E+06	1.434E+02	3.906E+03	2.134E+06	1.434E+02	6.118E+01	1.707E+04	1.147E+00
2068	14,479	15,960	593,631	654,360	5.371E+03	4.300E+06	2.889E+02	1.434E+03	2.150E+06	1.445E+02	3.935E+03	2.150E+06	1.445E+02	6.165E+01	1.720E+04	1.156E+00
2069	14,479	15,960	608,110	670,320	5.409E+03	4.331E+06	2.910E+02	1.445E+03	2.165E+06	1.455E+02	3.964E+03	2.165E+06	1.455E+02	6.209E+01	1.732E+04	1.164E+00
2070	14,479	15,960	622,589	686,280	5.446E+03	4.360E+06	2.930E+02	1.454E+03	2.180E+06	1.465E+02	3.991E+03	2.180E+06	1.465E+02	6.252E+01	1.744E+04	1.172E+00
2071	14,479	15,960	637,068	702,240	5.481E+03	4.388E+06	2.948E+02	1.464E+03	2.194E+06	1.474E+02	4.016E+03	2.194E+06	1.474E+02	6.292E+01	1.755E+04	1.179E+00
2072	14,479	15,960	651,547	718,200	5.514E+03	4.415E+06	2.966E+02	1.473E+03	2.207E+06	1.483E+02	4.041E+03	2.207E+06	1.483E+02	6.330E+01	1.766E+04	1.187E+00
2073	14,479	15,960	666,026	734,160	5.546E+03	4.440E+06	2.983E+02	1.481E+03	2.220E+06	1.492E+02	4.064E+03	2.220E+06	1.492E+02	6.366E+01	1.776E+04	1.193E+00
2074	14,479	15,960	680,504	750,120	5.576E+03	4.464E+06	3.000E+02	1.489E+03	2.232E+06	1.500E+02	4.086E+03	2.232E+06	1.500E+02	6.401E+01	1.786E+04	1.200E+00
2075	14,479	15,960	694,983	766,080	5.605E+03	4.487E+06	3.015E+02	1.497E+03	2.244E+06	1.508E+02	4.107E+03	2.244E+06	1.508E+02	6.434E+01	1.795E+04	1.206E+00
2076	14,479	15,960	709,462	782,040	5.632E+03	4.509E+06	3.030E+02	1.504E+03	2.255E+06	1.515E+02	4.127E+03	2.255E+06	1.515E+02	6.465E+01	1.804E+04	1.212E+00

RESULTS **Landfill Name or Identifier:** Potrero Hills

Closure Year (with 80-year limit) = 2079

Methane = 50 *% by volume*

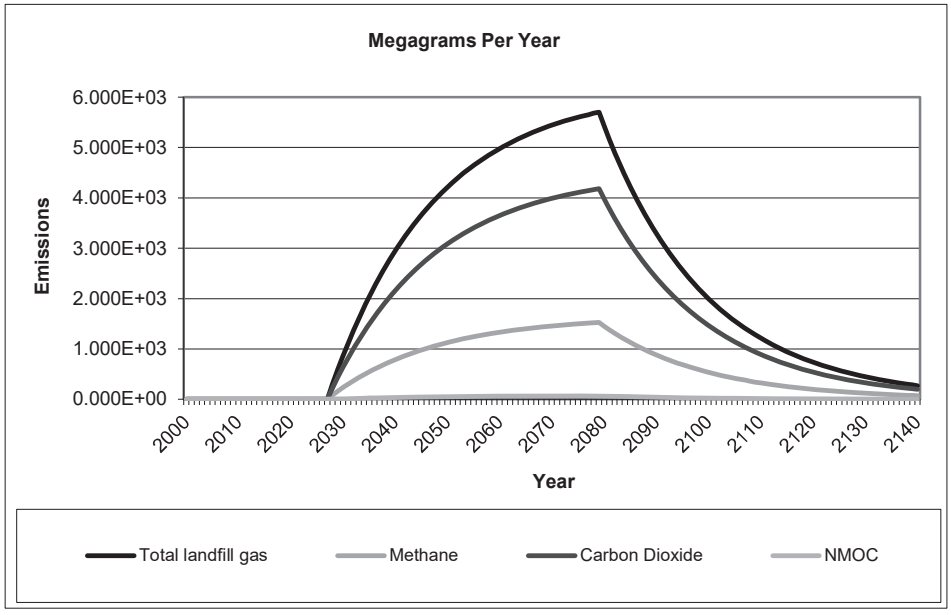
Please choose a third unit of measure to represent all of the emission rates below.

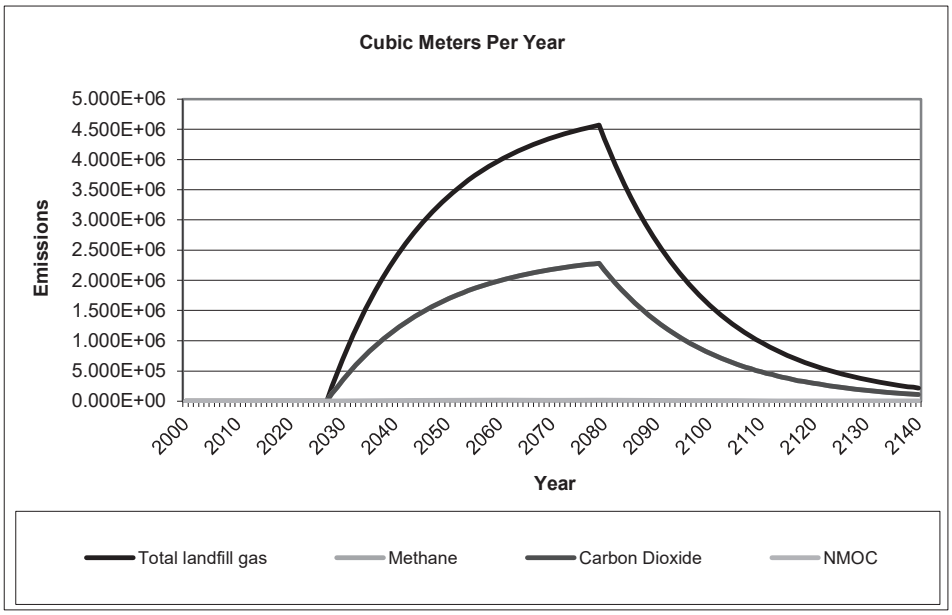
User-specified Unit: av ft^3/min

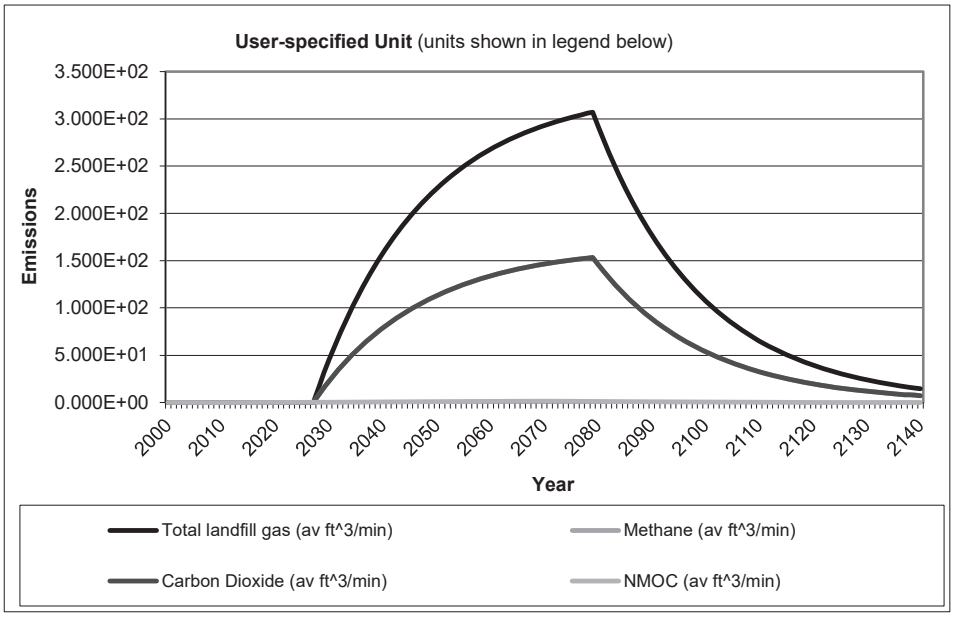
Year	Waste Accepted		Waste-In-Place		Total landfill gas			Methane			Carbon Dioxide			NMOC		
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2077	14,479	15,960	723,941	798,000	5.658E+03	4.530E+06	3.044E+02	1.511E+03	2.265E+06	1.522E+02	4.146E+03	2.265E+06	1.522E+02	6.495E+01	1.812E+04	1.217E+00
2078	14,479	15,960	738,420	813,960	5.683E+03	4.550E+06	3.057E+02	1.518E+03	2.275E+06	1.528E+02	4.164E+03	2.275E+06	1.528E+02	6.523E+01	1.820E+04	1.223E+00
2079	0	0	752,898	829,920	5.706E+03	4.569E+06	3.070E+02	1.524E+03	2.284E+06	1.535E+02	4.181E+03	2.284E+06	1.535E+02	6.550E+01	1.827E+04	1.228E+00
2080	0	0	752,898	829,920	5.428E+03	4.346E+06	2.920E+02	1.450E+03	2.173E+06	1.460E+02	3.977E+03	2.173E+06	1.460E+02	6.231E+01	1.738E+04	1.168E+00
2081	0	0	752,898	829,920	5.163E+03	4.134E+06	2.778E+02	1.379E+03	2.067E+06	1.389E+02	3.783E+03	2.067E+06	1.389E+02	5.927E+01	1.654E+04	1.111E+00
2082	0	0	752,898	829,920	4.911E+03	3.932E+06	2.642E+02	1.312E+03	1.966E+06	1.321E+02	3.599E+03	1.966E+06	1.321E+02	5.638E+01	1.573E+04	1.057E+00
2083	0	0	752,898	829,920	4.672E+03	3.740E+06	2.513E+02	1.248E+03	1.870E+06	1.257E+02	3.423E+03	1.870E+06	1.257E+02	5.363E+01	1.496E+04	1.005E+00
2084	0	0	752,898	829,920	4.444E+03	3.558E+06	2.391E+02	1.187E+03	1.779E+06	1.195E+02	3.256E+03	1.779E+06	1.195E+02	5.101E+01	1.423E+04	9.562E-01
2085	0	0	752,898	829,920	4.227E+03	3.384E+06	2.274E+02	1.129E+03	1.692E+06	1.137E+02	3.098E+03	1.692E+06	1.137E+02	4.853E+01	1.354E+04	9.096E-01
2086	0	0	752,898	829,920	4.021E+03	3.219E+06	2.163E+02	1.074E+03	1.610E+06	1.082E+02	2.947E+03	1.610E+06	1.082E+02	4.616E+01	1.288E+04	8.652E-01
2087	0	0	752,898	829,920	3.825E+03	3.062E+06	2.058E+02	1.022E+03	1.531E+06	1.029E+02	2.803E+03	1.531E+06	1.029E+02	4.391E+01	1.225E+04	8.230E-01
2088	0	0	752,898	829,920	3.638E+03	2.913E+06	1.957E+02	9.717E+02	1.457E+06	9.786E+01	2.666E+03	1.457E+06	9.786E+01	4.177E+01	1.165E+04	7.829E-01
2089	0	0	752,898	829,920	3.461E+03	2.771E+06	1.862E+02	9.243E+02	1.385E+06	9.309E+01	2.536E+03	1.385E+06	9.309E+01	3.973E+01	1.108E+04	7.447E-01
2090	0	0	752,898	829,920	3.292E+03	2.636E+06	1.771E+02	8.792E+02	1.318E+06	8.855E+01	2.412E+03	1.318E+06	8.855E+01	3.779E+01	1.054E+04	7.084E-01
2091	0	0	752,898	829,920	3.132E+03	2.507E+06	1.685E+02	8.364E+02	1.254E+06	8.423E+01	2.295E+03	1.254E+06	8.423E+01	3.595E+01	1.003E+04	6.739E-01
2092	0	0	752,898	829,920	2.979E+03	2.385E+06	1.602E+02	7.956E+02	1.193E+06	8.012E+01	2.183E+03	1.193E+06	8.012E+01	3.420E+01	9.540E+03	6.410E-01
2093	0	0	752,898	829,920	2.834E+03	2.269E+06	1.524E+02	7.568E+02	1.134E+06	7.622E+01	2.076E+03	1.134E+06	7.622E+01	3.253E+01	9.075E+03	6.097E-01
2094	0	0	752,898	829,920	2.695E+03	2.158E+06	1.450E+02	7.199E+02	1.079E+06	7.250E+01	1.975E+03	1.079E+06	7.250E+01	3.094E+01	8.632E+03	5.800E-01
2095	0	0	752,898	829,920	2.564E+03	2.053E+06	1.379E+02	6.848E+02	1.026E+06	6.896E+01	1.879E+03	1.026E+06	6.896E+01	2.943E+01	8.211E+03	5.517E-01
2096	0	0	752,898	829,920	2.439E+03	1.953E+06	1.312E+02	6.514E+02	9.763E+05	6.560E+01	1.787E+03	9.763E+05	6.560E+01	2.800E+01	7.811E+03	5.248E-01
2097	0	0	752,898	829,920	2.320E+03	1.857E+06	1.248E+02	6.196E+02	9.287E+05	6.240E+01	1.700E+03	9.287E+05	6.240E+01	2.663E+01	7.430E+03	4.992E-01
2098	0	0	752,898	829,920	2.207E+03	1.767E+06	1.187E+02	5.894E+02	8.834E+05	5.936E+01	1.617E+03	8.834E+05	5.936E+01	2.533E+01	7.067E+03	4.749E-01
2099	0	0	752,898	829,920	2.099E+03	1.681E+06	1.129E+02	5.606E+02	8.403E+05	5.646E+01	1.538E+03	8.403E+05	5.646E+01	2.410E+01	6.723E+03	4.517E-01
2100	0	0	752,898	829,920	1.997E+03	1.599E+06	1.074E+02	5.333E+02	7.994E+05	5.371E+01	1.463E+03	7.994E+05	5.371E+01	2.292E+01	6.395E+03	4.297E-01
2101	0	0	752,898	829,920	1.899E+03	1.521E+06	1.022E+02	5.073E+02	7.604E+05	5.109E+01	1.392E+03	7.604E+05	5.109E+01	2.180E+01	6.083E+03	4.087E-01
2102	0	0	752,898	829,920	1.807E+03	1.447E+06	9.720E+01	4.825E+02	7.233E+05	4.860E+01	1.324E+03	7.233E+05	4.860E+01	2.074E+01	5.786E+03	3.888E-01
2103	0	0	752,898	829,920	1.719E+03	1.376E+06	9.246E+01	4.590E+02	6.880E+05	4.623E+01	1.259E+03	6.880E+05	4.623E+01	1.973E+01	5.504E+03	3.698E-01
2104	0	0	752,898	829,920	1.635E+03	1.309E+06	8.795E+01	4.366E+02	6.545E+05	4.397E+01	1.198E+03	6.545E+05	4.397E+01	1.877E+01	5.236E+03	3.518E-01
2105	0	0	752,898	829,920	1.555E+03	1.245E+06	8.366E+01	4.153E+02	6.225E+05	4.183E+01	1.140E+03	6.225E+05	4.183E+01	1.785E+01	4.980E+03	3.346E-01
2106	0	0	752,898	829,920	1.479E+03	1.184E+06	7.958E+01	3.951E+02	5.922E+05	3.979E+01	1.084E+03	5.922E+05	3.979E+01	1.698E+01	4.737E+03	3.183E-01
2107	0	0	752,898	829,920	1.407E+03	1.127E+06	7.570E+01	3.758E+02	5.633E+05	3.785E+01	1.031E+03	5.633E+05	3.785E+01	1.615E+01	4.506E+03	3.028E-01
2108	0	0	752,898	829,920	1.339E+03	1.072E+06	7.200E+01	3.575E+02	5.358E+05	3.600E+01	9.808E+02	5.358E+05	3.600E+01	1.537E+01	4.287E+03	2.880E-01
2109	0	0	752,898	829,920	1.273E+03	1.019E+06	6.849E+01	3.400E+02	5.097E+05	3.425E+01	9.330E+02	5.097E+05	3.425E+01	1.462E+01	4.078E+03	2.740E-01
2110	0	0	752,898	829,920	1.211E+03	9.697E+05	6.515E+01	3.235E+02	4.848E+05	3.258E+01	8.875E+02	4.848E+05	3.258E+01	1.390E+01	3.879E+03	2.606E-01
2111	0	0	752,898	829,920	1.152E+03	9.224E+05	6.197E+01	3.077E+02	4.612E+05	3.099E+01	8.442E+02	4.612E+05	3.099E+01	1.322E+01	3.690E+03	2.479E-01
2112	0	0	752,898	829,920	1.096E+03	8.774E+05	5.895E+01	2.927E+02	4.387E+05	2.948E+01	8.030E+02	4.387E+05	2.948E+01	1.258E+01	3.510E+03	2.358E-01
2113	0	0	752,898	829,920	1.042E+03	8.346E+05	5.608E+01	2.784E+02	4.173E+05	2.804E+01	7.639E+02	4.173E+05	2.804E+01	1.197E+01	3.338E+03	2.243E-01
2114	0	0	752,898	829,920	9.916E+02	7.939E+05	5.334E+01	2.648E+02	3.969E+05	2.667E+01	7.266E+02	3.969E+05	2.667E+01	1.138E+01	3.176E+03	2.134E-01
2115	0	0	752,898	829,920	9.432E+02	7.552E+05	5.074E+01	2.519E+02	3.776E+05	2.537E+01	6.912E+02	3.776E+05	2.537E+01	1.083E+01	3.021E+03	2.030E-01
2116	0	0	752,898	829,920	8.972E+02	7.183E+05	4.827E+01	2.396E+02	3.592E+05	2.413E+01	6.575E+02	3.592E+05	2.413E+01	1.030E+01	2.873E+03	1.931E-01
2117	0	0	752,898	829,920	8.535E+02	6.833E+05	4.591E+01	2.279E+02	3.417E+05	2.296E+01	6.254E+02	3.417E+05	2.296E+01	9.797E+00	2.733E+03	1.836E-01
2118	0	0	752,898	829,920	8.119E+02	6.500E+05	4.367E+01	2.168E+02	3.250E+05	2.184E+01	5.949E+02	3.250E+05	2.184E+01	9.319E+00	2.600E+03	1.747E-01
2119	0	0	752,898	829,920	7.723E+02	6.183E+05	4.154E+01	2.062E+02	3.091E+05	2.077E+01	5.659E+02	3.091E+05	2.077E+01	8.865E+00	2.473E+03	1.662E-01
2120	0	0	752,898	829,920	7.346E+02	5.881E+05	3.952E+01	1.962E+02	2.941E+05	1.976E+01	5.383E+02	2.941E+05	1.976E+01	8.433E+00	2.353E+03	1.581E-01
2121	0	0	752,898	829,920	6.988E+02	5.595E+05	3.759E+01	1.866E+02	2.797E+05	1.879E+01	5.120E+02	2.797E+05	1.879E+01	8.021E+00	2.238E+03	1.504E-01
2122	0	0	752,898	829,920	6.647E+02	5.322E+05	3.576E+01	1.775E+02	2.661E+05	1.788E+01	4.871E+02	2.661E+05	1.788E+01	7.630E+00	2.129E+03	1.430E-01
2123	0	0	752,898	829,920	6.323E+02	5.062E+05	3.401E+01	1.689E+02	2.531E+05	1.701E+01	4.633E+02	2.531E+05	1.701E+01	7.258E+00	2.025E+03	1.360E-01
2124	0	0	752,898	829,920	6.014E+02	4.815E+05	3.235E+01	1.606E+02	2.408E+05	1.618E+01	4.407E+02	2.408E+05	1.618E+01	6.904E+00	1.926E+03	1.294E-01
2125	0	0	752,898	829,920	5.721E+02	4.580E+05	3.078E+01	1.528E+02	2.290E+05	1.539E+01	4.192E+02	2.290E+05	1.539E+01	6.567E+00	1.832E+03	1.231E-01
2126	0	0	752,898	829,920	5.442E+02	4.357E+05	2.927E+01	1.453E+02	2.179E+05	1.464E+01	3.988E+02	2.179E+05	1.464E+01	6.247E+00	1.743E+03	1.171E-01
2127	0	0	752,898	829,920	5.177E+02	4.145E+05	2.785E+01	1.383E+02	2.072E+05	1.392E+01	3.793E+02	2.072E+05	1.392E+01	5.942E+00	1.658E+03	1.114E-01
2128	0	0	752,898	829,920	4.924E+02	3.942E+05	2.649E+01	1.315E+02	1.971E+05	1.324E+01	3.608E+02	1.971E+05	1.324E+01	5.653E+00	1.577E+03	1.060E-01
2129	0	0	752,898	829,920	4.684E+02	3.750E+05	2.520E+01	1.251E+02	1.875E+05	1.260E+01	3.432E+02	1.875E+05	1.260E+01	5.377E+00	1.500E+03	1.008E-01
2130	0	0	752,898	829,920	4.456E+02	3.567E+05	2.397E+01	1.190E+02	1.784E+05	1.198E+01	3.265E+02	1.784E+05	1.198E+01	5.115E+00	1.427E+03	9.587E-02
2131	0	0	752,898	829,920	4.238E+02	3.393E+05	2.280E+01	1.132E+02	1.697E+05	1.140E+01	3.106E+02	1.697E+05	1.140E+01	4.865E+00	1.357E+03	9.120E-02
2132	0	0	752,898	829,920	4.032E+02	3.228E+05	2.169E+01	1.077E+02	1.614E+05	1.084E+01	2.954E+02	1.614E+05	1.084E+01	4.628E+00	1.291E+03	8.675E-02
2133	0	0	752,898	829,920	3.835E+02	3.070E+05	2.063E+01	1.024E+02	1.535E+05	1.031E+01	2.810E+02	1.535E+05	1.031E+01	4.402E+00	1.228E+03	8.252E-02
2134	0	0	752,898	829,920	3.648E+02	2.921E+05	1.962E+01	9.742E+01	1.460E+05	9.812E+00	2.673E+02	1.460E+05	9.812E+00	4.187E+00	1.168E+03	7.849E-02
2135	0	0	752,898	829,920	3.470E+02	2.778E+05	1.867E+01	9.267E+01	1.389E+05	9.333E+00	2.543E+02	1.389E+05	9.333E+00	3.983E+00	1.111E+03	7.467E-02
2136	0	0	752,898	829,920	3.301E+02	2.643E+05	1.776E+01	8.815E+01	1.321E+05	8.878E+00	2.419E+02	1.321E+05	8.878E+00	3.789E+00	1.057E+03	7.102E-02
2137	0	0	752,898	829,920	3.140E+02	2.514E+05	1.689E+01	8.385E+01	1.257E+05	8.445E+00	2.301E+02	1.257E+05	8.445E+00	3.604E+00	1.006E+03	6.756E-02
2138	0	0	752,898	829,920	2.987E+02	2.391E+05	1.607E+01	7.976E+01	1.196E+05	8.033E+00	2.189E+02	1.196E+05	8.033E+00	3.428E+00	9.565E+02	6.427E-02
2139	0	0	752,898	829,920	2.841E+02	2.275E+05	1.528E+01	7.587E+01	1.137E+05	7.641E+00	2.082E+02	1.137E+05	7.641E+00	3.261E+00	9.098E+02	6.113E-02
2140	0	0	752,898	829,920	2.702E+02	2.164E+05	1.454E+01	7.217E+01	1.082E+05	7.269E+00	1.980E+02	1.082E+05	7.269E+00	3.102E+00	8.654E+02	5.815E-02

GRAPHS

Landfill Name or Identifier: Potrero Hills







NRWS
Landfill (Avoidance)
Emission Calculations

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Table 1: LandGEM LFG Output Summary

Year	CO2 Emissions (MG/Yr)	CH4 Emissions (MG/Yr)	CH4 Emissions (m3/yr)
2027	220.289913	80.28743934	120344.2002
2028	429.8361602	156.6592141	234819.1446
2029	629.1627164	229.3062934	343711.08
2030	818.7680017	298.4103328	447292.2931
2031	999.1261281	364.1441285	545821.7908
2032	1170.688085	426.6720491	639545.9482
2033	1333.882866	486.1504471	728699.1245
2034	1489.118544	542.7280493	813504.2491
2035	1636.783289	596.5463293	894173.3789
2036	1777.246339	647.7398609	970908.2289
2037	1910.858925	696.4366544	1043900.676
2038	2037.955149	742.7584773	1113333.24
2039	2158.852816	786.8211583	1179379.537
2040	2273.854235	828.7348769	1242204.718
2041	2383.246969	868.6044394	1301965.88
2042	2487.304555	906.5295403	1358812.455
2043	2586.287194	942.6050123	1412886.59
2044	2680.442392	976.9210627	1464323.498
2045	2770.005587	1009.5635	1513251.798
2046	2855.200733	1040.613946	1559793.837
2047	2936.240864	1070.150044	1604065.995
2048	3013.32862	1098.24565	1646178.973
2049	3086.656762	1124.971017	1686238.077
2050	3156.408648	1150.392972	1724343.476
2051	3222.758695	1174.575085	1760590.453
2052	3285.872812	1197.577821	1795069.643
2053	3345.908817	1219.458701	1827867.264
2054	3403.016831	1240.272438	1859065.326
2055	3457.339655	1260.071076	1888741.84
2056	3509.013123	1278.904124	1916971.014
2057	3558.166447	1296.818673	1943823.435
2058	3604.922535	1313.85952	1969366.247
2059	3649.398301	1330.069274	1993663.322
2060	3691.704959	1345.488469	2016775.415
2061	3731.948296	1360.155662	2038760.318
2062	3770.228943	1374.107527	2059673.004
2063	3806.642621	1387.378951	2079565.766
2064	3841.280383	1400.003121	2098488.347
2065	3874.228841	1412.011602	2116488.063
2066	3905.570384	1423.434423	2133609.923
2067	3935.383381	1434.300146	2149896.739
2068	3963.742382	1444.635942	2165389.238
2069	3990.718298	1454.467655	2180126.159
2070	4016.378583	1463.81987	2194144.352
2071	3820.497488	1392.428532	2087134.669
2072	3634.169627	1324.518992	1985343.91
2073	3456.929083	1259.921438	1888517.545
2074	3288.332662	1198.474344	1796413.458
2075	3127.958786	1140.024061	1708801.339

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2076	2975.406436	1084.4[illegible]	[illegible]
2077	2830.294151	1031.536428	1546187.392
2078	2692.259077	981.2278026	1470778.943
2079	2560.956052	933.3727579	1399048.207
2080	2436.056752	887.8516314	1330815.821
2081	2317.248862	844.5505964	1265911.168
2082	2204.235301	803.3613777	1204171.952
2083	2096.733477	764.180981	1145443.793
2084	1994.474579	726.9114348	1089579.84
2085	1897.202906	691.4595458	1036440.404
2086	1804.675228	657.7366658	985892.6088
2087	1716.660179	625.6584701	937810.0588
2088	1632.937674	595.1447464	892072.5226
2089	1553.298364	566.1191946	848565.6323
2090	1477.543109	538.5092357	807180.598
2091	1405.482481	512.2458304	767813.9357
2092	1336.936292	487.2633064	730367.2082
2093	1271.733139	463.4991946	694746.7791
2094	1209.709982	440.8940721	660863.5789
2095	1150.71173	419.3914145	628632.8818
2096	1094.590857	398.9374538	597974.0944
2097	1041.207031	379.4810446	568810.5537
2098	990.4267646	360.9735357	541069.3356
2099	942.1230813	343.3686486	514681.0727
2100	896.1751965	326.622362	489579.7806
2101	852.4682164	310.6928014	465702.693
2102	810.8928509	295.5401347	442990.1046
2103	771.3451399	281.1264722	421385.2223
2104	733.7261935	267.4157724	400834.0225
2105	697.9419448	254.3737513	381285.1165
2106	663.9029145	241.967797	362689.622
2107	631.5239873	230.1668883	345001.0404
2108	600.724199	218.9415167	328175.1411
2109	571.4265341	208.263613	312169.8506
2110	543.5577331	198.1064767	296945.1473
2111	517.0481097	188.4447098	282462.9616
2112	491.8313758	179.2541529	268687.0804
2113	467.8444766	170.5118247	255583.0569
2114	445.0274322	162.1958649	243118.1241
2115	423.3231882	154.2854792	231261.1133
2116	402.6774727	146.7608876	219982.3757
2117	383.0386606	139.6032746	209253.7086
2118	364.3576447	132.7947426	199048.2848
2119	346.5877127	126.3182666	189340.5854
2120	329.6844305	120.157652	180106.3361
2121	313.6055311	114.2974942	171322.4464
2122	298.3108088	108.7231396	162966.9521
2123	283.762019	103.4206495	155018.9601
2124	269.922782	98.37676491	147458.5962
2125	256.7584926	93.57887347	140266.9556
2126	244.2362332	89.01497796	133426.0554
2127	232.3246915	84.67366626	126918.7899
2128	220.9940826	80.54408282	120728.8875
2129	210.216074	76.61590155	114840.8702
2130	199.9637151	72.87929994	109240.0149

Period	CO2 Emissions (MG/Yr)	CH4 Emissions (MG/Yr)	CH4 Emissions (m3/yr)
25-Year Totals	53350.177	19444.1454	29145158.28
100-Year Totals	194841.76	71012.54	106441895.4

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Emission Calculations

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Table 2: Avoided Landfill Gas GHG Emissions - 25-Year Project Lifetime Basis

Table 2a: GHG Calculations

Pollutant	25-year Emission Total (MG)	25-year Emission Total (MT)	Average Annual GHG over Project Lifetime (MT/Yr)
CO2	53,350	53,350	2,134
CH4	19,444	19,444	778

Table 2b: Methane Combustion GHG Emission Calculations

Pollutant	Emission Factor	UOM	Emissions (Kg/yr)	AR5 GWP	GHG Emissions (CO2e/yr)
CO2	52.07	Kg/MMscf	1,608	1	2
CH4	3.2	g/MMscf	0.10	28	0.00
N2O	0.63	g/MMscf	0.02	265	0.01

Table 2c: Summary of Avoided GHG Emissions

Pollutant	Source	Emissions (MT CO2e/yr)
CO2	Directly emitted	2,134
CH4	Directly emitted	5,444
CO2	Methane combustion	2
CH4	Methane combustion	0.003
N2O	Methane combustion	0.005
Total		**7,580**

Supporting Calculations

Annualized Methane Emissions	777.77	MT/yr
Landfill Gas Collection System Efficiency	75%	
Methane Emitted Untreated	194.44	MT/yr
Annualized Methane Emissions	1,165,806.33	m3/yr
Conversion Factor	35.31	ft3/m3
Annualized Methane Emissions	41,170,100.85	ft3/yr
Methane captured and treated	30,877,575.64	ft3/yr
Methane captured and treated	30.88	MMscf/yr

Data and Parameters

Project Life	25	years
Conversion	1	MT/MG
Conversion	1000	Kg/MT
Conversion	1000	g/kg

NRWS
Landfill (Avoidance)
Emission Calculations

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Table 3: Avoided Landfill Gas GHG Emissions - 100-Year Decomposition Basis

Table 2a: GHG Calculations

Pollutant	100-year Emission Total (MG)	100-year Emission Total (MT)	Average Annual GHG over Project Lifetime (MT/Yr)
CO2	194,842	194,842	7,794
CH4	71,013	71,013	2,841

Table 2b: Methane Combustion GHG Emission Calculations

Pollutant	Emission Factor	UOM	Emissions (Kg/yr)	AR5 GWP	GHG Emissions (CO2e/yr)
CO2	52.07	Kg/MMscf	5,872	1	6
CH4	3.2	g/MMscf	0.36	28	0.01
N2O	0.63	g/MMscf	0.07	265	0.02

Table 2c: Summary of Avoided GHG Emissions

Pollutant	Source	Emissions (MT CO2e/yr)
CO2	Directly emitted	7,794
CH4	Directly emitted	19,884
CO2	Methane combustion	6
CH4	Methane combustion	0
N2O	Methane combustion	0
Total		**27,683**

Supporting Calculations

Annualized Methane Emissions	2840.50	MT/yr
Landfill Gas Collection System Efficiency	75%	
Methane Emitted Untreated	710.13	MT/yr
Annualized Methane Emissions	4,257,675.81	m3/yr
Conversion Factor	35.31	ft3/m3
Annualized Methane Emissions	150,358,544.10	ft3/yr
Methane captured and treated	112,768,908.07	ft3/yr
Methane captured and treated	112.77	MMscf/yr

Data and Parameters

Project Life	25	years
Conversion	1	MT/MG
Conversion	1000	Kg/MT
Conversion	1000	g/kg

Napa Recycling and Waste Services

820 Levitin Road
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December 2025

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Napa Renewable Resource Project: CEQA Modeling Technical Report

Napa Renewable Resource Project: CEQA Modeling Technical Report

Prepared for:

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December 2025

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List of Acronyms and Abbreviations

AERMOD	**A**merican Meteorological Society/**E**PA **R**egulatory **Mod**el
Air District	Bay Area Air District
CalEEMod	California Emissions Estimator Model®
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CEQA Guidelines	Bay Area Air District 2022 CEQA Air Quality Guidelines
DPM	Diesel Particulate Matter
EIR	Environmental Impact Report
EPA	[United States] Environmental Protection Agency
HARP2	Hot Spots Analysis and Reporting Program, version 2
HRA	Health Risk Assessment
lb	pounds
MEIR	Maximally Exposed Individual Resident
MEIW	Maximally Exposed Individual Worker
NRWS	Napa Recycling & Waste Services
OEHHA	[California] Office of Environmental Health Hazard Assessment
PM_{10}	Respirable Particulate Matter [with a Diameter of 10 Microns or Less]
$PM_{2.5}$	Fine Particulate Matter [with a Diameter of 2.5 Microns or Less]
PMI	Point of Maximum Impact
TAC	Toxic Air Contaminant
$\mu g/m^3$	micrograms per cubic meter

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Napa Renewable Resource Project: CEQA Modeling Technical Report

1.0 INTRODUCTION

1.1 Overview

Napa Recycling & Waste Services (NRWS) is a materials diversion facility (MDF) and composting facility located in south Napa County at 820 Levitin Way. The facility receives and processes residential and commercial recyclables, yard waste, and other materials. NRWS is proposing to develop a new biomass conversion facility and an anaerobic digester (AD) system. Both are described in additional detail below.

The proposed biomass conversion facility and AD system would support the State of California's goal in complying with California's Mandatory Commercial Recycling Law, approved by the Office of Administrative Law on May 7, 2012, under Assembly Bill (AB) 341, which directs the California Department of Resources Recycling and Recovery (CalRecycle) to increase statewide diversion of solid waste. The projects would also support AB 32, which emphasizes the generation of renewable energy and the production of low carbon fuel.

This report documents the fine particulate matter ($PM_{2.5}$) and health risk assessment (HRA) California Environmental Quality Act (CEQA) modeling analyses conducted for project construction and project operations.

1.1.1 Biomass Conversion Facility

NRWS is developing a new biomass conversion facility on the property to produce syngas for on-site electricity generation and biochar as a soil supplement and carbon sink. The biomass conversion facility will include three identical conversion modules, each consisting of a gasifier, an engine, and a flare. The gasifier will produce heat, electricity, and biochar from wood that would otherwise have been used in a landfill as Alternate Daily Cover (ADC). Woody biomass will be reacted in the gasifier to produce synthesis gas (syngas) and biochar. The syngas will be combusted by new spark-ignited engines to generate electrical power. In case of engine shutdown or process upset, limited use flares will be utilized to combust the excess syngas until the plant is shut down completely. The proposed new equipment includes grinding and material handling, drying, biochar handling, and syngas treatment, in addition to the gasifiers, engines, and flares.

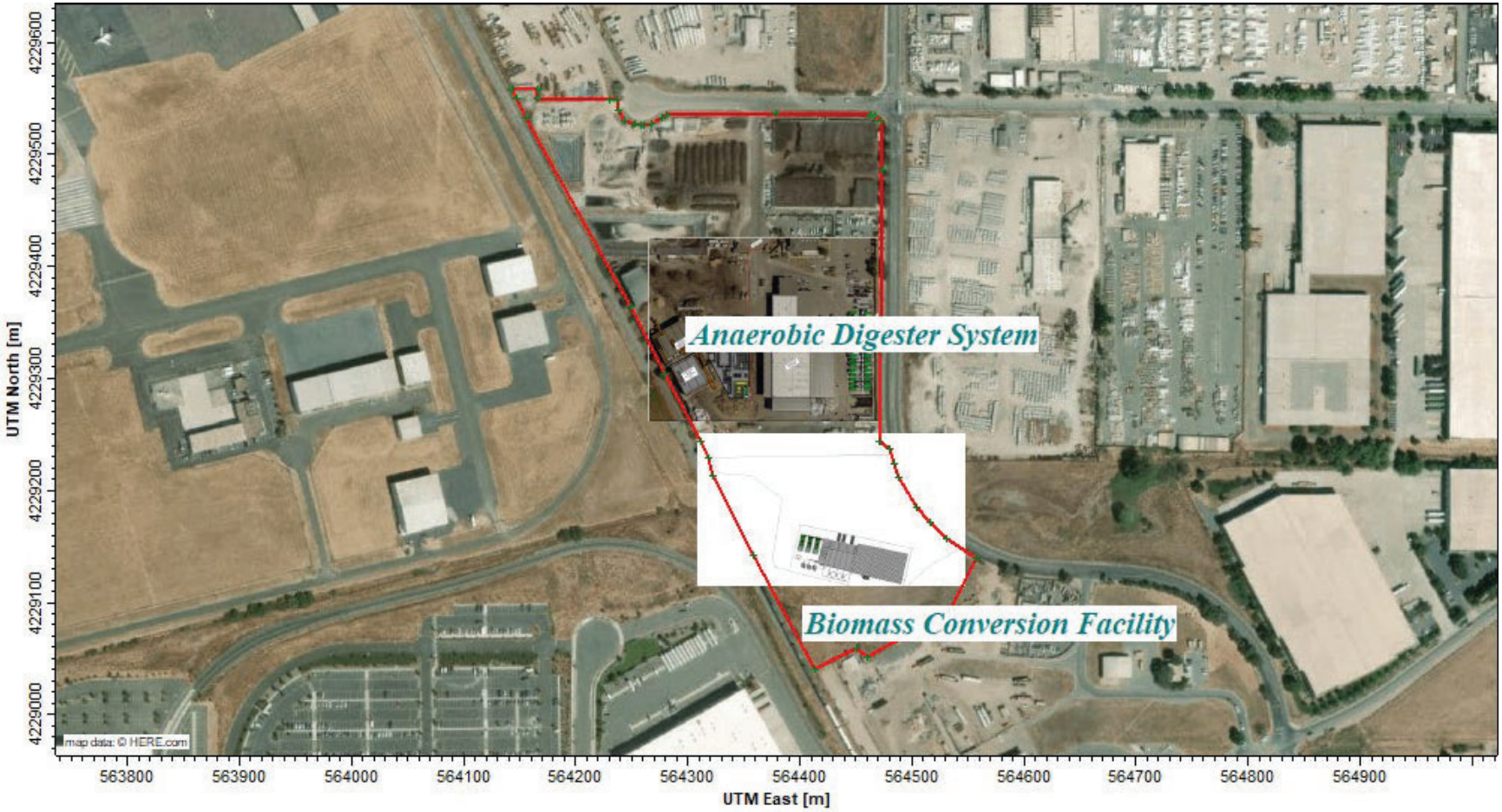
1.1.2 AD System

NRWS is also proposing to install and operate an AD system. The installation of the AD system will allow the facility to process organic wastes including, but not limited to, food waste, green waste, and grape pomace in a fully enclosed structure to create renewable natural gas (RNG) and a digestate byproduct. The RNG will be compressed to be used as fuel to NRWS's trash truck fleet, and the digestate will be processed with the compost[1] on-site. The proposed new equipment includes an AD, associated conveyors, feed hoppers, and digestate dewatering; biogas storage, biogas treatment system, biofilter; a boiler; a flare; and an emergency engine.

[1] Compost is produced in a separate permitted process. Digestate processing may include blending and curing.

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Figure 1-1: NRWS Project Location



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1.2 Air District Project Risk Requirements

This project modeling was performed in accordance with the Bay Area Air District's (Air District) 2022 CEQA Air Quality Guidelines (CEQA Guidelines, Bay Area Air District 2022) for construction and operations of the AD and Biomass Projects. Appendix E of the Air District's CEQA Guidelines, "Recommended Methods for Screening and Modeling Local Risks and Hazards" (posted 8/28/2023), provides guidance for conducting individual project cancer risk and hazards analyses as part of a project's environmental review. The Air District's CEQA Guidelines "are nonbinding recommendations, intended to assist lead agencies with navigating the CEQA process."

The Air District's CEQA Guidelines recommend that project sponsors use a tiered approach for individual projects. For the first tier, a screening model can be used to estimate the project's impact. If the thresholds are exceeded at the screening level (Tier 1), project sponsors can refine the analysis further by following Tier 2 recommendations and using complex air dispersion models, source-specific release parameters, and area-specific meteorology. The tiered approach is flexible, and project sponsors can mix and match tier methodologies to suit the project's needs. The project HRA in this report used Tier 2 refined modeling for construction and operational sources.

The Air District's CEQA Guidelines require that HRAs include analysis of both Toxic Air Contaminant (TAC) emissions and fine particulate matter ($PM_{2.5}$) emissions. The Air District's CEQA Significance Thresholds for HRAs are provided in both Chapter 2 and Section 1.2 of Appendix E of the Air District's CEQA Guidelines and are shown in Table 1-1 of this report.

This analysis focuses on project impacts. A cumulative impact analysis was not conducted as part of this analysis.

Table 1-1: Air District Thresholds of Significance for Local Community Risk and Hazard Impacts

Analysis	Thresholds of Significance
Individual project: construction and/or operations	Compliance with qualified community risk reduction plan, or ▸ increased cancer risk of > 10.0 cases in a million ▸ increased noncancer risk of > 1.0 Hazard Index (Chronic and Acute) ▸ ambient $PM_{2.5}$ increase > 0.3 µg/m^3 annual average
Cumulative impacts	Compliance with qualified community risk reduction plan, or ▸ cancer risk > 100 cases in a million (from all sources) ▸ noncancer risk > 10.0 Hazard Index (from all local sources) (Chronic) ▸ $PM_{2.5}$ > 0.8 µg/m^3 annual average (from all local sources)

Source: Bay Area Air District 2022

Key: µg/m^3 = micrograms per cubic meter; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns.

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2.0 EMISSION SOURCES

For a detailed description of the emission sources and associated calculations, please refer to the CEQA emissions report.

2.1 Construction Emissions

Construction of these projects will result in TAC and $PM_{2.5}$ emissions. During construction, Diesel Particulate Matter (DPM) is the TAC that will have the largest effect on health risks. Hence, DPM is commonly the only TAC that is modeled in construction HRAs and, therefore, was the only TAC included in the construction HRA for construction equipment and vehicles. Respirable particulate matter (PM_{10}) exhaust emissions from construction equipment and diesel fueled trucks were used to estimate DPM emissions (i.e., conservatively assumed to be equal). Emissions are quantified for the modeled sources including construction equipment, fugitive dust generation, light-duty worker vehicles, and heavy-duty trucks.

The construction emissions analysis was performed using the California Emissions Estimator Model® (CalEEMod) version 2022.1.1.29 (CAPCOA 2022), the official statewide land use computer model designed to provide a uniform platform for estimating potential criteria pollutant[2] emissions associated with construction of stationary source and land use projects. CalEEMod includes default data that has been provided by various air districts such as the Air District to reflect local conditions and can be used for most projects.

Project construction is expected to take approximately one year for the Biomass Conversion facility and one year for the AD facility. The construction of both facilities is expected to overlap; therefore, the full emissions of both were modeled. Modeled annual DPM and $PM_{2.5}$emissions, which include all onsite emissions, are shown in Table 2-1 and Table 2-2. Note that emissions of $PM_{2.5}$ are conservatively assumed to be equal PM_{10} emissions, and that DPM emissions are conservatively assumed to be equal to PM_{10}. Assumptions and methodology used to develop the emissions are summarized in the CEQA emissions report. Details are included in Attachment C.

Table 2-1: Construction Project DPM Emissions

Sources	AD Facility (lb/yr)	Biomass Conversion Facility (lb/yr)	Total Construction (lb/yr)
Construction Equipment	5.84	12.88	18.72
On-Site Trucks	0.02	0.04	0.06

Source: CalEEMod version 2022.1.1.29.

[2] Criteria pollutants are contaminants for which health protective ambient standards have been established, and include volatile organic compounds (VOC, as an ozone precursor), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and respirable and fine particulate matter (PM_{10} and $PM_{2.5}$).

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Table 2-2: Construction Project $PM_{2.5}$ Emissions

Sources	Emissions Mechanism	AD Facility (lb/yr)	Biomass Conversion Facility (lb/yr)	Total Construction Emissions (lb/yr)
Construction Equipment	Exhaust	5.84	12.88	18.72
	Fugitive	0.45	96.27	96.72
On-Site Trucks	Exhaust	0.02	0.04	0.06
	Fugitive	1.33	31.86	33.18

Source: CalEEMod version 2022.1.1.29.

2.2 Operational Emissions

Operational emissions (toxics, $PM_{2.5}$) for each source associated with the AD and Biomass facilities are summarized in the CEQA emissions report. Table 2-3 summarizes the toxic emissions per source while Table 2-4 summarizes the inputs for each source used for the $PM_{2.5}$ modeling analysis.

Detailed emission calculations are also provided in the appendices of the CEQA emissions report (Attachment 2: Mobile sources, Attachment 3: Biomass Energy Facility, Attachment 4: AD Facility).

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Table 2-3: Operational TAC Emissions

Pollutant	CAS	AD Facility					Biomass Facility					Mobile Sources	
		NH_3/ Organics	Boiler	Engine	Flare	MH	Drying	Grinder	Engines	Flare	MH	Diesel	Road Dust
		Annual Emissions (lb/yr)											
[D] Acetone	67641	3.05E+01	-	-	-	-	-	-	-	-	-	-	-
1,1,1-TCA	71556	-	-	-	-	-	-	-	-	2.12E-01	-	-	-
1,1,2TriClEthan	79005	-	-	-	-	-	-	-	1.34E-01	-	-	-	-
1,1-DiClEthane	75343	-	-	-	-	-	-	-	9.92E-02	-	-	-	-
1,2,4TriMeBenze	95636	-	-	-	-	-	-	-	6.01E-02	-	-	-	-
1,3-Butadiene	106990	-	-	-	-	-	-	-	1.12E+00	-	-	-	-
2,2,4TriMePentn	540841	-	-	-	-	-	-	-	1.05E+00	-	-	-	-
2MeNaphthalene	91576	-	-	-	-	-	-	-	1.40E-01	-	-	-	-
Acenaphthene	83329	-	-	-	-	-	-	-	5.26E-03	-	-	-	-
Acenaphthylene	208968	-	-	-	-	-	-	-	2.33E-02	-	-	-	-
Acetaldehyde	75070	1.81E+01	3.88E-02	-	1.24E-01	-	8.43E+02	-	3.52E+01	3.23E-04	-	-	-
Acrolein	107028	-	2.43E-02	-	1.08E-01	-	-	-	2.16E+01	2.03E-04	-	-	-
AllylChlor	107051	4.56E-02	-	-	-	-	-	-	-	-	-	-	-
Arsenic	7440382	-	-	-	-	1.70E-04	2.96E-05	5.75E-06	-	-	9.27E-07	-	2.39E-03
B[b]fluoranthen	205992	-	-	-	-	-	-	-	6.97E-04	-	-	-	-
B[e]pyrene	192972	-	-	-	-	-	-	-	1.75E-03	-	-	-	-
B[g,h,i]perylen	191242	-	-	-	-	-	-	-	1.74E-03	-	-	-	-
Benzene	71432	6.76E-02	7.21E-02	-	2.33E-01	-	-	-	1.86E+00	6.80E-02	-	-	-
Biphenyl	92524	-	-	-	-	-	-	-	8.92E-01	-	-	-	-
Cadmium	7440439	-	-	-	-	5.49E-05	2.84E-06	5.52E-07	-	-	8.90E-08	-	4.45E-04
CCl4	56235	-	-	-	-	-	-	-	1.54E-01	-	-	-	-
Chlorine	7782505	-	-	-	-	-	1.46E-02	2.84E-03	-	-	4.58E-04	-	-

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Pollutant	CAS	AD Facility					Biomass Facility					Mobile Sources	
		NH_3/ Organics	Boiler	Engine	Flare	MH	Drying	Grinder	Engines	Flare	MH	Diesel	Road Dust
		Annual Emissions (lb/yr)											
Chlorobenzn	108907	-	-	-	-	-	-	-	1.28E-01	1.56E-02	-	-	-
Chloroform	67663	6.89E-02	-	-	-	-	-	-	1.20E-01	-	-	-	-
Chrysene	218019	-	-	-	-	-	-	-	2.91E-03	-	-	-	-
Cobalt	7440484	-	-	-	-	2.42E-04	1.72E-05	3.33E-06	-	-	5.38E-07	-	3.41E-03
Copper	7440508	-	-	-	-	1.89E-03	7.81E-04	1.52E-04	-	-	2.45E-05	-	2.20E-02
Cr(VI)	18540299	-	-	-	-	6.73E-05	7.10E-07	1.38E-07	-	-	2.22E-08	-	1.26E-04
CS2	75150	1.58E-01	-	-	-	-	-	-	-	-	-	-	-
DieselExhPM	9901	-	-	2.99E+00	-	-	-	-	-	-	-	9.65E+00	-
EDB	106934	-	-	-	-	-	-	-	1.86E-01	-	-	-	-
EDC	107062	2.27E-01	-	-	-	-	-	-	9.92E-02	-	-	-	-
Ethyl Benzene	100414	1.48E-01	8.57E-02	-	2.77E-01	-	-	-	1.67E-01	1.32E+00	-	-	-
Ethyl Chloride	75003	3.51E-02	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	206440	-	-	-	-	-	-	-	4.66E-03	-	-	-	-
Fluorene	86737	-	-	-	-	-	-	-	2.38E-02	-	-	-	-
Formaldehyde	50000	-	1.53E-01	-	4.93E-01	-	3.22E+01	-	2.23E+02	7.39E+01	-	-	-
H2S	7783064	-	-	-	-	-	-	-	-	5.93E+01	-	-	-
Hexane	110543	1.34E-01	5.68E-02	-	1.85E-01	-	-	-	4.66E+00	4.73E-04	-	-	-
Isopropyl Alcoh	67630	1.09E-01	-	-	-	-	-	-	-	-	-	-	-
Lead	7439921	-	-	-	-	5.49E-03	1.47E-04	2.86E-05	-	-	4.62E-06	-	1.84E-02
Manganese	7439965	-	-	-	-	1.21E-02	4.18E-02	8.11E-03	-	-	1.31E-03	-	1.19E-01
MEK	78933	3.30E+01	-	-	-	-	-	-	-	-	-	-	-
Mercury	7439976	-	-	-	-	2.75E-05	4.68E-07	9.10E-08	-	-	1.47E-08	-	1.34E-03
Methanol	67561	2.06E+01	-	-	-	-	1.75E+03	-	1.05E+01	-	-	-	-

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Pollutant	CAS	AD Facility					Biomass Facility					Mobile Sources	
		NH_3/ Organics	Boiler	Engine	Flare	MH	Drying	Grinder	Engines	Flare	MH	Diesel	Road Dust
		Annual Emissions (lb/yr)											
Methylene Chlor	75092	-	-	-	-	-	-	-	8.41E-02	4.39E+00	-	-	-
Naphthalene	91203	3.02E-01	2.71E-03	-	1.20E-02	-	-	-	3.14E-01	2.25E-05	-	-	-
NH3	7664417	6.84E+02	2.89E+01	-	1.28E+02	-	-	-	-	4.28E-01	-	-	-
Nickel	7440020	-	-	-	-	2.61E-03	2.14E-04	4.16E-05	-	-	6.71E-06	-	1.78E-03
PAHs-w/o	1151	-	9.02E-04	-	4.01E-03	-	-	-	3.26E-02	7.50E-06	-	-	-
p-DiClBenzene	106467	9.38E-02	-	-	-	-	-	-	-	-	-	-	-
Perc	127184	-	-	-	-	-	-	-	-	1.23E-01	-	-	-
Phenanthrene	85018	-	-	-	-	-	-	-	4.38E-02	-	-	-	-
Phenol	108952	-	-	-	-	-	-	-	1.01E-01	-	-	-	-
Propylene	115071	2.49E+00	6.59E+00	-	2.13E+01	-	-	-	-	5.48E-02	-	-	-
Pyrene	129000	-	-	-	-	-	-	-	5.71E-03	-	-	-	-
Selenium	7782492	-	-	-	-	2.75E-05	2.54E-05	4.94E-06	-	-	7.97E-07	-	2.97E-04
Styrene	100425	1.49E-01	-	-	-	-	-	-	9.92E-02	-	-	-	-
TetraClEthane	79345	-	-	-	-	-	-	-	1.68E-01	-	-	-	-
Toluene	108883	2.66E-01	3.30E-01	-	1.06E+00	-	-	-	1.72E+00	4.88E-01	-	-	-
Vanadium	7440622	-	-	-	-	-	1.30E-05	2.53E-06	-	-	4.08E-07	-	1.05E-02
Vinyl Acetate	108054	1.27E+00	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	75014	-	-	-	-	-	-	-	6.27E-02	6.68E-02	-	-	-
Vinylid Chlorid	75354	-	-	-	-	-	-	-	-	1.56E-02	-	-	-
Xylenes	1330207	1.84E-01	2.45E-01	-	7.90E-01	-	-	-	7.75E-01	2.82E+00	-	-	-
Zinc	7440666	-	-	-	-	-	3.51E-03	6.81E-04	-	-	1.10E-04	-	-

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Table 2-4: Operations $PM_{2.5}$ Emissions

Facility	Source Description	$PM_{2.5}$ (lb/yr)	$PM_{2.5}$ (lb/hr)
AD	AD Loader Exhaust	4.74E+00	5.41E-04
AD	AD Loader Road Dust	8.84E+00	1.01E-03
AD	Yard Waste and Food Waste Feed Stock - Organic Waste Loading	4.12E+00	4.70E-04
AD	Bioteg Biofilter - Digestate Dewatering	0.00E+00	0.00E+00
AD	Boiler - Natural Gas - 1.05 MMBTU/hr	6.85E+01	7.82E-03
AD	Emergency Flare - 10.9 MMBTU/hr	1.80E+02	2.05E-02
AD	Emergency Generator - NG - 130kW	2.99E+00	3.42E-04
Biomass	Processed Wood to Biomass and Biochar - Exhaust	1.60E-01	1.83E-05
Biomass	Processed Wood to Biomass and Biochar - Road Dust	2.67E+01	3.05E-03
Biomass	Processed Wood to Biomass and Biochar - Loadout	1.06E-01	1.21E-05
Biomass	Biochar Storage	2.13E-01	2.43E-05
Biomass	Biomass Facility Loader - Exhaust	4.74E+00	5.41E-04
Biomass	Biomass Facility Loader - Road Dust	1.04E+01	1.19E-03
Biomass	Grinder Loading and Ground Wood Stockpiles - Material Handling	1.04E+00	1.18E-04
Biomass	Load Material into Biomass Gasification Process	4.15E-01	4.73E-05
Biomass	Dryer	0.00E+00	0.00E+00
Biomass	Dryer Loading	1.04E+00	1.18E-04
Biomass	Syncraft Flare	1.80E+01	2.05E-03
Biomass	Syncraft Flare	1.80E+01	2.05E-03
Biomass	Syncraft Flare	1.80E+01	2.05E-03
Biomass	Grinding	1.60E+01	1.82E-03
Biomass	Jenbacher J412 500 kW	3.12E+02	3.56E-02
Biomass	Jenbacher J412 500 kW	3.12E+02	3.56E-02
Biomass	Jenbacher J412 500 kW	3.12E+02	3.56E-02

Notes: Air District $PM_{2.5}$ threshold is based on an annual averaging period. For hourly emissions entered into AERMOD, divided annual emissions by 8,760 hr/yr.

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3.0 MODELING METHODOLOGY AND INPUTS

The project HRA and $PM_{2.5}$ modeling was developed using a refined dispersion model to estimate downwind concentrations from project construction and operational emissions. For the HRA, a health risk software tool was then used to convert these concentrations to health risks. Air dispersion modeling inputs used to create the dispersion characteristics are described in Section 3.1. A description of the health risk methodology follows in Section 3.2. Results are presented in Section 4.

3.1 Air Dispersion Modeling Methodology and Inputs

Air dispersion models calculate the atmospheric transport and fate of pollutants emitted from an emissions source. The models calculate the concentration of selected pollutants at specific downwind ground-level points, such as residential or off-site workplace receptors. The transformation (fate) of an airborne pollutant, its movement with the prevailing winds (transport), its crosswind and vertical movement due to atmospheric turbulence (dispersion), and its removal due to dry and wet deposition are influenced by the pollutant's physical and chemical properties and by meteorological and environmental conditions. Factors such as the distance from the source to the receptor, meteorological conditions, intervening land use and terrain, pollutant release characteristics, and background pollutant concentrations affect the predicted concentration of an air pollutant. Air dispersion models take these factors into consideration when calculating downwind ground-level pollutant concentrations.

The air dispersion model used for this HRA Is the American Meteorological Society (AMS)/ Environmental Protection Agency (EPA) Regulatory Model (AERMOD). AERMOD is a steady-state plume dispersion model that incorporates air dispersion calculations based on planetary boundary layer turbulence structure and scaling concepts. AERMOD includes the treatment of both surface and elevated sources and both simple and complex terrain. AERMOD, like most dispersion models, uses mathematical algorithms to characterize the atmospheric processes that disperse pollutants emitted by a source. Using emission rates, exhaust parameters, terrain characteristics, and meteorological inputs, AERMOD calculates downwind pollutant concentrations at specified receptor locations. AERMOD is recommended by the EPA, California Air Resources Board (CARB), and the Air District for stationary source air dispersion modeling projects.

The Lakes Environmental Software (Lakes) implementation/user interface, AERMOD View™, Version 13.0.0, was used for this Project. This version of AERMOD View™ implements the current version of AERMOD (version 24142) at the time the modeling was performed.

The emissions and other inputs used for the AERMOD modeling are outlined in Attachments B and C and are described in more detail below.

3.1.1 Source Parameters

Construction Sources: Volume sources were used to model the equipment exhaust emissions for construction equipment while line-volume sources were used to model onsite vehicles. For volume sources, total project construction equipment exhaust emissions were distributed proportionally by the size of the modeled volume sources.

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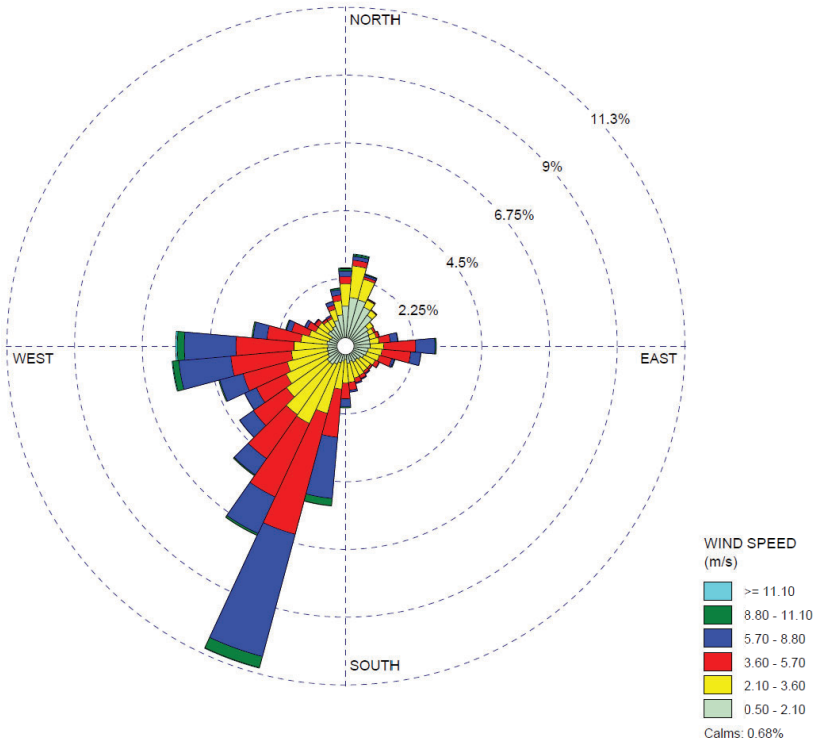
$PM_{2.5}$ exhaust and fugitive dust emissions were also modeled and compared to the Air District health-based annual $PM_{2.5}$ threshold provided in Table 1-1 for projects. CalEEMod calculates fugitive dust emissions from grading, bulldozing, truck loading, demolition, and on-road vehicles traveling along paved and unpaved roads. Fugitive dust from construction offroad equipment travel is not quantified in CalEEMod, which is consistent with approaches taken in other comprehensive models (CalEEMod User Guide 2022). CalEEMod calculates the default area graded based on the equipment list (including number of equipment), the number of days needed to complete the default phases listed on this screen (e.g., grading), and the maximum number of acres a given piece of equipment can traverse in an 8-hour workday. Accordingly, CalEEMod included fugitive dust emissions for each construction site. A detailed summary of source parameters used for the construction and operations HRA and $PM_{2.5}$ analyses is included in Attachment A.

Operational Sources: For the AD and Bioenergy operational sources, various source types were used in AERMOD. This included area, volume, line-volume (mobile equipment) and point sources to characterize the emissions sources. A detailed summary of source parameters used for the operations HRA and $PM_{2.5}$ analyses is included in Attachment B.

3.1.2 Meteorological Data

Five years of AERMOD-ready preprocessed meteorological data files for 2013-2017 obtained from the Air District for the Napa County Airport. The Napa Country Airport meteorological station is located immediately west of the facility. The terrain around and between the airport and the NRWS facility is relatively flat. The wind rose (Figure 3-1) shows that the predominant wind direction is from the south-southwest.

Figure 3-1: Napa County Airport Wind Data (2013-2017)



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3.1.3 Urban/Rural Dispersion Option

AERMOD allows for the use of urban or rural dispersion coefficients. The determination of whether the facility is in an urban or rural area followed the Auer method noted in the references section of the Code of Federal Regulations (CFR) Title 40 Part 51, Appendix W. The Auer method requires drawing a circle with a 3-kilometer radius centered on the centroid of the emissions source locations and classifying the land use types within the circle as urban or rural according to a set of criteria. If 50% or more of the land use types within the circle meet the urban criteria (I1-Heavy Industrial, I2-Light-Moderate Industrial, C1-Commercial, R2 and R3-Compact Residential), the Facility is considered an urban area. Rural criteria are R1-Common Residential, R4-Estate Residential, A1-Metropolitan Natural, A2-Agricultural, A3-Undeveloped (Grass/Weeds), A4-Undeveloped (Heavily Wooded), and A5-Water Surfaces.

Figure 3-2 shows the area within 3 kilometers of the Project Area. More than 50% of the land use types within the circle meet the criteria to be classified as rural. Therefore, rural dispersion coefficients were used in AERMOD.

Figure 3-2: Land Use Types Within 3 Kilometers of the Project Area



3.1.4 Terrain Options and Modeling Domain

For this project, the AERMOD runs used the regulatory default elevated terrain option. Terrain data were imported directly into AERMOD View™ using the WebGIS import feature. The terrain

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data were from the United States Geological Survey (USGS) National Elevation Dataset (NED) and had a spatial resolution of approximately 10 meters (1/3 arcsecond). The terrain data files were processed by AERMOD View™ using AERMAP version 24142, and elevations were assigned to receptors and emissions sources accordingly. All geographical coordinates referenced in this appendix and attachments are in the Universal Transverse Mercator (UTM) coordinate system, with the North American (NAD83) datum.

3.1.5 On-Site Buildings

On-site buildings are included in AERMOD dispersion modeling to account for building downwash effects on point sources. No on-site buildings were included in the AERMOD modeling of construction sources as there are no point sources associated with Project construction. Modeled operational sources did include point sources and building downwash was incorporated into the operational risk assessment.

3.1.6 Receptors

The facility boundary encompasses the existing facility and the proposed Project expansion area. Per Air District guidance, a fenceline grid of receptors was used to ensure that impacts will be evaluated against the appropriate CEQA thresholds at all locations off-site. These gridded receptors were located as follows:

- Fenceline receptors spaced every 20 meters;
- 20-m spacing from the fenceline to a distance of 325 m from the center of the facility;
- 50-m spacing from 325 to 575 m;
- 100-m spacing from 575 to 1,075 m; and
- 250-m spacing from 1,075 to 1,575 m.

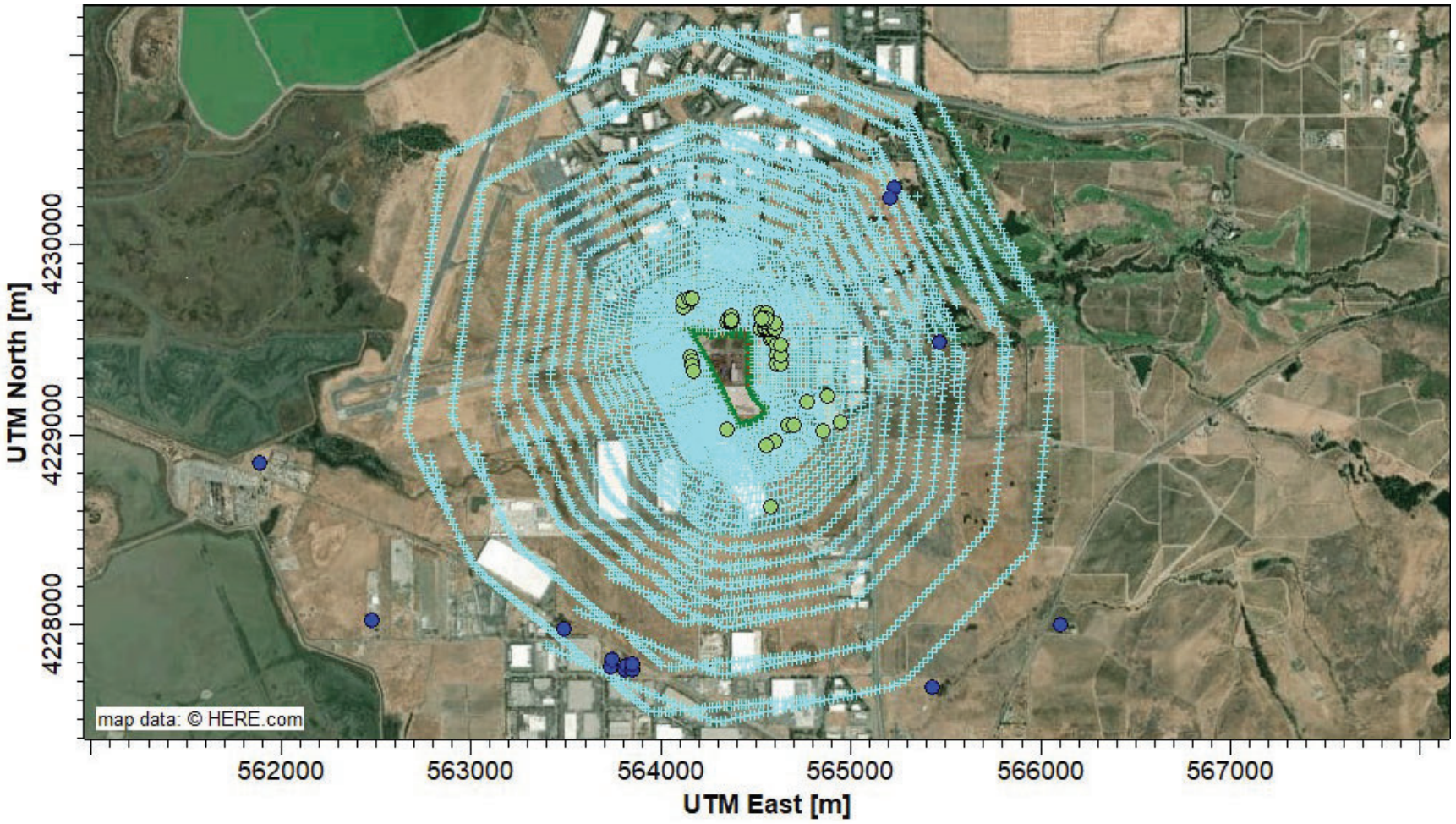
Additional discrete Cartesian receptors were used to evaluate the locations of the closest residential receptors, sensitive receptors, and off-site workplaces. A flagpole height of 1.5 meters was used for all receptors per Air District CEQA Guidelines.

The nearest resident is a single-family home located approximately 0.90 miles southwest of the facility. The nearest school is Napa Valley Montessori south of the facility more than one mile away. The closest off-site workplaces include Universal Shipping to the southwest, Devlin Road Transfer Station to the southeast, Napa County Airport to the west, Foley Products Company to the east, and Biagi Bros Inc. to the north.

Figure 4-3 shows the locations of receptors used in the modeling and the property line.

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Figure 4-3: Fenceline and Receptor Locations



Blue Cross: Fenceline Receptor Grid
Blue Dot: Discrete Receptor (Residence/Sensitive)
Green Dot: Discrete Receptor (Worker)

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3.2 HRA Methodology

The results from the AERMOD runs were imported into the Hot Spots Analysis and Reporting Program, version 2 (HARP2) for further processing and analysis. An HRA involves four steps that aim at estimating the extent of cancer and non-cancer health effects associated with TAC emissions on both a population and specific receptor basis. The four major components of an HRA include:

- Hazard identification;
- Exposure assessment;
- Dose-response assessment; and
- Risk characterization.

Hazard identification generally involves the determination of potential health effects that may be associated with an emitted pollutant and is based on the estimated TAC emissions.

The purpose of the exposure assessment is to estimate the extent of public exposure to a substance for which cancer and non-cancer effects are evaluated. This step involves combining the TAC emissions with the modeling of environmental transport using AERMOD, evaluation of environmental fate, identification of exposure routes, determination of the exposed population, and estimations of short-term (acute) and long-term (chronic) exposure levels.

Dose-response assessment is the process of characterizing the relationship between the exposure to a substance or emitted pollutant and the incidence of an adverse health effect in an exposed population. The California Office of Environmental Health Hazard Assessment (OEHHA) has determined the current risk threshold values that are used in this HRA.

Risk characterization, which is the final step in the risk assessment process, is the integration of the exposure and dose-response assessment for the emitted pollutants.

HARP2 was used to conduct the dose-response assessment and risk characterization. The dose-response assessment is the relationship between pollutant exposure and potential incidence of an adverse health effect in the exposed populations. It is determined for each chemical using the most current OEHHA potency factors for cancer risk and reference exposure levels (RELs) for acute and chronic non-cancer risks, which are incorporated into HARP2. Human doses were calculated for the modeled environmental exposures over specified time periods via multiple environmental pathways using the AERMOD dispersion modeling results. The risk characterization integrates the health effects and public exposure information and provides quantitative estimates of health risks resulting from facility TAC emissions.

This HRA followed the guidance provided in Appendix E of the Air District CEQA Guidelines (Bay Area Air District 2022), which are based on OEHHA's HRA guidelines (OEHHA 2015). The health risk calculations were performed using HARP2's Air Dispersion Modeling and Risk Tool (ADMRT, version 22118). The HARP2 software tool uses OEHHA equations and algorithms to calculate health risks based on input parameters, such as emissions, X/Q concentrations, and toxicological data, as presented in the OEHHA risk assessment guidelines. The input parameters used in the HARP2 risk assessment are outlined in Attachments A and B.

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4.0 HEALTH RISK ASSESSMENT AND PM2.5 CONCENTRATION RESULTS

4.1 HRA Results

The results of the project HRA from DPM and $PM_{2.5}$ emissions during Project construction and operations are presented in this Section. Modeling files can be provided upon request.

4.1.1 Construction

Table 4-1 presents a summary of the construction HRA results at the Point of Maximum Impact (PMI), Maximally Exposed Individual Resident (MEIR), Maximally Exposed Individual Worker (MEIW), and maximally exposed sensitive receptor. Attachment C presents more detailed tables of the HARP2 modeling results for each health risk, at each receptor type, broken down by pollutant and source.

The results show that, for all receptor types and locations, the predicted health risks are less than the Air District cancer significance threshold and well below the chronic non-cancer thresholds. [3]

The cancer risk PMI occurs at the facility's eastern fenceline near Devlin Road. The cancer risk at the MEIR occurs at a residence approximately 0.9 miles to the southwest of the facility off Green Island Road. The MEIW occurs at Universal Shipping, which is located south of the facility. DPM emissions from the Biomass Conversion Process construction equipment contribute most of the risk at each receptor type.

Table 4-1: Construction Health Risk Assessment Results

Health Risk	PMI	MEIR	Maximum Sensitive Receptor	MEIW	Air District CEQA Threshold
Cancer Risk (In One Million)	6.16	0.07	0.03	0.04	10
HIC	0.01	0.0001	0.00004	0.003	1

4.1.2 Operations

The results of the HRA from the Project operational emissions at full buildout are summarized in Table 4-2. Attachment D presents more detailed tables of the HARP2 modeling results for operations for each health risk, at each receptor type, broken down by pollutant and source.

The results show that, for all receptor types and locations, the predicted health risks are less than the Air District cancer significance threshold and well below the non-cancer thresholds.

The cancer risk PMI occurs at the facility's western fenceline which borders Napa County Airport. The cancer risk at the MEIR occurs at a residence approximately 0.9 miles to the southwest of the facility off Green Island Road. The MEIW occurs at Universal Shipping, which is located south of the facility. DPM emissions from the AD and Biomass offroad equipment contribute most of the risk at each receptor type. Acetaldehyde emissions from the biomass dryer is the second highest contributor.

[3] Because DPM does not exhibit acute health risk impacts, the acute health index (HIA) is not calculated for construction activities.

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The chronic risks are well below Air District thresholds. The peak impacts for the acute risk occur at the southeast fenceline of the facility. The MEIW occurs at Universal Shipping, which is located south of the facility.

Table 4-2: Operational Health Risk Assessment Results

Health Risk	PMI	MEIR	Maximum Sensitive Receptor	MEIW	Air District CEQA Threshold
Cancer Risk (In One Million)	30.01	0.36	0.15	0.64	10
HIC	0.09	0.002	0.001	0.01 (Annual) 0.006 (8-Hour)	1
HIA	0.23	0.02	0.01	0.13	1

4.2 $PM_{2.5}$ Concentrations

In addition to the cancer and non-cancer HRA thresholds of significance, the Air District has developed an off-site annual project $PM_{2.5}$ concentration threshold of 0.3 micrograms per cubic meter ($\mu g/m^3$) to determine project significance of community-scale impacts of air pollution (Table 1-1).

Since the Air District project $PM_{2.5}$ concentration is an annual threshold, only locations where someone could reside or work continuously for one year or more were considered. Table 4-3 compares the modeled $PM_{2.5}$ concentrations from construction and operations with the Air District project $PM_{2.5}$ significance threshold. As shown in Table 4-3, $PM_{2.5}$ emissions will not result in significant project community health risk during Project construction or operations.

Table 4-3: Comparison of Annual $PM_{2.5}$ Concentrations to Air District Significance Threshold

Source Type	Receptor Type	Modeled Concentration ($\mu g/m^3$)	Threshold of Significance ($\mu g/m^3$)	Significant?
Construction	Worker	0.13	0.3	No
	Resident	0.004	0.3	No
Operations	Worker	0.12	0.3	No
	Resident	0.02	0.3	No

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5.0 REFERENCES

Bay Area Air District. 2024. CEQA Resources: Health Risk Screening and Modeling. Roadway Screening Data Layers (last updated December 2022) and Rail and Railyard Screening Data Layers (last updated May 2024). Website: https://www.baaqmd.gov/en/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools/health-risk-screening-and-modeling.

Bay Area Air District. 2022. California Environmental Quality Act – Air Quality Guidelines. Website: https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines.

California Air Pollution Control Officers Association (CAPCOA). 2022. California Emissions Estimation Model® (CalEEMod). Website: http://www.caleemod.com/.

California Air Resources Board (CARB). 2024. Hotspots Analysis and Reporting Program Version 2 (HARP2) Air Dispersion Modeling and Risk Tool (ADMRT). Website (https://ww2.arb.ca.gov/our-work/programs/hot-spots-analysis-reporting-program). Office of Environmental Health Hazard Assessment (OEHHA). 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments. February 2015.

California Air Resources Board (CARB). 2024. California Emissions Estimator Model (CalEEMod) User's Guide. Website (https://ww2.arb.ca.gov/our-work/programs/california-emissions-estimator-model).

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ATTACHMENT A – CONSTRUCTION MODEL INPUT DATA

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Napa CEQA Modeling
Source Parameters - Construction

HRA Volume Sources

Release ID	Source Group	Description	Release Height (ft)	Release Height (m)	Initial Horizontal Dimension (ft)	Initial Horizontal Dimension (m)	Initial Vertical Dimension (ft)	Initial Vertical Dimension (m)	HRA Emission Rate (g/s)	UTM x WGS84 z10 (m)	UTM y WGS84 z10 (m)	Comments
ADC1	ADC	AD Construction	4.00	1.22	22.13	6.74	1.98	0.60	0.50	564,334.48	4,229,338.11	SZINIT, assumed surface based and release height of 4 ft.
ADC2		AD Construction	4.00	1.22	22.13	6.74	1.86	0.57	0.50	564,338.61	4,229,306.61	SZINIT, assumed surface based and release height of 4 ft.
BEC1	BEC	Biomass Conversion Facility Construction	4.00	1.22	22.13	6.74	1.86	0.57	0.33	564,414.98	4,229,150.40	SZINIT, assumed surface based and release height of 4 ft.
BEC2		Biomass Conversion Facility Construction	4.00	1.22	22.13	6.74	1.86	0.57	0.33	564,446.71	4,229,140.89	SZINIT, assumed surface based and release height of 4 ft.
BEC3		Biomass Conversion Facility Construction	4.00	1.22	22.13	6.74	1.86	0.57	0.33	564,478.92	4,229,134.62	SZINIT, assumed surface based and release height of 4 ft.

PM2.5 Volume Sources

Release ID	Source Group	Description	Release Height (ft)	Release Height (m)	Initial Horizontal Dimension (ft)	Initial Horizontal Dimension (m)	Initial Vertical Dimension (ft)	Initial Vertical Dimension (m)	PM2.5 Emission Rate (g/s)	UTM x WGS84 z10 (m)	UTM y WGS84 z10 (m)	Comments
ADE1	ADE1	AD Construction - Off Road Exhaust	4.00	1.22	22.13	6.74	1.98	0.60	4.20E-05	564,334.48	4,229,338.11	SZINIT, assumed surface based and release height of 4 ft.
ADE2	ADE2	AD Construction - Off Road Exhaust	4.00	1.22	22.13	6.74	1.86	0.57	4.20E-05	564,338.61	4,229,306.61	SZINIT, assumed surface based and release height of 4 ft.
ADD1	ADD1	AD Construction - Off Road Dust	4.00	1.22	22.13	6.74	1.98	0.60	3.21E-06	564,334.48	4,229,338.11	SZINIT, assumed surface based and release height of 4 ft.
ADD2	ADD2	AD Construction - Off Road Dust	4.00	1.22	22.13	6.74	1.86	0.57	3.21E-06	564,338.61	4,229,306.61	SZINIT, assumed surface based and release height of 4 ft.
BEE1	BEE1	Biomass Conversion Facility Construction - Off Road Exhaust	4.00	1.22	22.13	6.74	1.86	0.57	6.17E-05	564,414.98	4,229,150.40	SZINIT, assumed surface based and release height of 4 ft.
BEE2	BEE2	Biomass Conversion Facility ConstructionBiomass Conversion Facility	4.00	1.22	22.13	6.74	1.86	0.57	6.17E-05	564,446.71	4,229,140.89	SZINIT, assumed surface based and release height of 4 ft.
BEE3	BEE3	Biomass Conversion Facility ConstructionBiomass Conversion Facility	4.00	1.22	22.13	6.74	1.86	0.57	6.17E-05	564,478.92	4,229,134.62	SZINIT, assumed surface based and release height of 4 ft.
BED1	BED1	Biomass Conversion Facility Construction - Off Road Dust	4.00	1.22	22.13	6.74	1.86	0.57	4.62E-04	564,414.98	4,229,150.40	SZINIT, assumed surface based and release height of 4 ft.
BED2	BED2	Biomass Conversion Facility Construction - Off Road Dust	4.00	1.22	22.13	6.74	1.86	0.57	4.62E-04	564,446.71	4,229,140.89	SZINIT, assumed surface based and release height of 4 ft.
BED3	BED3	Biomass Conversion Facility Construction - Off Road Dust	4.00	1.22	22.13	6.74	1.86	0.57	4.62E-04	564,478.92	4,229,134.62	SZINIT, assumed surface based and release height of 4 ft.

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Napa CEQA Modeling
Mobile Source Parameters

Onsite Vehicle Model Inputs - Construction

Construction HRA

Source	Source Group	Description
ADV	ADV	AD Construction Vehicle Traffic
BEV	BEV	Bioenergy Construction Vehicle Traffic

Construction PM2.5

Source	Source Group	Description
ADVE	ADVE	AD Construction Vehicle Traffic - Exhaust
ADVD	ADVD	AD Construction Vehicle Traffic - Dust
BEVE	BEVE	Bioenergy Construction Vehicle Traffic - Exhaust
BEVD	BEVD	Bioenergy Construction Vehicle Traffic - Dust

Parameters based on EPA Haul Road Calculator

1. Separate volume sources (adjacent and surface based)	feet	AERMOD View input (m)	
2. Top of Plume Height = 1.7 x VH	16.73	5.10	PH
3. Volume Source Release Height = 0.5 x Top of Plume Height	8.37	2.55	release ht
VW = vehicle width	9.85	3.00	
4. Width of Plume = VW or lane width (Each lane should be modeled separately.)	29.54	9.00	PW

From EPA - Width of Plume = VW + 6m for single lane roadways / Road Width + 6m for two lane roadways

5. Initial Sigma Z - Top of Plume Height/2.15	7.78	2.37	calculated in AERMOD
6. Initial Sigma Y - Width of Plume/2.15	13.74	4.19	calculated in AERMOD
7. Emissions input as g/s			

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Napa CEQA Modeling **Construction**
AERMOD Dispersion Model Options/Assumptions

Parameter	Value				Comments
AERMOD Version	24142				--
AERMET Version	22112				--
AERMAP Version	24142				--
Lakes Environmental Software; AERMOD View™ Version	13.0.0				--
Control Pathway					
Regulatory Options	Default	☑	Non-Default	☐	--
Output Type	Concentration	☑	Dry Deposition	☐	--
	Total	☐	Wet Deposition	☐	
Depletion Options	Dry Depletion	☐	Wet Depletion	☐	--
	Disable Dry Depletion	☐	Disable Wet Depletion	☐	
Pollutant	Other				--
Averaging Time Options	1-Hour; Period (HRA) Annual (PM2.5)				--
Dispersion Coefficient	Rural	☑	Urban	☐	Rural
Terrain Height Options	Elevated		☑		--
	Non-Default Regulatory Options				--
	Flat	☐	Flat & Elevated	☐	--
Receptor Elevations / Hill Heights	Run AERMOD using the AERMAP Receptor Output file (*.ROU)				--
Source Pathway					
Building Downwash	Include	☑	Exclude	☐	--
Background Concentrations	Include	☐	Exclude	☑	--
Source Groups	When source groups used, they add to 1 g/s.				--
Urban Groups	N/A				--
Variable Emissions	N/A				--
Source emission rate	Set to 1 g/s per source for operations HRA, set to actual emissions for PM2.5 modeling				--
Receptor Pathway					
Flagpole Receptors	Include	☑	Exclude	☐	1.5 m
Fenceline Grid	--				--
	Tier		Segment Distance (m)	Tier Spacing (m)	--
	1		250	50	--
	2		500	100	--
	3		500	250	--
Plant Boundary	Receptor Spacing: 10 m				--
Discrete Cartesian Receptors	Includes residential, sensitive and offsite worker receptors				--
Meteorology Pathway					
Meteorological Station	Napa College				Representative meteorological data provided by the BAAQMD. Napa 2013-2017 is available, however missing data > 10%. Therefore, per recommendation of Bay Area, used 2010-2014.
Years	2010-2014				--
Base Elevation of Surface Station	1.8 m				--
Terrain Pathway					
Coordinate System Used	WGS84				--
Data File Type	NED GEOTIFF. Resolution: 1/3-arcsecond (10 meters).				--
AERMAP Domain Options	Not Specified	☐	User-Defined Domain	☑	Elevations and hill heights are calculated from a region measuring approximately 20,000 meters by 20,000 meters centered on the facility.

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Napa CEQA Modeling **Construction**
HARP2 Model Options/Assumptions

Parameter	Value				Comments
Model Version	HARP2 ADMRT version 22118				--
HARP Health Table Version	23279				--
Multi-Pathway					
Inhalation	Res	☑	Work	☑	DPM - Inhalation only
Soil	Res	☐	Work	☐	--
Dermal	Res	☐	Work	☐	--
Mother's Milk	Res	☐	Work	☐	--
Drinking Water	Res	☐	Work	☐	--
Fish	Res	☐	Work	☐	--
Homegrown Produce	Res	☐	Work	☐	--
Beef/Dairy	Res	☐	Work	☐	--
Pigs, Chickens, and/or Eggs	Res	☐	Work	☐	--
Deposition Velocity	--				--
Residential Cancer Risk Assumptions					
Exposure Duration	1 year				Over approximately two years, however, the number of days are closer to 1 year
Fraction of Time at Home	Third Trimester to 16 years: On 16 years to 30 years: On				No school within 1 in a million isopleth
Inhalation Rate Basis	RMP				--
Analysis Option	RMP Using the Derived Method				--
Worker Cancer Risk Assumptions					
Exposure Duration	1 year				Over approximately two years, however, the number of days are closer to 1 year
Analysis Option	OEHHA Derived Method				--
Inhalation Rate Basis	8-hour Breathing Rates, Moderate Intensity				--
Worker Adjustment Factor (WAF)	--				--
Residential and Worker Non-Cancer Risk Assumptions					
Analysis Option	OEHHA Derived Method				--
Inhalation Rate Basis	Residential: Long-Term 24-hour Off-Site Worker: 8-hour Breathing Rates, Moderate Intensity				--

ATTACHMENT B – OPERATIONS MODEL INPUT DATA

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Napa CEQA Modeling
Source Parameters - Operations

Point Sources

Stack ID	Source Group	Process Type	Description	Stack Height H_S (ft)	Stack Diameter D_S (ft)	Stack Velocity V_S (ft/s)	Stack Temp T_S (°F)	Stack Flow (acfm)	Stack Height H_S (m)	Stack Diameter D_S (m)	Stack Velocity V_S (m/s)	Stack Temp T_S (°K)	HRA Emission Rate (g/s)	Annual Average PM2.5 Input (lb/hr)	UTM x WGS84 z10 (m)	UTM y WGS84 z10 (m)	Stack configuration (fixed cap/flapper cap, vertical/horizontal stack)
ICE1	ICE1	Biomass	Jenbacher J412 500 kW	33.97	1.67	20.64	572.00	2,712.17	10.35	0.51	6.29	573.15	1.00	3.56E-02	564,416.42	4,229,155.67	vertical, no cap
ICE2	ICE2	Biomass	Jenbacher J412 500 kW	33.97	1.67	20.64	572.00	2,712.17	10.35	0.51	6.29	573.15	1.00	3.56E-02	564,409.94	4,229,157.02	vertical, no cap
ICE3	ICE3	Biomass	Jenbacher J412 500 kW	33.97	1.67	20.64	572.00	2,712.17	10.35	0.51	6.29	573.15	1.00	3.56E-02	564,403.33	4,229,158.51	vertical, no cap
FLARE1	FLARE1	Biomass	Syncraft Flare	19.69	3.94	2.32	932.00	1,695.10	6.00	1.20	0.71	773.15	1.00	2.05E-03	564,439.05	4,229,123.23	vertical, no cap
FLARE2	FLARE2	Biomass	Syncraft Flare	19.69	3.94	2.32	932.00	1,695.10	6.00	1.20	0.71	773.15	1.00	2.05E-03	564,433.31	4,229,124.36	vertical, no cap
FLARE3	FLARE3	Biomass	Syncraft Flare	19.69	3.94	2.32	932.00	1,695.10	6.00	1.20	0.71	773.15	1.00	2.05E-03	564,427.49	4,229,125.49	vertical, no cap
EMFLR	EMFLR	Anaerobic Digester	Emergency Flare - 10.9 MMBTU/hr	40.00	5.00	1.20	1,400.00	3,865.15	12.19	1.52	0.36	1,033.15	1.00	2.05E-02	564,346.58	4,229,303.25	vertical, no cap
BLR	BLR	Anaerobic Digester	Boiler - Natural Gas - 1.05 MMBTU/hr	10.00	0.50	42.49	350.00	435.99	3.05	0.15	12.95	449.82	1.00	7.82E-03	564,334.23	4,229,303.90	vertical, no cap
EMICE	EMICE	Anaerobic Digester	Emergency Generator - Natural Gas - 130kW	10.00	0.50	113.83	1,112.00	1,341.00	3.05	0.15	34.69	873.15	1.00	3.42E-04	564,336.30	4,229,306.00	vertical, no cap

Rectangular Area Sources

Release ID	Source Group	Process Type	Description	Release Height (ft)	Release Height (m)	HRA Emission Rate ($g/s/m^2$)	Annual Average PM2.5 Input (lb/hr)	UTM x WGS84 z10 (m)	UTM y WGS84 z10 (m)	Comments
BIOF	BIOF	Biomass	Bioteg Biofilter - Digestate Dewatering	6.00	1.83	7.33E-02	0.00E+00	564,348.34	4,229,342.10	Manufacturer's specifications. Model MCBF-1000.
BGLD	BGLD	Biomass	Load Material into Biomass Gasification Process	4.00	1.22	7.04E-03	4.73E-05	564,455.05	4,229,162.97	Assumed release height of 4 ft
DRYLD	DRYLD	Biomass	Dryer Loading	4.00	1.22	3.17E-03	1.18E-04	564,468.67	4,229,159.94	Assumed release height of 4 ft
BCS	BCS	Biomass	Biochar Storage	4.00	1.22	4.81E-03	2.43E-05	564,430.14	4,229,164.31	Assumed release height of 4 ft
GRIND	GRIND	Biomass	Grinding	10.00	3.05	1.12E-03	1.82E-03	0.00	0.00	Assumed release height of 10 ft (load height typically varies from 8-16 ft, based on data online from Vermeer). Open building (three sides), modeled as area source rather than a volume source.

Polygonal Area Sources

Release ID	Source Group	Process Type	Description	Release Height (ft)	Release Height (m)	HRA Emission Rate ($g/s/m^2$)	Annual Average PM2.5 Input (lb/hr)	UTM x WGS84 z10 (m)	UTM y WGS84 z10 (m)	Comments
BESP	BESP	Biomass	Grinder Loading and Ground Wood Stockpiles - Material Handling	4.00	1.22	3.24E-04	1.18E-04	564,261.14	4,229,405.25	Assumed release height of 4 ft
ADFS	ADFS	Anaerobic Digester	Yard Waste and Food Waste Feed Stock - Organic Waste Loading	4.00	1.22	6.56E-04	4.70E-04	564,305.26	4,229,266.93	Stockpile is already existing onsite, therefore, not included in analysis. Assumed release height of 4 ft

Volume Sources

Release ID	Source Group	Process Type	Description	Release Height (ft)	Release Height (m)	Initial Horizontal Dimension (ft)	Initial Horizontal Dimension (m)	Initial Vertical Dimension (ft)	Initial Vertical Dimension (m)	HRA Emission Rate (g/s)	Annual Average PM2.5 Input (lb/hr)	UTM x WGS84 z10 (m)	UTM y WGS84 z10 (m)	Comments
DRY1	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,456.32	4,229,146.94	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY2	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,464.75	4,229,144.96	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY3	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,473.38	4,229,143.06	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY4	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,481.95	4,229,141.31	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY5	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,490.36	4,229,139.43	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY6	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,454.62	4,229,138.78	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY7	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,463.03	4,229,136.74	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY8	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,471.38	4,229,134.96	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY9	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,479.91	4,229,133.16	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY10	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,488.29	4,229,131.35	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY11	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,453.00	4,229,130.68	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY12	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,462.32	4,229,128.56	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY13	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,470.60	4,229,126.69	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY14	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,478.71	4,229,124.96	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.
DRY15	Dryer	Biomass	Dryer	4.00	1.22	6.09	1.86	1.86	0.57	0.07	0.00	564,486.82	4,229,123.14	SZINIT, assumed surface based and release height of 4 ft. Dryer building is open when loaded with material.

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Napa CEQA Modeling
Source Parameters - Operations

Building Parameters

Building	X-Length (m)	Y-Length (m)	Height (m)
BLD_1	26.88	18.29	6.10
BLD_2	18.94	16.73	7.62
BLD_3	28.50	23.79	7.62
BLD_4	Polygonal		10.06
BLD_5	36.41	11.77	10.06
BLD_6	33.68	31.43	10.06
BLD_7	30.59	30.45	10.06
BLD_8	20.43	30.91	9.75
BLD_9	12.73	25.05	6.10
BLD_10	8.90	16.21	5.18
BLD_11	Polygonal		13.57
BLD_12	Polygonal		9.36
BLD_13	Polygonal		4.00
BLD_14	Polygonal		5.53
BLD_15	Polygonal		5.53
BLD_16	26.88	18.29	6.10
BLD_17	15.85	4.57	5.53
BLD_18	15.85	4.57	5.53
BLD_19	Polygonal		6.71
BLD_20	Polygonal		7.92
BLD_21	Polygonal		7.62
BLD_22	Polygonal		6.71
BLD_23	Polygonal		13.41
BLD_24	Polygonal		11.58
BLD_25	Polygonal		12.19
BLD_26	Polygonal		10.67
BLD_27	Polygonal		10.97
BLD_28	3.67	0.94	2.03

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Napa CEQA Modeling
Mobile Source Parameters

Onsite Vehicle Model Inputs - Operations

Operations HRA and PM2.5

Source	Source Group	Description
BCLO_E	BCLO_E	Processed Wood to Biomass and Biochar - Exhaust Emissions
BCLO_F	BCLO_F	Processed Wood to Biomass and Biochar - Road Dust Emissions
BCLO_L	BCLO_L	Processed Wood to Biomass and Biochar - Loadout Emissions
BE_E	BE_E	Bioenergy Facility Loader - Loader Exhaust Emissions
BE_F	BE_F	Bioenergy Facility Loader - Road Dust Emissions
AD_E	AD_E	AD Loader Loader Exhaust Emissions
AD_F	AD_F	AD Loader Road Dust Emissions

Parameters based on EPA Haul Road Calculator

1. Separate volume sources (adjacent and surface based)	feet	AERMOD View input (m)	
2. Top of Plume Height = 1.7 x VH	16.73	5.10	PH
3. Volume Source Release Height = 0.5 x Top of Plume Height	8.37	2.55	release ht
VW = vehicle width	9.85	3.00	
4. Width of Plume = VW or lane width (Each lane should be modeled separately.)	29.54	9.00	PW
From EPA - Width of Plume = VW + 6m for single lane roadways / Road Width + 6m for two lane roadways			
5. Initial Sigma Z - Top of Plume Height/2.15	7.78	2.37	calculated in AERMOD
6. Initial Sigma Y - Width of Plume/2.15	13.74	4.19	calculated in AERMOD
7. Emissions input as g/s			

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Napa CEQA Modeling **Operations**
AERMOD Dispersion Model Options/Assumptions

Parameter	Value				Comments
AERMOD Version	24142				--
AERMET Version	22112				--
AERMAP Version	24142				--
Lakes Environmental Software; AERMOD View™ Version	13.0.0				--
Control Pathway					
Regulatory Options	Default	☑	Non-Default	☐	--
Output Type	Concentration	☑	Dry Deposition	☐	--
	Total	☐	Wet Deposition	☐	
Depletion Options	Dry Depletion	☐	Wet Depletion	☐	--
	Disable Dry Depletion	☐	Disable Wet Depletion	☐	
Pollutant	Other				--
Averaging Time Options	1-Hour; Period (HRA) Annual (PM2.5)				--
Dispersion Coefficient	Rural	☑	Urban	☐	Rural
Terrain Height Options	Elevated		☑		--
	Non-Default Regulatory Options				--
	Flat	☐	Flat & Elevated	☐	--
Receptor Elevations / Hill Heights	Run AERMOD using the AERMAP Receptor Output file (*.ROU)				--
Source Pathway					
Building Downwash	Include	☑	Exclude	☐	--
Background Concentrations	Include	☐	Exclude	☑	--
Source Groups	When source groups used, they add to 1 g/s.				--
Urban Groups	N/A				--
Variable Emissions	N/A				--
Source emission rate	Set to 1 g/s per source for operations HRA, set to actual emissions for PM2.5 modeling				--
Receptor Pathway					
Flagpole Receptors	Include	☑	Exclude	☐	1.5 m
Fenceline Grid	--				--
	Tier		Segment Distance (m)	Tier Spacing (m)	--
	1		250	50	--
	2		500	100	--
	3		500	250	--
Plant Boundary	Receptor Spacing: 10 m				--
Discrete Cartesian Receptors	Includes residential, sensitive and offsite worker receptors				--
Meteorology Pathway					
Meteorological Station	Napa College				Representative meteorological data provided by the BAAQMD. Napa 2013-2017 is available, however missing data > 10%. Therefore, per recommendation of Bay Area, used 2010-2014.
Years	2010-2014				--
Base Elevation of Surface Station	1.8 m				--
Terrain Pathway					
Coordinate System Used	WGS84				--
Data File Type	NED GEOTIFF. Resolution: 1/3-arcsecond (10 meters).				--
AERMAP Domain Options	Not Specified	☐	User-Defined Domain	☑	Elevations and hill heights are calculated from a region measuring approximately 20,000 meters by 20,000 meters centered on the facility.

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Napa CEQA Modeling **Operations**
HARP2 Model Options/Assumptions

Parameter	Value				Comments
Model Version	HARP2 ADMRT version 22118				--
HARP Health Table Version	23279				--
Multi-Pathway					
Inhalation	Res	☒	Work	☒	--
Soil	Res	☒	Work	☒	--
Dermal	Res	☒	Work	☒	"Warm"
Mother's Milk	Res	☒	Work	☐	--
Drinking Water	Res	☐	Work	☐	--
Fish	Res	☐	Work	☐	--
Homegrown Produce	Res	☒	Work	☐	Default for "Households that garden". Bay Area Mandatory minimum pathways do not include Homegrown produce.
Beef/Dairy	Res	☐	Work	☐	--
Pigs, Chickens, and/or Eggs	Res	☐	Work	☐	--
Deposition Velocity	0.05 m/s				Conservatively assumed 0.05 m/s
Residential Cancer Risk Assumptions					
Exposure Duration	30 years				--
Fraction of Time at Home	Third Trimester to 16 years: On 16 years to 30 years: On				No school within 1 in a million isopleth
Inhalation Rate Basis	RMP				--
Analysis Option	RMP Using the Derived Method				--
Worker Cancer Risk Assumptions					
Exposure Duration	25 years				--
Analysis Option	OEHHA Derived Method				--
Inhalation Rate Basis	8-hour Breathing Rates, Moderate Intensity				--
Worker Adjustment Factor (WAF)	--				--
Residential and Worker Non-Cancer Risk Assumptions					
Analysis Option	OEHHA Derived Method				--
Inhalation Rate Basis	Residential: Long-Term 24-hour Off-Site Worker: 8-hour Breathing Rates, Moderate Intensity				--
WAF8	--				--

ATTACHMENT C – CONSTRUCTION HRA RESULTS SUMMARY

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Cancer Risk by Source for All Pollutants Combined at PMI, MEIR, MEIW and Sensitive Receptor
Napa Construction CEQA HRA

Sources	Description	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)	
		receptor #	6562	receptor #	70	receptor #	42	receptor #	93
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		564,510.10	4,229,178.17	563,851.10	4,227,796.21	563,951.96	4,226,374.43	564,345.97	4,229,025.99
		1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)
ALL	--	6.16E-06	100%	7.30E-08	100%	2.67E-08	100%	3.59E-08	100%
BEC	Bio Energy Conversion Facility Construction	5.97E-06	96.81%	5.04E-08	68.99%	1.91E-08	71.32%	3.11E-08	86.66%
ADC	AD Construction	1.93E-07	3.12%	2.24E-08	30.69%	7.58E-09	28.37%	4.72E-09	13.16%
BEV	Bio Energy Conversion Facility Vehicle Traffic	3.67E-09	0.06%	1.56E-10	0.21%	5.55E-11	0.21%	4.78E-11	0.13%
ADV	AD Vehicle Traffic	5.87E-10	0.01%	7.34E-11	0.10%	2.59E-11	0.10%	1.37E-11	0.04%

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Maximum Cancer Risk by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
Napa Construction CEQA HRA

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)	
		receptor #	6562	receptor #	70	receptor #	42	receptor #	93
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		564,510.10	4,229,178.17	563,851.10	4,227,796.21	563,951.96	4,226,374.43	564,345.97	4,229,025.99
		1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)
-	ALL	6.16E-06	100%	7.30E-08	100%	2.67E-08	100%	3.59E-08	100.00%
9901	DieselExhPM	6.16E-06	100.00%	7.30E-08	100.00%	2.67E-08	100.00%	3.59E-08	100.00%

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Chronic Hazard Index by Source for All Pollutants Combined at PMI, MEIR, MEIW and Sensitive Receptor
Napa Construction CEQA HRA

Sources	Description	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)	
		receptor #	6562	receptor #	70	receptor #	42	receptor #	93
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		564,510.10	4,229,178.17	563,851.10	4,227,796.21	563,951.96	4,226,374.43	564,345.97	4,229,025.99
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)
ALL	--	8.16E-03	100%	9.66E-05	100%	3.53E-05	100%	2.78E-03	100%
BEC	Bio Energy Conversion Facility Construction	7.89E-03	96.81%	6.67E-05	68.99%	2.52E-05	71.32%	2.41E-03	86.66%
ADC	AD Construction	2.55E-04	3.12%	2.97E-05	30.69%	1.00E-05	28.37%	3.66E-04	13.16%
BEV	Bio Energy Conversion Facility Vehicle Traffic	4.86E-06	0.06%	2.07E-07	0.21%	7.35E-08	0.21%	3.70E-06	0.13%
ADV	AD Vehicle Traffic	7.77E-07	0.01%	9.71E-08	0.10%	3.43E-08	0.10%	1.06E-06	0.04%

Notes:
Individual sources are not additive because risk is based on specific target organs, which may be different per source

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Maximum Chronic Hazard Index by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
Napa Construction CEQA HRA

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)	
		receptor #	6562	receptor #	70	receptor #	42	receptor #	93
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		564,510.10	4,229,178.17	563,851.10	4,227,796.21	563,951.96	4,226,374.43	564,345.97	4,229,025.99
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)
-	ALL	8.16E-03	100%	9.66E-05	100%	3.53E-05	100%	2.78E-03	100%
9901	DieselExhPM	8.16E-03	100.00%	9.66E-05	100.00%	3.53E-05	100.00%	2.78E-03	100.00%

Notes:
Individual sources are not additive because risk is based on specific target organs, which may be different per source

ATTACHMENT D – OPERATIONS HRA RESULTS SUMMARY

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Cancer Risk by Source for All Pollutants Combined at PMI, MEIR, MEIW and Sensitive Receptor
Napa Operations CEQA HRA

Sources	Description	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)	
		receptor #	6655	receptor #	70	receptor #	42	receptor #	93
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		564,307.05	4,229,252.17	563,851.10	4,227,796.21	563,951.96	4,226,374.43	564,345.97	4,229,025.99
		30-Year Cancer Risk	Contribution (%)	30-Year Cancer Risk	Contribution (%)	30-Year Cancer Risk	Contribution (%)	25-Year Cancer Risk	Contribution (%)
ALL	--	3.00E-05	100%	3.56E-07	100%	1.54E-07	100%	6.40E-07	100%
AD_E	AD Loader - Exhaust	2.43E-05	81.13%	7.54E-08	21.22%	2.49E-08	16.21%	1.21E-07	18.86%
DRYER	Dryer Process	1.45E-06	4.84%	1.25E-07	35.19%	4.87E-08	31.64%	2.78E-07	43.38%
BE_E	Bioenergy Facility Loader - Exhaust	1.13E-06	3.77%	7.04E-08	19.81%	2.72E-08	17.71%	1.92E-07	30.00%
ADFS	Yard Waste and Food Waste Feed Stock - Organic Waste Loading	1.05E-06	3.50%	1.73E-09	0.49%	5.65E-10	0.37%	1.48E-09	0.23%
AD_F	AD Loader - Road Dust	6.14E-07	2.05%	1.90E-09	0.54%	6.29E-10	0.41%	1.52E-09	0.24%
BCLO_F	Processed Wood to Biomass and Biochar - Road Dust	3.49E-07	1.16%	5.47E-09	1.54%	1.92E-09	1.25%	6.37E-09	1.00%
BIOF	AD Biofilter	3.30E-07	1.10%	3.61E-09	1.01%	1.24E-09	0.80%	4.52E-09	0.71%
EMICE	AD Emergency ICE	1.88E-07	0.62%	2.44E-08	6.87%	1.23E-08	8.03%	6.12E-09	0.96%
BCLO_E	Processed Wood to Biomass and Biochar - Vehicle Exhaust	1.61E-07	0.54%	2.53E-09	0.71%	8.89E-10	0.58%	5.90E-09	0.92%
ICE1	Biomass - ICE No.1	8.08E-08	0.27%	9.31E-09	2.62%	8.61E-09	5.60%	1.35E-09	0.21%
ICE2	Biomass - ICE No.2	7.33E-08	0.24%	9.51E-09	2.67%	8.66E-09	5.63%	1.71E-09	0.27%
ICE3	Biomass - ICE No.3	6.40E-08	0.21%	9.66E-09	2.72%	8.66E-09	5.63%	2.99E-09	0.47%
BE_F	Bioenergy Facility Loader - Road Dust	3.36E-08	0.11%	2.09E-09	0.59%	8.08E-10	0.53%	2.84E-09	0.44%
FLARE1	Biomass - Flare No.1	2.90E-08	0.10%	3.21E-09	0.90%	2.09E-09	1.36%	4.83E-09	0.75%
FLARE2	Biomass - Flare No.2	2.87E-08	0.10%	3.24E-09	0.91%	2.09E-09	1.36%	4.71E-09	0.74%
FLARE3	Biomass - Flare No.3	2.72E-08	0.09%	3.27E-09	0.92%	2.09E-09	1.36%	4.81E-09	0.75%
EMFLR	AD Emergency Flare	2.42E-08	0.08%	2.90E-09	0.82%	1.74E-09	1.13%	1.74E-10	0.03%
BLR	AD Boiler	2.40E-08	0.08%	1.73E-09	0.49%	6.44E-10	0.42%	2.98E-10	0.05%
GRIND	Biomass Grinder	4.10E-10	0.00%	1.77E-11	0.00%	5.73E-12	0.00%	4.40E-12	0.00%
BESP	Grinder Loading and Ground Wood Stockpiles	4.58E-11	0.00%	1.06E-12	0.00%	3.46E-13	0.00%	3.26E-13	0.00%
DRYLD	Dryer Loading	1.41E-11	0.00%	1.06E-12	0.00%	4.13E-13	0.00%	1.10E-12	0.00%
BGLD	Biomass Gasification Process Loading	6.63E-12	0.00%	4.32E-13	0.00%	1.65E-13	0.00%	5.54E-13	0.00%
BCLO_L	Processed Wood to Biomass and Biochar - Loadout	6.57E-12	0.00%	1.03E-13	0.00%	3.62E-14	0.00%	1.03E-13	0.00%
BCS	Biochar Storage	3.95E-12	0.00%	2.27E-13	0.00%	8.46E-14	0.00%	3.52E-13	0.00%

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Maximum Cancer Risk by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
Napa Operations CEQA HRA

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)	
		receptor #	6655	receptor #	70	receptor #	42	receptor #	93
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		564,307.05	4,229,252.17	563,851.10	4,227,796.21	563,951.96	4,226,374.43	564,345.97	4,229,025.99
		30-Year Cancer Risk	Contribution (%)	30-Year Cancer Risk	Contribution (%)	30-Year Cancer Risk	Contribution (%)	25-Year Cancer Risk	Contribution (%)
-	ALL	3.00E-05	100%	3.56E-07	100%	1.54E-07	100%	6.40E-07	100.00%
9901	DieselExhPM	2.58E-05	86.07%	1.73E-07	48.61%	6.54E-08	42.53%	3.25E-07	50.74%
75070	Acetaldehyde	1.59E-06	5.31%	1.19E-07	33.56%	4.68E-08	30.42%	2.61E-07	40.72%
18540299	Cr(VI)	8.84E-07	2.95%	3.26E-09	0.92%	1.13E-09	0.73%	3.52E-09	0.55%
7440382	Arsenic	8.34E-07	2.78%	5.89E-09	1.66%	2.08E-09	1.35%	4.38E-09	0.68%
50000	Formaldehyde	2.87E-07	0.96%	3.14E-08	8.82%	2.12E-08	13.79%	3.86E-08	6.03%
7440484	Cobalt	2.30E-07	0.77%	1.69E-09	0.48%	5.99E-10	0.39%	3.78E-09	0.59%
1151	PAHs-w/o	1.37E-07	0.46%	1.64E-08	4.60%	1.32E-08	8.58%	1.06E-09	0.17%
7439921	Lead	5.44E-08	0.18%	2.55E-10	0.07%	8.91E-11	0.06%	2.12E-10	0.03%
91203	Naphthalene	4.92E-08	0.16%	6.41E-10	0.18%	2.79E-10	0.18%	6.99E-10	0.11%
7440020	Nickel	2.60E-08	0.09%	6.90E-11	0.02%	2.35E-11	0.02%	1.33E-10	0.02%
107062	EDC	2.19E-08	0.07%	2.57E-10	0.07%	9.91E-11	0.06%	3.05E-10	0.05%
7440439	Cadmium	2.01E-08	0.07%	1.28E-10	0.04%	4.53E-11	0.03%	2.84E-10	0.04%
71432	Benzene	1.54E-08	0.05%	8.48E-10	0.24%	6.20E-10	0.40%	4.36E-10	0.07%
106990	1,3-Butadiene	1.39E-08	0.05%	1.82E-09	0.51%	1.65E-09	1.08%	5.90E-10	0.09%
106467	p-DiClBenzene	5.00E-09	0.02%	5.47E-11	0.02%	1.87E-11	0.01%	6.85E-11	0.01%
100414	Ethyl Benzene	2.59E-09	0.01%	1.14E-10	0.03%	6.57E-11	0.04%	1.37E-10	0.02%
67663	Chloroform	1.79E-09	0.01%	2.52E-11	0.01%	1.21E-11	0.01%	2.59E-11	0.00%
75014	Vinyl Chloride	1.31E-09	0.00%	1.55E-10	0.04%	1.12E-10	0.07%	1.76E-10	0.03%
107051	AllylChlor	1.28E-09	0.00%	1.40E-11	0.00%	4.78E-12	0.00%	1.75E-11	0.00%
106934	EDB	9.60E-10	0.00%	1.25E-10	0.04%	1.14E-10	0.07%	4.07E-11	0.01%
75092	Methylene Chlor	8.17E-10	0.00%	9.35E-11	0.03%	6.07E-11	0.04%	1.37E-10	0.02%
79345	TetraClEthane	6.96E-10	0.00%	9.09E-11	0.03%	8.27E-11	0.05%	2.95E-11	0.00%
56235	CCl4	4.79E-10	0.00%	6.26E-11	0.02%	5.70E-11	0.04%	2.03E-11	0.00%
205992	B[b]fluoranthen	1.97E-10	0.00%	2.57E-11	0.01%	2.34E-11	0.02%	1.57E-12	0.00%
79005	1,1,2TriClEthan	1.58E-10	0.00%	2.06E-11	0.01%	1.87E-11	0.01%	6.68E-12	0.00%
127184	Perc	1.37E-10	0.00%	1.56E-11	0.00%	1.01E-11	0.01%	2.31E-11	0.00%
218019	Chrysene	8.23E-11	0.00%	1.07E-11	0.00%	9.78E-12	0.01%	6.58E-13	0.00%
75343	1,1-DiClEthane	1.17E-11	0.00%	1.53E-12	0.00%	1.39E-12	0.00%	4.96E-13	0.00%
7440508	Copper	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7439965	Manganese	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7439976	Mercury	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7782492	Selenium	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440622	Vanadium	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7782505	Chlorine	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440666	Zinc	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
67641	[D] Acetone	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
67630	Isopropyl Alcoh	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75150	CS2	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75003	Ethyl Chloride	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
110543	Hexane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
67561	Methanol	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
78933	MEK	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
115071	Propylene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
100425	Styrene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108883	Toluene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108054	Vinyl Acetate	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1330207	Xylenes	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
107028	Acrolein	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7664417	NH3	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108907	Chlorobenzn	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7783064	H2S	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
71556	1,1,1-TCA	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75354	Vinylid Chlorid	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
95636	1,2,4TriMeBenze	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
540841	2,2,4TriMePentn	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
91576	2MeNaphthalene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
83329	Acenaphthene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
208968	Acenaphthylene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
192972	B[e]pyrene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
191242	B[g,h,i]perylen	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
92524	Biphenyl	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
206440	Fluoranthene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
86737	Fluorene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
85018	Phenanthrene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108952	Phenol	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
129000	Pyrene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

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Chronic Hazard Index by Source for All Pollutants Combined at PMI, MEIR, MEIW and Sensitive Receptor
Napa Operations CEQA HRA

Sources	Description	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	6519	receptor #	11	receptor #	42	receptor #	93	receptor #	33
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		564,311.65	4,229,243.62	565,466.19	4,229,489.04	563,951.96	4,226,374.43	564,345.97	4,229,025.99	564,607.26	4,229,375.66
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic 8-hr Hazard Index	Contribution (%)
ALL	--	9.35E-02	100%	1.86E-03	100%	8.17E-04	100%	1.40E-02	100%	5.96E-03	100%
AD_F	AD Loader - Road Dust	2.85E-02	30.51%	6.64E-05	3.57%	2.98E-05	3.65%	4.97E-04	3.54%	4.16E-05	0.70%
ADFS	Yard Waste and Food Waste Feed Stock - Organic Waste Loading	2.50E-02	26.70%	2.56E-05	1.38%	1.26E-05	1.54%	2.43E-04	1.73%	1.67E-05	0.28%
BCLO_F	Processed Wood to Biomass and Biochar - Road Dust	1.76E-02	18.82%	2.14E-04	11.50%	9.11E-05	11.16%	2.08E-03	14.84%	1.56E-04	2.62%
BIOF	AD Biofilter	8.61E-03	9.21%	7.46E-05	4.01%	3.35E-05	4.10%	1.17E-03	8.34%	1.94E-05	0.33%
AD_E	AD Loader - Exhaust	8.07E-03	8.64%	1.88E-05	1.01%	8.43E-06	1.03%	3.90E-04	2.78%	0.00E+00	0.00%
DRYER	Dryer Process	3.15E-03	3.37%	2.17E-04	11.68%	9.81E-05	12.01%	5.28E-03	37.61%	1.56E-03	26.16%
BE_F	Bioenergy Facility Loader - Road Dust	1.74E-03	1.86%	9.09E-05	4.89%	3.83E-05	4.69%	9.29E-04	6.62%	6.65E-05	1.12%
ICE1	Biomass - ICE No.1	1.21E-03	1.30%	3.14E-04	16.91%	1.31E-04	16.09%	3.01E-04	2.15%	1.05E-03	17.66%
ICE2	Biomass - ICE No.2	1.08E-03	1.15%	3.13E-04	16.81%	1.32E-04	16.17%	3.80E-04	2.71%	1.07E-03	18.01%
ICE3	Biomass - ICE No.3	9.26E-04	0.99%	3.11E-04	16.73%	1.32E-04	16.17%	6.66E-04	4.75%	1.11E-03	18.65%
FLARE1	Biomass - Flare No.1	5.05E-04	0.54%	6.66E-05	3.58%	3.43E-05	4.20%	7.57E-04	5.39%	3.57E-04	5.99%
FLARE2	Biomass - Flare No.2	4.97E-04	0.53%	6.64E-05	3.57%	3.43E-05	4.20%	7.38E-04	5.26%	3.50E-04	5.87%
FLARE3	Biomass - Flare No.3	4.68E-04	0.50%	6.61E-05	3.55%	3.43E-05	4.20%	7.54E-04	5.37%	3.42E-04	5.73%
BE_E	Bioenergy Facility Loader - Exhaust	4.19E-04	0.45%	2.19E-05	1.18%	9.21E-06	1.13%	6.20E-04	4.42%	0.00E+00	0.00%
EMFLR	AD Emergency Flare	9.54E-05	0.10%	1.38E-05	0.74%	5.58E-06	0.68%	2.20E-05	0.16%	2.39E-05	0.40%
BLR	AD Boiler	8.39E-05	0.09%	4.30E-06	0.23%	2.07E-06	0.25%	3.52E-05	0.25%	1.16E-05	0.20%
GRIND	Biomass Grinder	7.06E-05	0.08%	2.27E-06	0.12%	1.11E-06	0.14%	1.50E-05	0.11%	7.09E-06	0.12%
EMICE	AD Emergency ICE	6.04E-05	0.06%	8.65E-06	0.47%	4.17E-06	0.51%	1.98E-05	0.14%	0.00E+00	0.00%
BCLO_E	Processed Wood to Biomass and Biochar - Vehicle Exhaust	5.81E-05	0.06%	7.06E-07	0.04%	3.01E-07	0.04%	1.91E-05	0.14%	0.00E+00	0.00%
BESP	Grinder Loading and Ground Wood Stockpiles	7.52E-06	0.01%	1.42E-07	0.01%	6.71E-08	0.01%	1.11E-06	0.01%	5.17E-07	0.01%
DRYLD	Dryer Loading	2.99E-06	0.00%	1.78E-07	0.01%	8.01E-08	0.01%	3.75E-06	0.03%	8.76E-07	0.01%
BGLD	Biomass Gasification Process Loading	1.41E-06	0.00%	6.93E-08	0.00%	3.19E-08	0.00%	1.89E-06	0.01%	3.21E-07	0.01%
BCLO_L	Processed Wood to Biomass and Biochar - Loadout	1.36E-06	0.00%	1.65E-08	0.00%	7.02E-09	0.00%	3.53E-07	0.00%	7.52E-08	0.00%
BCS	Biochar Storage	8.47E-07	0.00%	3.45E-08	0.00%	1.64E-08	0.00%	1.20E-06	0.01%	1.50E-07	0.00%

Notes:
Individual sources are not additive because risk is based on specific target organs, which may be different per source

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Maximum Chronic Hazard Index by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
Napa Operations CEQA HRA

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)		Maximally Exposed Individual Worker (MEIW) 8-hour	
		receptor #	6519	receptor #	11	receptor #	42	receptor #	93	receptor #	33
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		564,311.65	4,229,243.62	565,466.19	4,229,489.04	563,951.96	4,226,374.43	564,345.97	4,229,025.99	564,607.26	4,229,375.66
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic 8-hr Hazard Index	Contribution (%)
-	ALL	9.35E-02	100%	1.86E-03	100%	8.17E-04	100%	1.40E-02	100%	5.96E-03	100%
7440382	Arsenic	6.41E-02	68.60%	3.58E-04	19.27%	1.55E-04	19.00%	2.71E-03	19.34%	4.29E-05	0.72%
9901	DieselExhPM	8.61E-03	9.21%	5.00E-05	2.69%	2.21E-05	2.71%	1.05E-03	7.48%	0.00E+00	0.00%
7664417	NH3	8.27E-03	8.85%	8.21E-05	4.42%	3.65E-05	4.47%	1.15E-03	8.16%	0.00E+00	0.00%
7439965	Manganese	7.29E-03	7.80%	4.96E-05	2.67%	2.18E-05	2.67%	1.25E-03	8.91%	3.01E-04	5.04%
7440020	Nickel	4.03E-03	4.31%	7.45E-06	0.40%	3.43E-06	0.42%	1.86E-04	1.32%	1.90E-05	0.32%
50000	Formaldehyde	2.92E-03	3.13%	4.63E-04	24.91%	2.09E-04	25.55%	3.63E-03	25.87%	3.37E-03	56.54%
107028	Acrolein	2.34E-03	2.51%	6.72E-04	36.16%	2.84E-04	34.71%	9.75E-04	6.95%	1.82E-03	30.48%
75070	Acetaldehyde	2.24E-03	2.39%	1.38E-04	7.41%	6.21E-05	7.61%	3.31E-03	23.57%	7.09E-04	11.89%
7439976	Mercury	6.92E-04	0.74%	4.88E-06	0.26%	2.10E-06	0.26%	6.59E-05	0.47%	7.02E-06	0.12%
7783064	H2S	6.17E-04	0.66%	8.36E-05	4.50%	4.32E-05	5.29%	0.00E+00	0.00%	0.00E+00	0.00%
7440439	Cadmium	2.70E-04	0.29%	1.35E-06	0.07%	5.88E-07	0.07%	2.02E-05	0.14%	0.00E+00	0.00%
67561	Methanol	1.52E-04	0.16%	9.75E-06	0.52%	4.40E-06	0.54%	2.39E-04	1.70%	0.00E+00	0.00%
71432	Benzene	9.50E-05	0.10%	8.99E-06	0.48%	3.84E-06	0.47%	2.59E-05	0.18%	5.95E-05	1.00%
91203	Naphthalene	8.16E-05	0.09%	1.10E-06	0.06%	4.81E-07	0.06%	1.15E-05	0.08%	0.00E+00	0.00%
106467	p-DiClBenzene	4.48E-05	0.05%	3.88E-07	0.02%	1.74E-07	0.02%	6.09E-06	0.04%	2.61E-06	0.04%
7782505	Chlorine	3.27E-05	0.03%	1.91E-06	0.10%	8.71E-07	0.11%	4.28E-05	0.31%	0.00E+00	0.00%
18540299	Cr(VI)	2.46E-05	0.03%	6.68E-08	0.00%	2.98E-08	0.00%	5.99E-07	0.00%	0.00E+00	0.00%
106990	1,3-Butadiene	2.09E-05	0.02%	6.08E-06	0.33%	2.56E-06	0.31%	8.73E-06	0.06%	7.26E-06	0.12%
7782492	Selenium	1.75E-05	0.02%	1.02E-07	0.01%	4.43E-08	0.01%	2.77E-07	0.00%	0.00E+00	0.00%
108054	Vinyl Acetate	1.51E-05	0.02%	1.31E-07	0.01%	5.89E-08	0.01%	2.06E-06	0.01%	0.00E+00	0.00%
106934	EDB	8.63E-06	0.01%	2.52E-06	0.14%	1.06E-06	0.13%	3.61E-06	0.03%	0.00E+00	0.00%
115071	Propylene	3.43E-06	0.00%	1.54E-07	0.01%	6.63E-08	0.01%	7.57E-07	0.01%	0.00E+00	0.00%
108883	Toluene	2.30E-06	0.00%	1.23E-07	0.01%	5.39E-08	0.01%	6.27E-07	0.00%	5.20E-07	0.01%
107062	EDC	1.36E-06	0.00%	1.44E-08	0.00%	6.40E-09	0.00%	1.88E-07	0.00%	0.00E+00	0.00%
1330207	Xylenes	1.32E-06	0.00%	9.59E-08	0.01%	4.61E-08	0.01%	8.20E-07	0.01%	0.00E+00	0.00%
75092	Methylene Chlor	1.15E-06	0.00%	1.56E-07	0.01%	8.06E-08	0.01%	1.74E-06	0.01%	0.00E+00	0.00%
67663	Chloroform	5.63E-07	0.00%	9.08E-09	0.00%	3.96E-09	0.00%	8.07E-08	0.00%	0.00E+00	0.00%
95636	1,2,4TriMeBenze	5.58E-07	0.00%	1.63E-07	0.01%	6.85E-08	0.01%	0.00E+00	0.00%	4.37E-07	0.01%
75150	CS2	4.71E-07	0.00%	4.08E-09	0.00%	1.83E-09	0.00%	6.41E-08	0.00%	0.00E+00	0.00%
100425	Styrene	3.99E-07	0.00%	4.62E-09	0.00%	2.04E-09	0.00%	5.54E-08	0.00%	0.00E+00	0.00%
127184	Perc	3.65E-07	0.00%	4.95E-08	0.00%	2.56E-08	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
100414	Ethyl Benzene	2.77E-07	0.00%	1.44E-08	0.00%	7.02E-09	0.00%	1.40E-07	0.00%	0.00E+00	0.00%
56235	CCl4	1.44E-07	0.00%	4.19E-08	0.00%	1.76E-08	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
110543	Hexane	7.58E-08	0.00%	8.10E-09	0.00%	3.43E-09	0.00%	1.84E-08	0.00%	0.00E+00	0.00%
67630	Isopropyl Alcoh	3.71E-08	0.00%	3.22E-10	0.00%	1.44E-10	0.00%	5.05E-09	0.00%	0.00E+00	0.00%
75354	Vinylid Chlorid	2.32E-08	0.00%	3.14E-09	0.00%	1.62E-09	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
71556	1,1,1-TCA	2.20E-08	0.00%	2.99E-09	0.00%	1.54E-09	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108952	Phenol	1.87E-08	0.00%	5.46E-09	0.00%	2.30E-09	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108907	Chlorobenzn	6.37E-09	0.00%	1.60E-09	0.00%	6.97E-10	0.00%	4.47E-09	0.00%	0.00E+00	0.00%
75003	Ethyl Chloride	2.79E-09	0.00%	2.42E-11	0.00%	1.08E-11	0.00%	3.80E-10	0.00%	0.00E+00	0.00%
7440622	Vanadium	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440508	Copper	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
78933	MEK	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75014	Vinyl Chloride	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440484	Cobalt	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1151	PAHs-w/o	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7439921	Lead	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
79345	TetraClEthane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
205992	B[b]fluoranthen	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
218019	Chrysene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
79005	1,1,2TriClEthan	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
107051	AllylChlor	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75343	1,1-DiClEthane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
67641	[D] Acetone	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
540841	2,2,4TriMePentn	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
91576	2MeNaphthalene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
83329	Acenaphthene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
208968	Acenaphthylene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
192972	B[e]pyrene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
191242	B[g,h,i]perylen	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
92524	Biphenyl	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
206440	Fluoranthene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
86737	Fluorene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
85018	Phenanthrene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
129000	Pyrene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440666	Zinc	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

Notes:
Individual sources are not additive because risk is based on specific target organs, which may be different per source

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Acute Hazard Index by Source for All Pollutants Combined at PMI, MEIR, MEIW and Sensitive Receptor
Napa Operations CEQA HRA

Sources	Description	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)	
		receptor #	6560	receptor #	11	receptor #	43	receptor #	93
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		564,525.92	4,229,161.86	565,466.19	4,229,489.04	564,052.68	4,226,374.43	564,345.97	4,229,025.99
		Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)
ALL	--	2.30E-01	100%	2.33E-02	100%	8.38E-03	100%	1.30E-01	100%
DRYER	Dryer Process	1.44E-01	62.51%	1.08E-02	46.08%	2.28E-03	27.25%	6.87E-02	52.89%
EMICE	AD Emergency ICE	2.62E-02	11.36%	3.50E-03	14.99%	1.73E-03	20.68%	7.59E-03	5.85%
ICE1	Biomass - ICE No.1	1.36E-02	5.91%	1.74E-03	7.47%	1.09E-03	13.05%	6.49E-03	5.00%
ICE2	Biomass - ICE No.2	1.29E-02	5.60%	1.74E-03	7.45%	1.09E-03	13.03%	1.06E-02	8.14%
ICE3	Biomass - ICE No.3	8.57E-03	3.72%	1.74E-03	7.47%	1.09E-03	13.05%	1.32E-02	10.17%
BIOF	AD Biofilter	8.26E-03	3.59%	1.59E-03	6.81%	3.54E-04	4.23%	1.37E-02	10.53%
FLARE3	Biomass - Flare No.3	5.56E-03	2.41%	6.51E-04	2.79%	2.02E-04	2.41%	3.00E-03	2.31%
FLARE2	Biomass - Flare No.2	5.19E-03	2.25%	6.27E-04	2.69%	2.02E-04	2.41%	3.07E-03	2.36%
FLARE1	Biomass - Flare No.1	4.68E-03	2.03%	5.77E-04	2.47%	2.02E-04	2.42%	3.39E-03	2.61%
EMFLR	AD Emergency Flare	1.80E-03	0.78%	4.47E-04	1.92%	1.32E-04	1.58%	4.60E-04	0.35%
BE_F	Bioenergy Facility Loader - Road Dust	1.57E-03	0.68%	7.18E-05	0.31%	1.46E-05	0.17%	4.64E-04	0.36%
ADFS	Yard Waste and Food Waste Feed Stock - Organic Waste Loading	6.30E-04	0.27%	9.47E-05	0.41%	2.07E-05	0.25%	8.77E-04	0.68%
BCLO_F	Processed Wood to Biomass and Biochar - Road Dust	3.25E-04	0.14%	5.49E-05	0.24%	1.71E-05	0.20%	3.32E-04	0.26%
BLR	AD Boiler	2.41E-04	0.10%	5.18E-05	0.22%	1.70E-05	0.20%	1.44E-04	0.11%
AD_F	AD Loader - Road Dust	2.08E-04	0.09%	3.10E-05	0.13%	6.78E-06	0.08%	1.90E-04	0.15%
GRIND	Biomass Grinder	9.45E-06	0.00%	2.31E-06	0.01%	9.79E-07	0.01%	1.10E-05	0.01%
DRYLD	Dryer Loading	5.67E-06	0.00%	9.18E-08	0.00%	2.26E-08	0.00%	7.75E-07	0.00%
BCS	Biochar Storage	1.35E-06	0.00%	4.95E-08	0.00%	1.29E-08	0.00%	6.58E-07	0.00%
BGLD	Biomass Gasification Process Loading	1.31E-06	0.00%	3.69E-08	0.00%	9.40E-09	0.00%	4.16E-07	0.00%
BESP	Grinder Loading and Ground Wood Stockpiles	7.24E-07	0.00%	1.81E-07	0.00%	5.01E-08	0.00%	8.06E-07	0.00%
BCLO_L	Processed Wood to Biomass and Biochar - Loadout	6.43E-08	0.00%	1.09E-08	0.00%	3.39E-09	0.00%	6.58E-08	0.00%
BE_E	Bioenergy Facility Loader - Exhaust	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
AD_E	AD Loader - Exhaust	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
BCLO_E	Processed Wood to Biomass and Biochar - Vehicle Exhaust	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

Notes:
Individual sources are not additive because risk is based on specific target organs, which may be different per source

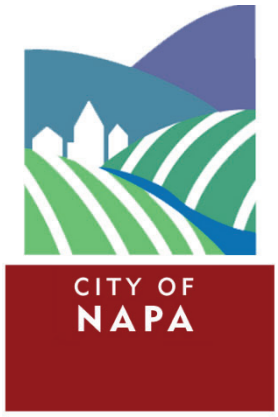
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Maximum Acute Hazard Index by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
Napa Operations CEQA HRA

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)	
		receptor #	6560	receptor #	11	receptor #	43	receptor #	93
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		564,525.92	4,229,161.86	565,466.19	4,229,489.04	564,052.68	4,226,374.43	564,345.97	4,229,025.99
		Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)
-	ALL	2.30E-01	100%	2.33E-02	100%	8.38E-03	100%	1.30E-01	100%
75070	Acetaldehyde	1.10E-01	47.79%	8.39E-03	35.97%	1.80E-03	21.54%	5.40E-02	41.60%
50000	Formaldehyde	6.58E-02	28.56%	6.69E-03	28.67%	2.47E-03	29.54%	3.69E-02	28.39%
107028	Acrolein	4.65E-02	20.18%	6.68E-03	28.62%	3.73E-03	44.52%	2.71E-02	20.85%
7783064	H2S	1.54E-02	6.70%	1.85E-03	7.95%	6.06E-04	7.24%	9.46E-03	7.28%
7664417	NH3	7.80E-03	3.39%	1.55E-03	6.62%	3.61E-04	4.31%	1.17E-02	9.02%
71432	Benzene	7.41E-03	3.22%	1.02E-03	4.37%	4.94E-04	5.90%	2.38E-03	1.83%
67561	Methanol	3.82E-03	1.66%	2.89E-04	1.24%	6.18E-05	0.74%	1.85E-03	1.42%
7440020	Nickel	2.28E-03	0.99%	2.20E-04	0.94%	5.15E-05	0.62%	1.66E-03	1.27%
7440382	Arsenic	1.76E-03	0.77%	1.35E-04	0.58%	3.29E-05	0.39%	8.63E-04	0.66%
7439976	Mercury	3.97E-04	0.17%	2.99E-05	0.13%	7.30E-06	0.09%	1.88E-04	0.14%
78933	MEK	8.22E-05	0.04%	1.58E-05	0.07%	3.53E-06	0.04%	1.36E-04	0.10%
7440622	Vanadium	6.23E-05	0.03%	4.67E-06	0.02%	1.14E-06	0.01%	2.92E-05	0.02%
7440508	Copper	4.04E-05	0.02%	3.10E-06	0.01%	7.57E-07	0.01%	1.98E-05	0.02%
108883	Toluene	2.96E-05	0.01%	4.59E-06	0.02%	1.95E-06	0.02%	1.20E-05	0.01%
67663	Chloroform	2.16E-05	0.01%	3.80E-06	0.02%	1.15E-06	0.01%	2.78E-05	0.02%
106990	1,3-Butadiene	2.02E-05	0.01%	2.77E-06	0.01%	1.46E-06	0.02%	8.53E-06	0.01%
1330207	Xylenes	5.53E-06	0.00%	8.28E-07	0.00%	3.30E-07	0.00%	2.50E-06	0.00%
7782505	Chlorine	4.71E-06	0.00%	4.36E-07	0.00%	1.26E-07	0.00%	2.56E-06	0.00%
75092	Methylene Chlor	3.75E-06	0.00%	4.55E-07	0.00%	1.56E-07	0.00%	2.21E-06	0.00%
67630	Isopropyl Alcoh	1.11E-06	0.00%	2.13E-07	0.00%	4.75E-08	0.00%	1.83E-06	0.00%
75150	CS2	8.24E-07	0.00%	1.58E-07	0.00%	3.53E-08	0.00%	1.36E-06	0.00%
106467	p-DiClBenzene	3.48E-07	0.00%	6.69E-08	0.00%	1.49E-08	0.00%	5.76E-07	0.00%
100425	Styrene	2.71E-07	0.00%	4.99E-08	0.00%	1.29E-08	0.00%	4.00E-07	0.00%
56235	CCl4	2.24E-07	0.00%	3.33E-08	0.00%	2.09E-08	0.00%	1.93E-07	0.00%
95636	1,2,4TriMeBenze	6.91E-08	0.00%	1.03E-08	0.00%	6.45E-09	0.00%	5.95E-08	0.00%
127184	Perc	6.74E-08	0.00%	8.10E-09	0.00%	2.65E-09	0.00%	4.13E-08	0.00%
108952	Phenol	4.79E-08	0.00%	7.13E-09	0.00%	4.47E-09	0.00%	4.13E-08	0.00%
71556	1,1,1-TCA	3.42E-08	0.00%	4.11E-09	0.00%	1.34E-09	0.00%	2.09E-08	0.00%
75014	Vinyl Chloride	7.02E-09	0.00%	8.98E-10	0.00%	3.81E-10	0.00%	3.90E-09	0.00%
9901	DieselExhPM	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
18540299	Cr(VI)	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440484	Cobalt	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1151	PAHs-w/o	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7439921	Lead	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440439	Cadmium	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
91203	Naphthalene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
100414	Ethyl Benzene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
107062	EDC	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
106934	EDB	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
79345	TetraClEthane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
205992	B[b]fluoranthen	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
218019	Chrysene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
79005	1,1,2TriClEthan	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
107051	AllylChlor	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75343	1,1-DiClEthane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7439965	Manganese	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7782492	Selenium	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
110543	Hexane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
115071	Propylene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108907	Chlorobenzn	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
67641	[D] Acetone	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75003	Ethyl Chloride	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108054	Vinyl Acetate	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
540841	2,2,4TriMePentn	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
91576	2MeNaphthalene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
83329	Acenaphthene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
208968	Acenaphthylene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
192972	B[e]pyrene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
191242	B[g,h,i]perylen	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
92524	Biphenyl	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
206440	Fluoranthene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
86737	Fluorene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
85018	Phenanthrene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
129000	Pyrene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75354	Vinylid Chlorid	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440666	Zinc	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

Notes:
Individual pollutants are not additive because risk is based on specific target organs, which may be different per pollutant.



Net-Zero Assessment for the Napa Renewable Resources Project 2.0

October 8th 2025

Net-Zero Assessment

This report endeavors to use credible, thorough, and transparent sources to estimate the greenhouse gas (GHG) impacts of the proposed "Napa Renewable Resources Project 2.0" (Project) located at The Napa Materials Diversion Facility (NMDF) located at 820 Levitin Way in American Canyon, California. This study is developed consistently with an existing GHG assessment conducted by SCS Consulting for NMDF for calendar year 2024. The purpose of this study is to calculate and compare the emissions impacts and avoided emissions that will result from the Project.

The main components of the project include:

- An increase in daily permitted tonnage, which will result in annual tonnages increases at the NMDF for recycling. This increase is expected to go from **123,229 tons per year (TPY)** to **213,928 TPY**[1]. Approximately 52,908 tons or 58% of this increase is expected to be new inert recovery, with the remaining 42% anticipated to be from recyclables recovery operations[2]. Inbound compost feedstock will remain constant year.
- The addition of a 1.5-Megawatt Biomass Gasification Facility.
- The addition of an Anaerobic Digestion Facility

Baseline Emissions

The CY 2024 SCS Consulting GHG assessment for NMDF included an assessment of Scope 1 (direct) emissions and Scope 2 (indirect) emissions.

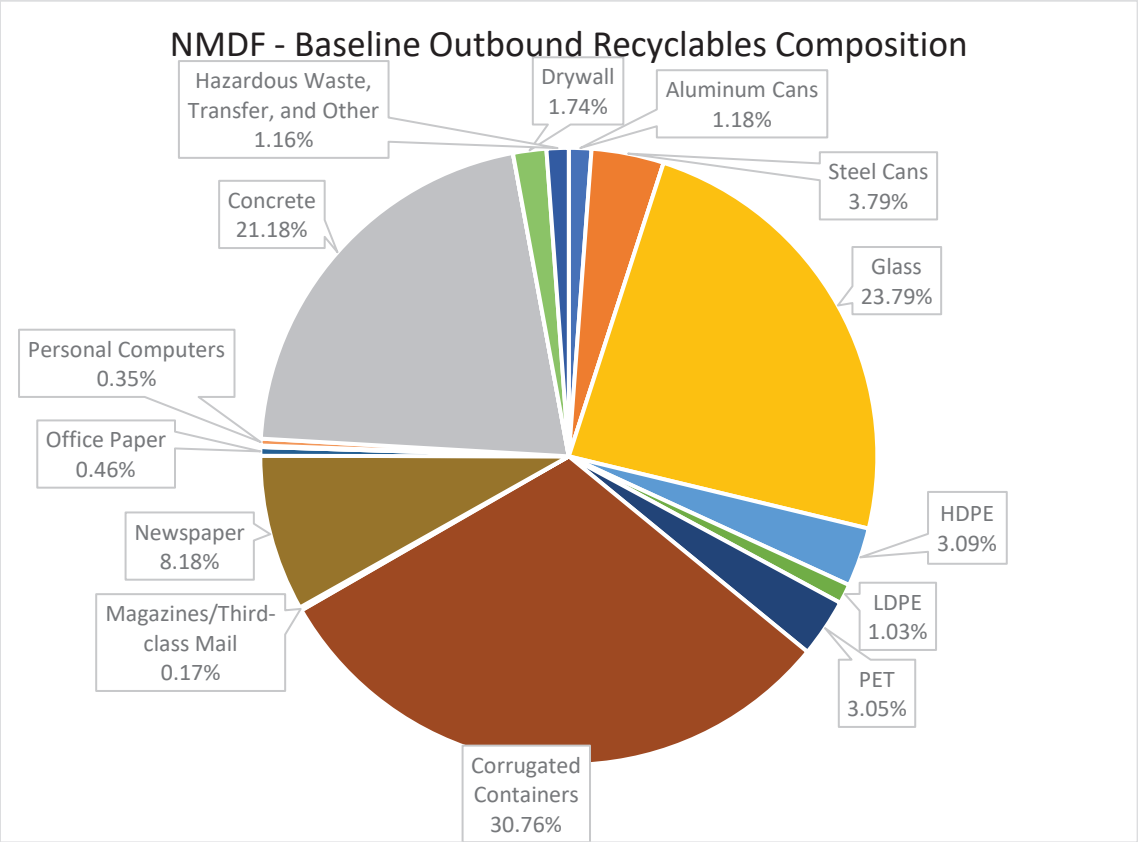
Table 1 - Baseline Operational Emissions

$MTCO_2e$ Summary - NMDF CY 2024		
Category	Emissions $MTCO_2e$	% of Total
Natural Gas/Heating	15	0.16%
Stationary Combustion	20	0.22%
Mobile Combustion	3,159	34.24%
Process Emissions	5,537	60.00%
Scope 1 (Direct Emissions)	8,731	94.62%
Scope 2 (Electricity Indirect Emissions)	497	5.38%
Operational Emissions Total	9,228	100%

[1] From Yorke September 2025's "Napa Renewable Resource Project Emissions" Table 1.3.
[2] Conversations with Will Kelley, NRWS. September 2024.

Scope 3 Emissions

This SCS Consulting inventory did not include an Avoided Emissions calculation (under Scope 3). NMDF's operator Napa Waste and Recycling Services (NRWS) provided inbound and outbound tonnages from the facility from CY 2024, which are used to calculate the life cycle GHG impacts of the materials managed under the facility. The primary source for life cycle impacts of organic waste materials managed for this analysis comes from two California Air Resources Board's (CARB) Reports. The first of such report estimates emissions for combusting biomass[3]. These emissions are conservative, i.e. likely higher than actual emissions, as biomass technology has improved since the CARB report. The second source from CARB measures and compares fugitive emissions and GHG benefit from composting materials[4]. As fugitive emissions from compost are already included in the existing Scope 1 inventory, only the avoided emissions benefits are included in this analysis.



[3] California Air Resources Board: "METHOD FOR ESTIMATING GREENHOUSE GAS EMISSION REDUCTIONS FROM RECYCLING". November 2011. Page 19. https://ww2.arb.ca.gov/sites/default/files/classic/cc/protocols/recycling_method.pdf

[4] California Air Resources Board: "METHOD FOR ESTIMATING GREENHOUSE GAS EMISSION REDUCTIONS FROM DIVERSION OF ORGANIC WASTE FROM LANDFILLS TO COMPOST FACILITIES". May 2017. Page 20. https://ww2.arb.ca.gov/sites/default/files/classic/cc/waste/cerffinal.pdf

Table 2 - Scope 3 Baseline Emissions

Avoided $MTCO_2e$ Summary - NMDF CY 2024			
Material Type	Tons	$MTCO_2e$/ton	$MTCO_2e$
Aluminum Cans	606	-12.92	-7,834
Steel Cans	1,951	-1.52	-2,970
Copper Wire	0	-4.73	0
Glass	12,235	-0.22	-2,719
HDPE	1,588	-0.82	-1,306
LDPE	528	-0.02	-12
PET	1,566	-1.42	-2,228
Corrugated Containers	15,818	-5.20	-82,249
Magazines/Third-class Mail	87	-0.46	-40
Newspaper	4,206	-3.49	-14,691
Office Paper	234	-4.59	-1,075
Phonebooks	0	-2.72	0
Carpet	40	-2.38	-94
Personal Computers	182	-2.52	-460
Concrete	10,893	-0.03	-286
Tires	0	-0.39	0
Asphalt Shingles	0	-0.11	0
Drywall	896	0.01	9
Hazardous Waste, Transfer, and Other	596	0.00	0
Yard Trimmings - Composted (Inbound)	82,954	-0.51	-42,306
Food Waste - Composted (Inbound)	10,820	-0.69	-7,466
Food Waste - Anaerobic Digestion (Inbound)	0	-0.39	0
Yard Trimmings - Anaerobic Digestion (Inbound)	0	-0.21	0
Wood - Combustion	3,982	0	-820
Composting Residual	538	0	60
Compost Overs	6,620	0	147
Alternative Daily Cover	17,298	0.02	384
Mixed Solid Waste	9,504	0.11	1,065

Operational Area	Tons		$MTCO_2e$
MRF Itself Outbound	51,427		-115,953
Organics Outbound	45,000		-50,385
Landfill Outbound	26,802		1,450
TOTAL:	**123,229**		**-164,888**

Baseline Net-Zero

Net-Zero is a comparison of the Scope 1 and Scope 2 operational emissions and the GHG benefits from Scope 3. This convention is supported by CARB who included Net-Zero in the AB 32 Scoping Plan First Update in 2014 and copied below. Net-Zero has been defined by the California Air Resource Board as when an organization's avoided indirect emissions offset their operational emissions.

Based on the scale house tonnages from NMDF in 2024, the avoided emissions from the facility are equivalent to **164,888 MTCO$_2$e** this figure accounts for the downstream impacts, both negative and positive of the recovery of the above listed materials. As such, this figure includes all the benefits of replaced raw inputs from recycling, avoided landfill emissions from recycling and composting, as well as the energy costs of performing these recycling endeavors. In instances where NMDF already has these impacts included in their Scope 1 and Scope 2 emissions, the avoided emissions were adjusted so as not to double count. This includes electricity from on-site processing, fugitive emissions from composting, and some transportation emissions which were already included in the SCS Consulting inventory. To remain conservative, the Net-Zero analysis also includes the landfill emissions from those materials, such as ADC and MSW, that NMDF does send to landfill.

Achieving Net-Zero GHG Emissions from the Waste Sector by Mid-term

Beyond 2020, additional reductions in GHG emissions from the Waste Sector will be needed to achieve a Net-Zero GHG emissions goal. To achieve these reductions, even greater diversion of organics and other recyclable commodities from landfills must be realized and further expansion and enhancement of the alternative non-disposal pathways must be developed. In addition, greater emphasis will need to be placed on reducing the volume of waste generated, recycling/reusing products at the end-of-life and remanufacturing these materials into beneficial products. To achieve Net-Zero, the direct GHG emissions from the Waste Sector would have to be fully offset by avoided GHG emissions. Avoided GHG emissions are reductions in life-cycle GHG emissions that would occur because waste is shifted from landfilling to alternative non-disposal pathways.

AB 32 Scoping Plan – First Update May 15, 2014

Please note that the Net-Zero ratio is not a direct apples-to-apples comparison as operational emissions are calculated on an end-of-life basis, whereas Net-Zero is a life-cycle measurement. Further, companies cannot solely take credit for all the avoided emissions that occur because of recycling and resource recovery. Rather, these benefits are produced by everyone along the recycling value chain from the individual that sorted the material to the end reprocessor that transformed it into a new good.

This comparison shows **164,888 $MTCO_2e$** of avoided emissions is **17.9 times greater than the 9,228 $MTCO_2e$ of operational emissions.**

Project Emissions

The Project emissions assume all remaining activity remains constant except for those changes identified in the Project. The three components of the project are defined below.

Project Impact #1 – Increase in Processed Tonnages

The first of the proposed project impacts is an increase in daily tonnages from 760 TPD to 1,000 TPD. NMDF anticipates **213,928 TPY** passing out of the MRF each year under the project. This results in a 174% increase in tons from this category. Anticipated tonnages incoming for the composting operation are expected to be remain constant**.** Under the inbound NDMF tonnage projection projections, 58% of the composition of the new stream tons are expected to come from inert recovery, with the remaining 48% of new tons coming from the MRF. The amount of residual from this operation is scaled similarly. Alternative daily cover from wood waste is expected to be eliminated under the project scenario as these materials will serve as fuel for the biomass gasifier. Of the 15,000 TPY of biomass capacity, existing outbound wood streams are modelled as consumed first, then compost overs, followed by wood waste ADC.

Table 3 – Scope 3 Project Emissions

Avoided $MTCO_2e$ Summary - NMDF Project			
Material Type	Tons	$MTCO_2e$/ton	$MTCO_2e$
Aluminum Cans	859	-12.92	-11,098
Steel Cans	2,764	-1.52	-4,208
Copper Wire	0	-4.73	0
Glass	17,333	-0.22	-3,852
HDPE	2,250	-0.82	-1,850
LDPE	748	-0.02	-17
PET	2,219	-1.42	-3,156
Corrugated Containers	22,409	-5.20	-116,519
Magazines/Third-class Mail	123	-0.46	-56
Newspaper	5,958	-3.49	-20,812
Office Paper	332	-4.59	-1,522
Phonebooks	0	-2.72	0
Carpet	56	-2.38	-133
Personal Computers	258	-2.52	-652
Concrete	63,801	-0.03	-1,674
Tires	0	-0.39	0
Asphalt Shingles	0	-0.11	0
Drywall	1,270	0.01	13
Hazardous Waste, Transfer, and Other	845	0.00	0
Yard Trimmings - Composted (Inbound)	50,558	-0.51	-25,784
Food Waste - Composted (Inbound)	10,630	-0.69	-7,334
Food Waste - Anaerobic Digestion (Inbound)	19,000	-0.39	-7,410
Yard Trimmings - Anaerobic Digestion (Inbound)	13,000	-0.21	-2,730
Wood - Combustion	0	-0.21	0
Composting Residual	762	0.11	85
Compost Overs	0	0.02	0
Alternative Daily Cover	12,900	0.02	287
Mixed Solid Waste	13,464	0.11	1,509

Operational Area	Tons		$MTCO_2e$
MRF Itself Outbound	121,224		-165,536
Compost Outbound	34,622		-59,827
Landfill Outbound	26,364		1,796
TOTAL:	**182,210**		**-223,567**

The benefits shown do not include the compost benefit from digestate, the electricity benefit from biomass, or the avoided CNG benefit from anaerobic digestion. Rather these benefits are captured as reductions in Scope 1 and Scope 2 operational emissions to avoid double counting.

Project Impact #2 – Biomass Gasification Facility

The second component of the Project is the development of an on-site 1.5 MW biomass gasification facility. The operator estimates 15,000 tons of wood waste will be consumed by the facility per year producing **12,000,000 kWh** of renewable electricity. This would effectively replace this amount of the **2,051,935 kWh** used currently on-site reducing the total GHG impact by **497 MTCO$_2$e/year.** The electricity is sufficient to power to anaerobic digester, as well as all increases in electricity that could occur under this project. This benefit has been captured in Scope 2, and has been excluded from Scope 3 to avoid double counting.

Further, an additional benefit of 2,975 TPY of biochar would be generated from the gasification process, which would be marketed and distributed to agricultural and environmental applications that align with carbon sequestration goals. However, this benefit is outside of the scope of this report.

Project Impact #3 – Anaerobic Digestion Facility

The Anaerobic Digestion Facility is anticipated to both provide capacity for processing organics, and more importantly provide a replacement renewable compressed natural gas (RNG) fuel for NMDF's collection vehicles. The Scope 3 emissions benefit is conservatively modelled as only including the avoided landfill benefit from diverting organics and does not count any agricultural benefit of the composted digestate. The organic waste diversion benefits are already captured under the Scope 3 analysis above, and the electrical emissions of running the facility are captured in the biomass gasification Scope 2 accounting above. The AD facility's net output is estimated to be **440,000 Diesel Gallon Equivalents (DGE)** per year.

Table 4 - Project Annual Fleet Fuel

Description	Amount	Unit
Net Production at AD	440,000	DGE
Currently Used by NMDF CNG Fleet	284,037	DGE
Remaining After NMDF CNG Fleet Is Fueled	155,963	DGE
Energy Efficiency Ratio	0.9	EER
Remaining Fueling Potential	140,367	Diesel Gallons
Baseline NMDF Diesel Use	115,728	Diesel Gallons
Remaining Fueling Potential	24,640	Diesel Gallons

This could completely replace the **284,037 DGE** of compressed natural gas (CNG) used currently, with remaining DGE. Considering Engine Efficiency Ratios, the remaining DGE could be used to offset up to **140,367 gallons** of the diesel fuel currently being used. Should NMDF completely transition its fleet to RNG, the AD could fuel this NMDF's entire fleet and have enough remaining to replace **24,640 gallons** of diesel fuel.

Project Net-Zero

The project will reduce the operational emissions of the facility and fleet by **1,960 $MTCO_2e$/year**. This takes into account the direct emissions from composting, the direct emissions from the biomass gasifier, and accounting for the electricity demands of all operations. In addition to these changes, the facility will be able to process more organic waste and be able to manage its wood waste on site. The increase in TPD will allow for more recyclables and inert waste to be recovered. This results in 100,468 $MTCO_2e$ more *avoided emissions* per year. Ultimately, the Project will improve the Net-Zero ratio of avoided emissions/operational emissions from **17.9x** to **31.5x** Net-Zero. The table below summarizes these changes in detail.

Table 5 - Net-Zero Comparison

$MTCO_2e$ Baseline		Net Change	Project
Category	Emissions $MTCO_2e$	$MTCO_2e$	Emissions $MTCO_2e$
Natural Gas/Heating	15	0	15
Stationary Combustion	20	0	20
Mobile Combustion	3,159	-1,960	1,200
Process Emissions	5,537	0	5,537
Scope 1 (Direct Emissions)	8,731	-1,960	6,772
Scope 2 (Electricity Indirect Emissions)	497	-497	0
Operational Emissions Total	9,228	-2,456	6,772
Scope 3 (Avoided Emissions)	-164,888	-58,679	-223,567
Net-Zero Ratio	-17.9	-15.1	-33.0

APPENDIX D

BIOLOGICAL RESOURCES ASSESSMENT



Biological Resources Assessment

Napa Renewable Resources Project 2.0
September 2024

Prepared for:

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SWIFT BIOLOGICAL

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1 Introduction

The Napa Materials Diversion Facility (NMDF) currently receives and processes all solid waste, compostable, and recyclable materials generated within the City of Napa (City) that are collected by the City's authorized operator, Napa Recycling & Waste Services (NRWS). The City wants to expand its operations within three sites: the existing NMDF facility at 820 Levitin Way, a ruderal property to the south of the NMDF that will be annexed to the City, and an industrial parcel to the north owned by 600 Tower Road Holdings, LLC. The City plans to increase its resource recovery capabilities at the NMDF to meet evolving state regulations for solid waste, compostable, and recyclable materials.

Swift Biological Consulting LLC (Swift Biological) and Jane Valerius Environmental Consulting (Jane Valerius) were retained by RCH Group, through a contract with the City of Napa Utilities Department, to complete a biological resources assessment of the proposed expansion project. The purpose of this report is to identify sensitive biological communities and special-status species and their habitats within the project site[1], evaluate potential impacts on sensitive resources resulting from the proposed project, and recommend measures to avoid, minimize, or mitigate potential impacts. This report is based on information available at the time of the biological surveys, site conditions observed, currently available information, and the report preparer's best professional judgment. This report will be used to support the City's California Environmental Quality Act (CEQA) analysis and/or agency consultations.

1.1 Project Setting

The project is within the Napa Valley Business Park, an area used extensively for industrial and commercial land uses (Figure 1). The business park is located along Highway 12 at the southern end of Napa County. The project is located to the west of Devlin Road, which runs north-south through the business park. Railroad tracks and the Napa County Airport are directly to the west. The Devlin Road Transfer Station is to the south of the vacant Annexed Parcel, and there is a wetland area to the south of the Annexed Parcel and to the east across Devlin Road. There is a small vacant lot to the north of the NMDF. Additional industrial uses include a masonry product manufacturing facility and other warehousing and material storage on nearby developed lands. The sites are south of Fagan Creek, an intermittent creek that flows from east to west and drains into the Napa River. The Fagan Marsh State Marin Park and the Napa River are located east of the project.

[1] The term “project site” is used to define the project footprint, including all three locations where work is proposed – the existing NMDF site, annexed parcel to the south, and industrial 600 Tower Road Holdings, LLC. parcel.

1.2 Proposed Project

The Napa Materials Diversion Facility (NMDF) currently receives and processes all solid waste, compostable, and recyclable materials generated within the City of Napa (City) that are collected by the City's authorized operator, Napa Recycling & Waste Services (NRWS). The NMDF also receives and processes materials delivered by haulers servicing surrounding jurisdictions (such as unincorporated Napa County) and by private (self-haul) customers. The project would include the expansion of the existing NMDF facility, the development of a vacant parcel to be annexed to the City to the south (Annexed Parcel), and the reuse of an industrial parcel to the north owned by 600 Tower Road Holdings, LLC (600 Tower Road Parcel), an LLC with the same owners as NRWS (Figure 2). The project would include increasing NMDF's permitted maximum incoming daily tonnage from 760 to 1,000 tons. The Annexed Parcel may include the proposed biomass conversion facility and potentially other NMDF operations, such as an anaerobic digestion facility, which was previously approved under a 2014 CEQA Mitigated Negative Declaration. Approximately 2,500 solar panels would be installed on canopies along the eastern boundary of the existing NMDF site. The 600 Tower Road Parcel may be used for inert materials processing and storage and equipment storage.

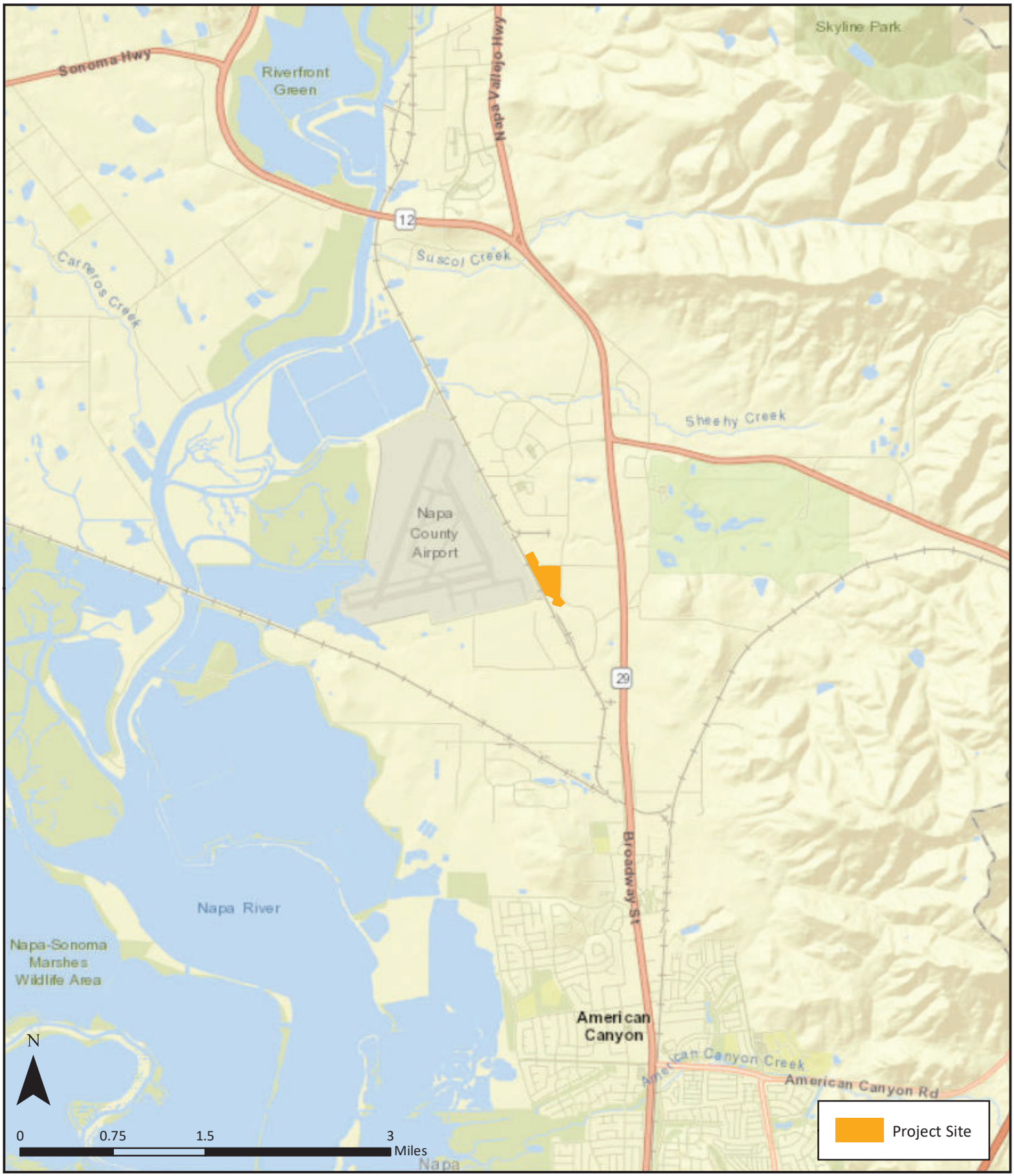


Figure 1. Project Location

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Sources: Street Map - ESRI,
Project Site - Napa County



Figure 2. Site Map

Biological Resources Assessment
Napa Renewable Resources Project 2.0
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Sources: Aerial - ESRI,
Parcels - Napa County

2 Methods

2.1 Background Review

Information on special-status species and habitats was compiled through a review of background literature and databases. The search focused on the known occurrences of special-status species and habitats on the Cuttings Wharf 7.5-minute USGS quadrangle where the project is located and the surrounding quadrangles. The following resources were consulted to determine species and habitats within the site:

- The California Natural Diversity Database[2] (CNDDB) maintained by the California Department of Fish and Wildlife (CDFW 2024a); this included species reported within a 5-mile buffer around the project site,
- Unprocessed Data from CNDDB Online Field Survey Forms (CDFW 2024b),
- CDFW's Special Animals List, July 2024 (CDFW 2024c),
- CDFW's Special Vascular Plants, Bryophytes, and Lichens List, July 2024 (CDFW 2024d),
- U.S. Fish and Wildlife Service's Information for Planning and Consultation (IPaC) database (USFWS 2024a),
- CDFW's California Sensitive Natural Communities list, June 1, 2023 (CDFW 2023a),
- California Native Plant Society's (CNPS) A Manual of California Vegetation Online (CNPS 2024a),
- California Native Plant Society's Rare Plant Inventory (CNPS 2024b),
- Calflora's Observation Search and Search for Plants databases (Calflora 2024),
- USDA Natural Resources Conservation Service Web Soil Survey (WSS; NRCS 2024),
- USDA Soil Survey for Napa County (USDA 1978),
- National Wetlands Inventory (NWI) (USFWS 2024b)
- Google Earth aerial images,
- USGS topographic maps,
- VegCAMP Vegetation Classification and Mapping Program (CDFW 2016), and
- Historic and current accounts of biological resources within the Napa River watershed and species-specific information presented in other technical reports, publications, and field guides.

2.2 Maps and Photographs

Maps for this report were generated using ESRI ArcGIS ArcMap 10.8.2 software. Field data was collected using a sub-meter Bad Elf GNSS Surveyor and ArcGIS Field Maps application and downloaded in the office to support the mapping efforts. Site maps, aerial imagery, and existing

[2] The California Natural Diversity Database is an inventory of the status and locations of rare plants and animals in California and is maintained by the California Department of Fish and Wildlife. It is part of an international network of natural heritage programs, managed by NatureServe. It is a positive detection database and only contains records where species have been detected; there are no organized inventory or survey efforts used to populate the database. Observations are submitted by local agencies, researchers, and consultants and reviewed by CDFW staff prior to entry into the database. The CNDDB is not a public dataset; the maps and information provided in this report are for internal review only and should not be used for any public reports or other documents.

GIS layers available from ArcGIS Online on soil types, land cover/vegetation, and hydrology were used to create figures representing conditions within the project site. Data downloaded from the *VegCAMP Vegetation and Classification and Mapping Program* was also used to characterize the site (CDFW 2016). Digital photographs were collected in the field to characterize on-site conditions and document biological resources.

2.3 Biological Field Surveys

Biological surveys of the project site were completed in February through May 2024 by Swift Biological, and August 9, 2017, October 30, 2018, and February through June 2024 by Jane Valerius Environmental Consulting. The field surveys followed the methods described in CDFW's *Protocols for Surveying and Evaluating Impacts to Special-status Native Plant Populations and Natural Communities* (CDFW 2018) and Napa County's *Guidelines for Preparing Biological Resources Reconnaissance Surveys* (Napa County 2016). The surveys were completed to 1) document and map vegetation communities, 2) compile a list of plant and animal species present, 3) evaluate the project site for the presence of special-status species and their habitats, and 4) evaluate the project site for jurisdictional aquatic features. Areas adjacent to the project site were also observed for context and to evaluate the potential for impacts on off-site resources.

Before the surveys, a background review was completed to generate a list of potentially sensitive biological communities and special-status species that may occur within the project site; see *Background Review*. A base map of the site was produced before the field surveys, with the parcel boundaries overlaid on an aerial photograph. The site boundaries and aerial data were also downloaded into the ESRI Field Maps application, and GPS field data on biological features were collected in the field. During the surveys, the entire site was systematically and thoroughly surveyed to inventory all biological resources present.

Plants. Botanical surveys of the project site were conducted on February 22, April 2, May 6, and June 18, 2024, to describe the vegetation communities and evaluate for the presence of special-status plants. Plant communities were identified and described based on the *Manual of California Vegetation* (CNPS 2024a) definitions. This included protocol-level special-status plant species surveys performed in accordance with state and federal plant survey protocols (CDFW 2018; USFWS 2000). Surveys were completed by Jane Valerius, botanist and wetland ecologist, of Jane Valerius Environmental Consulting. The surveys were conducted for the proposed development and the adjacent wetlands that were mapped in 2018 but are no longer part of the development area. A meandering pattern was walked through each habitat to ensure that all areas were viewed. Protocol-level surveys for special-status plants were timed to coincide with peak blooming periods for special-status plants known to occur in the area based on database searches. The botanical surveys were floristic in nature, and every plant taxon that occurred on the site was identified at the taxonomic level necessary to determine rarity or listing status. All plants were identified using the *Jepson eFlora* (Jepson Flora Project 2024) and *A Flora of Napa County* (Ruygt 2020). A complete list of plant species observed on the project site is presented in Table 2.

Wildlife. Wildlife surveys of the project site were completed to describe the wildlife species and habitats present and evaluate for the presence of special-status species. Surveys were completed by Swift Biological on February 22, March 20, and 25, April 1, 9, 16, and 22, and May 9, 2024. Binoculars (Swarovski 10x42), spotting scope (Vortex Razor HD), and a high-resolution camera (Canon PowerShot SX70) were used. All wildlife species were identified by sight or sound, and details of wildlife behavior and activity were recorded. The surveys were carried out under suitable weather conditions to maximize the potential for the detection of wildlife species. The surveys included a daytime inspection of all vegetation and an evaluation of unique wildlife habitat features, such as drainages, small mammal burrows or other suitable aestivation holes, and nesting bird habitat. All wildlife species observed were incorporated into the *Wildlife Habitats* text below. In addition to general wildlife surveys, one year of protocol-level Swainson's hawk surveys were completed within the project site from March through May 2024. The Swainson's hawk is discussed in detail below, along with the survey methodologies, findings, and implications for the project; see *Swainson's Hawk*.

2.4 Jurisdictional Delineation

An assessment of jurisdictional[3] wetlands and non-wetland waters (streams) was completed by Jane Valerius in 2018, with follow-up verification in the spring of 2024. This included evaluating the presence of wetlands, waters of the US and State of California, and riparian habitat under the jurisdiction of the US Army Corps of Engineers (Corps), the Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW). Wetland jurisdiction is determined based on a preliminary assessment of hydrophytic vegetation, hydric soils, and hydrology; a site must meet these three parameters to be considered jurisdictional (Corps 1987, 2008b); wetland features were assessed where present. Waters and other drainage areas (non-wetland waters) are identified based on wetland indicators and other physical characteristics such

[3] Three agencies regulate activities within inland streams, wetlands, and riparian areas in California. The US Army Corps of Engineers regulates the discharge of dredged or fill materials into "waters of the US." including wetlands and non-wetland waters under Section 404 of the Clean Water Act. The Regional Water Quality Control Board regulates activities under Section 401 of the CWA and regulates "waters of the sate" under Porter–Cologne Water Quality Control Act. The California Department of Fish and Wildlife regulates activities under the Fish and Game Code Sections 1600–1616. This report does not provide additional regulatory background information.

Waters of the US include "the territorial seas, and waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide, tributaries, lakes, and ponds, and impoundments of jurisdictional waters; and adjacent wetlands" (85 FR 22340). *Waters of the State* include "any surface water or groundwater, including saline waters, within the boundaries of the state" (Water Code Section 13050(e)). This is broadly construed to include all waters within the State's boundaries, whether private or public, including both natural and artificial channels. *Wetlands* include swamps, bogs, seasonal wetlands, seeps, marshes, and other aquatic habitats. Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions". They are typically delineated based on the presence of wetland plants, soils, and hydrology indicators. *Riparian areas* are plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent lotic and lentic water bodies (rivers, streams, lakes, or drainage ways). Riparian areas are usually transitional between wetlands and uplands. They have distinctly different vegetative species than adjacent areas and/or species similar to adjacent areas but exhibiting more vigorous or robust growth forms.

as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, or the presence of litter and debris to indicate the presence of an Ordinary High Water Mark based on the Corps' *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Corps 2008a).

A jurisdictional delineation of an approximately 4-acre parcel, including the proposed Annexed Parcel, was completed on October 18, 2018, and follow-up surveys in spring 2024 confirmed that the boundaries had not changed. A jurisdictional delineation report was prepared by Jane Valerius Environmental Consulting in November 2018; *Delineation of Waters of the United States, including Wetlands, for the South Napa Waste Management Authority, Devlin Road, Napa, Napa County, California* (Jane Valerius Environmental Consulting 2018). The report was submitted to the San Francisco District, US Amry Corps of Engineers, and the wetland boundaries were verified by Sahrye Cohen, Corps project manager, during a site visit on January 23, 2019. The Annexed Parcel boundaries were adjusted based on the presence of jurisdictional wetlands. The project was reduced in size to avoid the wetlands and provide a 50-foot buffer from the delineated wetlands. The wetlands are no longer part of the project site.

3 Existing Conditions

3.1 Physical Characteristics

The project site includes three contiguous sites in a low-lying area of the lower Napa River watershed. All of the parcels are relatively flat. The Annexed Parcel has a slightly elevated topography due to soil placement in an upland area. Elevations within the project site range from approximately 50 to 62 feet. The 600 Tower Road Parcel and Napa Material Diversion Facility are hard-packed soils due to their industrial uses; these sites are fully fenced. The Annexed Parcel is comprised of part fill material and part undeveloped land. The sites are serviced by Devlin and Tower Roads. Fagan Creek, an intermittent creek and tributary to the Napa River, flows to the north of the 600 Tower Road Parcel. Seasonal wetlands are located around the Annexed Parcel and to the east.

According to the USDA's Natural Resources Conservation Service Soil Survey, the project site is underlain by two soil mapping units: Clear Lake clay, drained, 0 to 2 percent slopes and Cole silt loam, 0 to 2 percent slopes (NRCS 1978 and 2024). The Clear Lake series consists of clays that are formed under poorly drained conditions on old alluvial fans and in basins. It is derived from igneous, metamorphic, and sedimentary rock. It is comprised of clay in the upper 60 inches. Permeability is slow. Runoff is high. Ponding is frequent. It is listed as hydric soil. This soil is used mainly for annual pastures. The plant cover is generally annual grasses with scattered oaks. The majority of the project site is mapped as Clear Lake clay. The Cole series consists of somewhat poorly drained soils on alluvial fans and flood plains. It is derived from volcanic and sedimentary rock. It is comprised of silt loam in the upper 8 inches, clay loam from 8 to 41 inches, and clay loam/clay from 41 to 64 inches. It is somewhat poorly drained, permeability is moderately slow, and the run-off class is low. It is rarely subject to flooding or ponding. This soil is used mainly for vineyards. The plant cover is generally native grasses and oaks. The northwest corner of the Tower Road Parcel is mapped as Cole silt loam.

3.2 Plant Communities

The project is located in an industrial and commercial business park and includes three separate sites. The existing Napa Materials Diversion Facility and 600 Tower Road Parcel are fully developed, and there are no native plant communities. The Annexed Parcel is comprised of ruderal non-native grassland with adjacent seasonal wetlands. These sites are described in detail below based on botanical surveys completed in 2024. Existing conditions are shown in Figures 3, 4, and 5 and in the *Photographs* section.

600 Tower Road Parcel and Napa Material Diversion Facility

The 600 Tower Road Parcel and Napa Material Diversion Facility are developed sites with hard-packed surfaces, pavement, existing structures, and small areas of fringe ruderal non-native vegetation (Figures 3 and 4). The ruderal non-native vegetation is dominated by weedy, non-native grasses and forbs including wild oats (*Avena fatua*), ripgut brome (*Bromus diandrus*), ryegrass (*Festuca perennis*), annual bluegrass (*Poa annua*), hare barley (*Hordeum murinum* ssp. l*eporinum*),

fennel (*Foeniculum vulgare*), stinkwort (*Dittrichia graveolens*), wild radish (*Raphanus sativus*), Himalayan blackberry (*Rubus armeniacus*), and filarees (*Erodium* spp.). These sites do not support native plant communities, wetlands, or habitats for any special-status plant species.

Annexed Parcel

The Annexed Parcel includes an area that received soil material from 2019 to 2022. The soil was from the construction of ponds and active curing piles. The site is elevated from the surrounding area, including the wetlands that were delineated for the larger parcel in 2018. The soils were placed in a designated upland site. No wetlands were impacted by this soil placement.

Ruderal Non-native Grassland. The Annexed Parcel is dominated by non-native annual grasses and forbs and is classified as ruderal non-native grassland (Figure 5). Non-native grasses present include ryegrass, wild oats (*Avena barbata, A. fatua*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), soft chess (*Bromus hordaeceus*), ripgut brome, weedy brome (*Bromus carolihenrici*), Harding grass (*Phalaris aquatica*), medusa head grass (*Elymus caput-medusae*), and velvet grass (*Holcus lanatus*). Weedy forb species include salsify (*Tragopogon porrifolius*), chicory (*Cichorium intybus*), bristly ox-tongue (*Helminthotheca echioides*), bindweed (*Convolvulus arvensis*), prickly lettuce (*Lactuca serriola*), Queen Anne's lace (*Daucus carota*), and wild radish. A few native coyote brush (*Baccharis pilularis*) have recently been established.

Seasonal Wetlands. Seasonal wetlands are adjacent to the Annexed Parcel. These areas were delineated in 2018, and boundaries were confirmed in 2024 (Jane Valerius Environmental Consulting 2018). These wetlands encompass the lands to the west and south of the Annexed Parcel. They follow a drainage course from a culvert under Devlin Road to the southeast of the Annexed Parcel and a culvert under the railroad tracks to the west. The property to the east of Devlin Road is a created wetland that was mitigation for the recycling and transfer facility. The wetland drainage flows along the west side of the Annexed Parcel adjacent to the railroad tracks and flows into a drain inlet structure approximately mid-way between the transfer station and the NMDF. All of these wetlands are outside of the Annexed Parcel and will be avoided. A 50-foot buffer will be maintained between the delineated wetland boundary and development on the Annexed Parcel.



Figure 3. 600 Tower Road Parcel - Existing Conditions

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Sources: Aerial - ESRI,
Parcels and Stream - Napa County

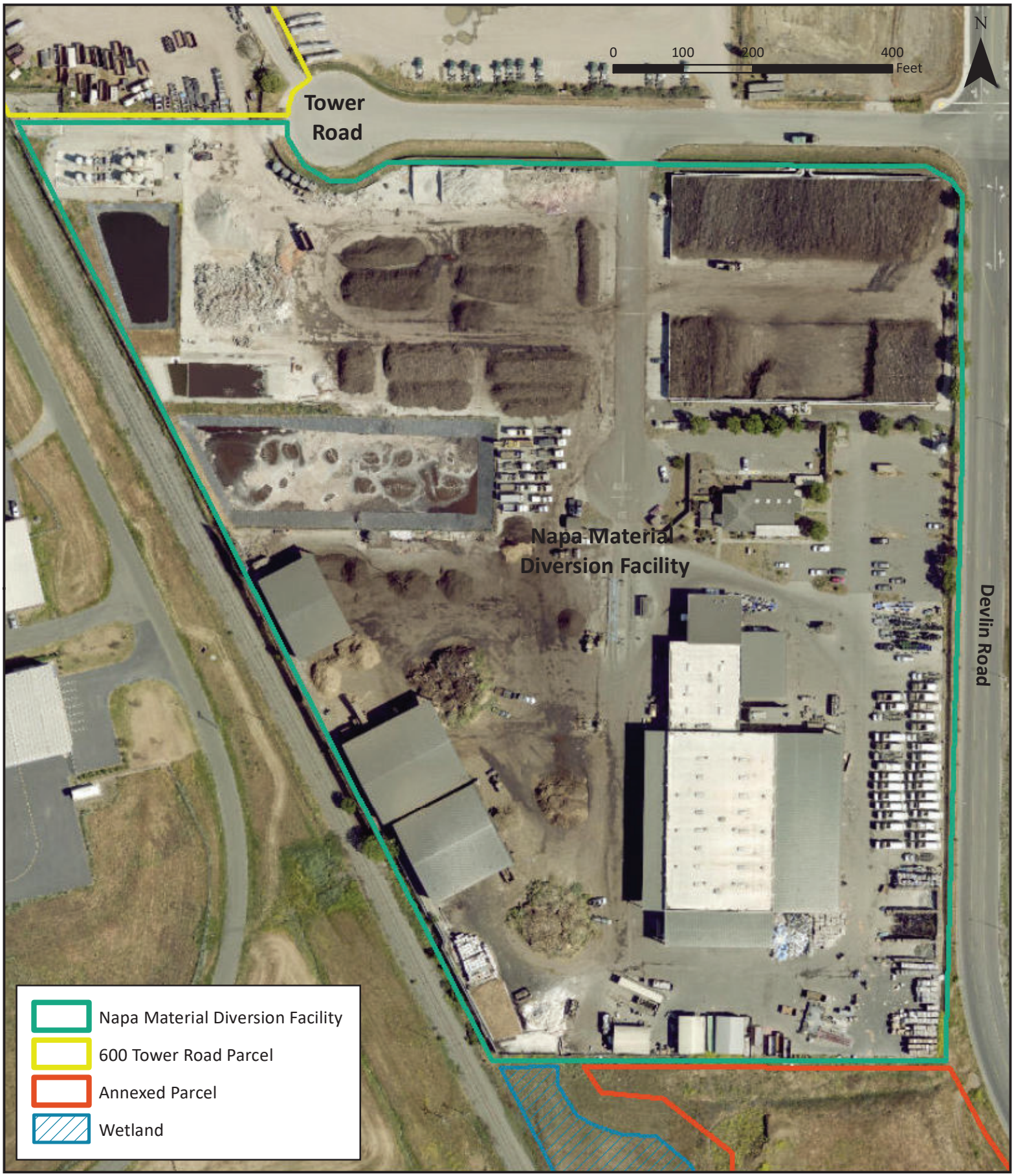


Figure 4. Napa Material Diversion Facility - Existing Conditions

Sources: Aerial - ESRI, Parcels and Wetland - Napa County

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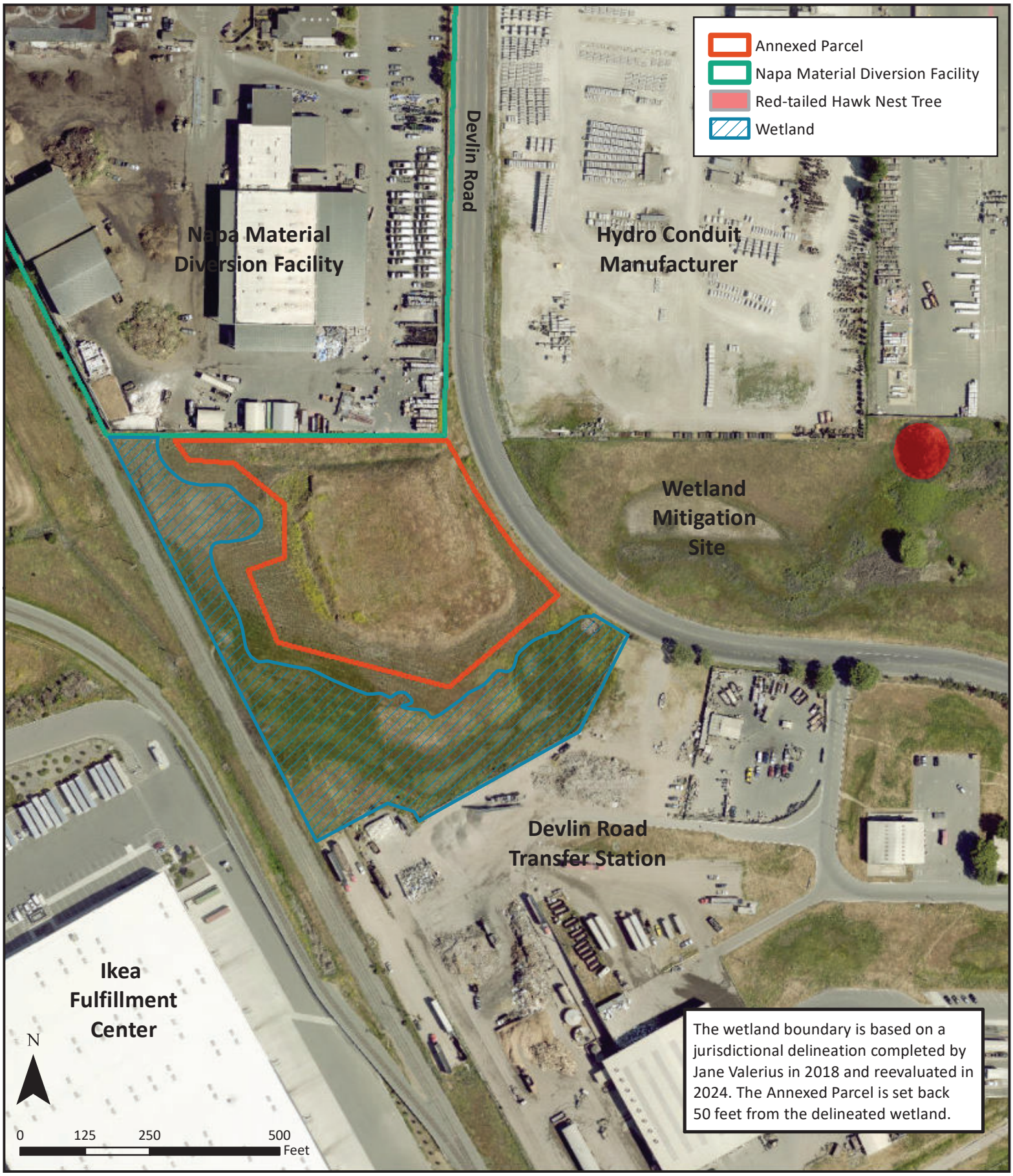


Figure 5. Annexed Parcel - Existing Conditions

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Source: Aerial - ESRI, Parcels and Wetland Boundary - Napa County

3.3 Wildlife Habitats

Wildlife use is directly related to a site's physical and biological components, including the type, size, and diversity of vegetation communities, human land use, and degree of disturbance. Wildlife require four basic habitat components: food and water for basic survival; shelter for many life functions such as nesting, predator avoidance, protection from weather, and rest; and space for foraging, finding mates, and establishing territories. As the quantity, type, and distribution of habitat components change, so do the types of wildlife species found within the habitat. Although characteristic assemblages of wildlife species occur predictably within certain vegetation types, relatively few animals are restricted to a single habitat, and, indeed, some may require more than one habitat type, especially during different life stages. The following discussion includes a general summary of wildlife species observed or typically associated with the habitats within the project site.

The project site is located in a highly industrialized and commercial-use area. Two of the sites, 600 Tower Road Parcel and Napa Materials Diversion Facility, are fully developed, and there are no native plant communities and limited vegetation. The Annexed Parcel is ruderal grassland with adjacent seasonal wetlands. Despite the developed nature of the site, there is some value for wildlife. Wildlife using the project site are primarily species typical of developed environments. These include a variety of native and non-native species that can live and thrive in areas with a high level of human activities. These species generally have a high tolerance for human disturbance, utilize human food resources, and are typically omnivorous and generalist with regard to food and habitat.

A number of wildlife species use the Napa Materials Diversion Facility. Waste management sites provide abundant and permanent feeding opportunities for scavenging birds. A large number of birds, especially gulls, corvids, starlings, and blackbirds frequent these areas. Species observed during the surveys included the American crow, California gull, common raven, European starling, and rock pigeon. These birds may be a particular nuisance at the site as they can disrupt daily operations and also pose human health and safety issues. Vermin are also common; these include a number of non-native mice and rats. Native northern raccoons and non-native Virgina possums are also common visitors. The Napa Materials Diversion Facility is most likely used primarily for forage. Limited bird nesting and other wildlife breeding may occur on the site. The 600 Tower Road Parcel provides limited value for wildlife, and wildlife use is low.

The ruderal non-native grasslands of the Annexed Parcel provide food, shelter, and space for wildlife, including birds, mammals, reptiles, amphibians, and invertebrates that can survive in disturbed environments. The area already experiences a high level of human activity, both from noise from nearby properties and the proximity to developed areas. The most common wildlife within the grasslands are birds. They may forage around the site, roost in shrubs, and nest on the site. Bird species observed on the Annexed Parcel during the surveys included American crow, Brewer's blackbird, golden-crowned sparrow, northern mockingbird, turkey vulture, western gull, and white-crowned sparrow. Fossorial mammal activity on the site was also observed; this

included several broad-footed mole mounds and tunnels of small mice. Black-tailed deer may forage and bed on the site as they were observed across the street. The Annexed Parcel is also directly adjacent to seasonal wetlands and the wetland mitigation site. These wetland habitats provide additional resources for wildlife that may use the wetlands as a seasonal water supply, breeding, and foraging habitat, and wildlife usage of the Annexed Parcel may increase due to the proximity to these seasonal wetlands. There are no trees on the Annexed Parcel, but there is a large eucalyptus tree and willows directly to the east that support nesting birds of prey.

As part of the biological assessment, protocol-level Swainson's hawk surveys were completed. This included an evaluation of the Annexed Parcel for Swainson's hawk foraging habitat based on its proximity to nearby suitable habitat, including the wetland mitigation site to the east, since it is directly adjacent to the site. During focused Swainson's hawk surveys, the Annexed Parcel, wetland mitigation site, and other documents SWHA locations were surveyed from March through early May 2024; the results of these surveys are included below under the *Special-status Animals* section. A complete list of animal species observed during the biological surveys of the project and focused Swainson's hawk surveys is presented in Table 4.

3.4 Wildlife Connectivity

Wildlife movement is essential for their survival. This includes both the day-to-day movements needed for wildlife to acquire food, shelter, and mates, but also for dispersal and migration to ensure gene flow, recolonization of unoccupied habitat, and geographic shifts in response to climate change. Movement is necessary to maintain healthy ecological and evolutionary processes. Habitat linkages are landscape connections that facilitate movement between large, core habitat areas for diverse organisms and processes. These can be critical at both the local and regional levels. Wildlife crossings are structures that allow animals to cross over human-made barriers to allow collections between habitats or allow animals to navigate through areas where they would be prone to vehicle collisions. Barriers can include urban development, roads, fences, and open areas with limited cover. Crossings can range in size from small culverts and underpasses to larger overpasses or green bridges.

The project site is currently fully developed or supports ruderal grassland with adjacent development. It is adjacent to a heavily trafficked roadway, Devlin Road. The 600 Tower Road Parcel and the Napa Material Diversion Facility are fully fenced. The Annexed Parcel is fenced along the northern boundary and shared fence line with the Napa Material Diversion Facility; fencing is also located further to the south at the Devlin Road Transfer Station. There is an undeveloped wetland mitigation site to the east of the Annexed Parcel and some open habitat to the west near the airport. However, the majority of the area is for industrial and commercial use. The area already experiences a high level of human activity. Wildlife using the project site are likely habituated to human activity. Redevelopment of the 600 Tower Road Parcel and the Napa Material Diversion Facility sites will not impact wildlife movement corridors. Wetlands surrounding the Annexed Parcel will not be developed, and wildlife will still have access to these areas. There are no wildlife nursery sites within the project site.

4 Special-status Species and Habitats

4.1 Special-status Species Evaluation Criteria

The potential for each special-status species identified during the background review was evaluated for potential occurrence within the project site. The potential for special-status species to occur on the site is based on the existing site conditions, known distribution and habitat requirements of the species, and the professional expertise of the biologist completing this assessment. The following criteria were used:

No Potential – Suitable habitat is not present, and/or the project site is outside the species' range.

Low Potential – Habitat is generally unsuitable or of very poor quality, key habitat elements are absent, and/or the project site is isolated from the nearest extant occurrences. The species is not expected to be found within the project site.

Moderate Potential – Marginally suitable habitat or some key habitat elements that could support this species are present within the project site or immediately adjacent to the site. Species has a moderate potential to occur within the project site.

High Potential – All of the habitat components required by this species are present and/or the suitable habitat is present adjacent to the project site. This species would be expected to be found during focused field surveys. Species has a high potential to occur within the project site.

Present – Species was observed directly or indirectly during surveys and/or known from reported occurrences that are believed to be still extant.

4.2 Special-status Plants

Based on the background review, a list of special-status plants that could occur within the project site was generated. The background review identified a number of plant species with reported occurrences within the region (Figure 6, Table 3; CDFW 2024a, USFWS 2024a). The potential for each species to occur within the project site was evaluated based on the existing site conditions and habitat requirements for each species. Table 3 lists these species, their listing status, description, local observations, and potential for occurrence within the project site.

Botanical surveys of the project were completed from February to June 2024. This included protocol-level special-status plant species surveys performed in accordance with state and federal plant survey protocols (CDFW 2018, USFWS 2000). No special status plants were observed during the seasonal, protocol-level surveys in 2024. The 600 Tower Road Parcel and Napa Material Diversion Facility are fully developed and do not support native plant communities. The Annexed Parcel supports non-native annual grassland and provides low habitat suitability for special-status plant species as it is dominated by non-native grasses and forbs, which typically outcompete native species. In addition, past land disturbances, such as soil placement, reduced the site's suitability to support special-status plant species. No special-status plant species are expected to occur within the project site and none were observed during the protocol level surveys.

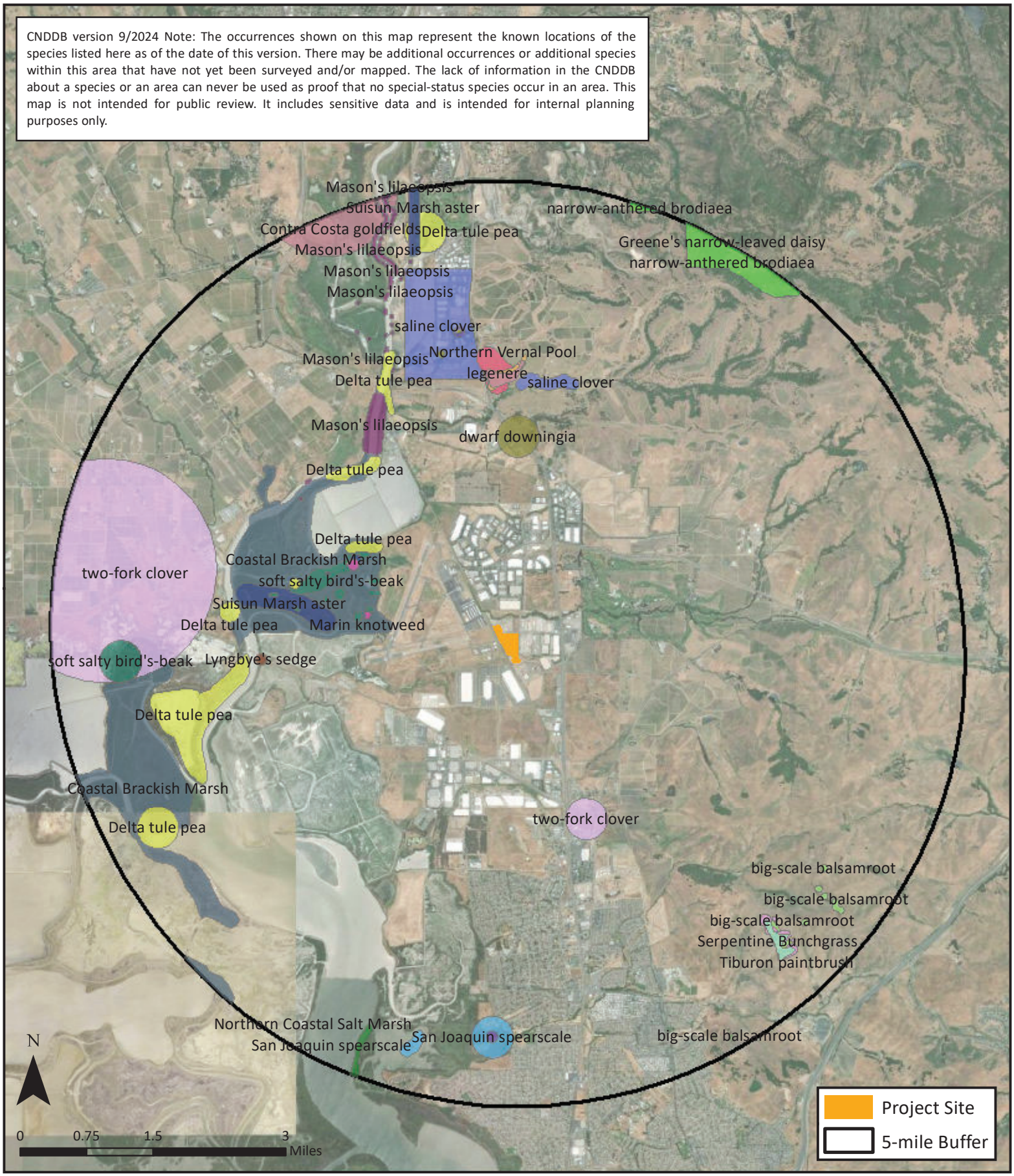


Figure 6. Special-status Plants Documented within a 5-mile Buffer of the Project Site

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Sources: Aerial - ESRI,
Species - CDFW CNDDB

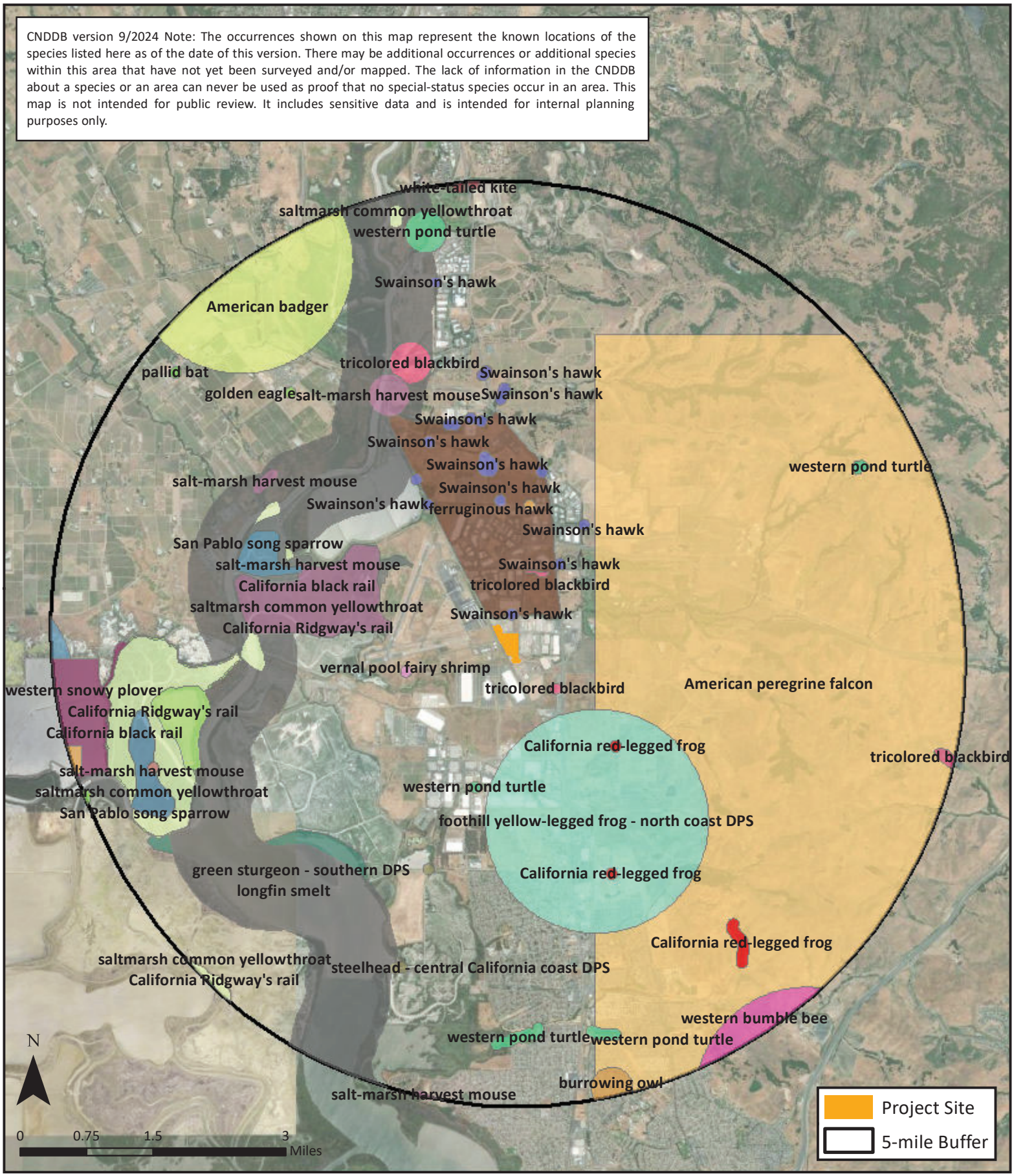


Figure 7. Special-status Animals Documented within a 5-mile Buffer of the Project Site

Biological Resources Assessment
Napa Renewable Resources Project 2.0
Napa Material Diversion Facility, Napa County
September 2024

Sources: Aerial - ESRI,
Species - CDFW CNDDB

4.3 Special-status Animals

Based on the background review, a list of special-status animals with the potential to occur within the project site was generated (Figure 7, Table 5; CDFW 2024a and 2024b, USFWS 2024a). The background review identified a number of animal species with reported occurrences within the region. The potential for each species to occur on the project site was evaluated based on the existing site conditions and habitat requirements for each species. Table 5 lists these species, their listing status, habitat requirements, local observations, potential for occurrence within the site, and justification for potential project impacts.

Wildlife surveys of the project were completed from February to May 2024. This included protocol-level Swainson's hawk surveys performed in accordance with state protocols (SWHA TAC 2000). No special-status animals were observed during the biological surveys of the project site in 2024. In addition, no special-status animals were identified on the site during a wildlife survey in September 2017 (Wildlife Research Associates 2017). The 600 Tower Road Parcel and Napa Material Diversion Facility are fully developed and do not support native habitats. The Annexed Parcel is undeveloped and supports ruderal non-native grassland comprised of disturbed soils and weedy species. The site has limited occurrences of native plants. The 600 Tower Road Parcel, Napa Material Diversion Facility, and Annexed Parcel are located within a highly industrialized and commercial area. The current site conditions and plant community composition within areas of the proposed development make it unsuitable for special-status animals. However, protected native birds could use the project site for nesting, and protection measures should be implemented; see below. Swainson's hawk also warrants further evaluation of the project impacts; background information on this species, results of the protocol-level surveys, and findings are discussed below.

Protected Birds

There are over 300 bird species that have been documented in Napa County, including 156 that have possible to confirmed breeding status in Napa County (Berner et al. 2003). These include a wide range of species from habitat generalists to specialists, year-round residents, winter residents, summer residents, spring and fall migrants, and rare vagrants. Bird species of concern are reported in CDFW's CNDDB (2024a), USFWS (2024a), and other bird reporting databases (eBird, iNaturalist). USFWS also identifies migratory and non-migratory Birds of Conservation Concern (beyond those already designated as threatened or endangered) that represent species of high conservation priority that deserve proactive attention (USFWS 2021). Table 5 includes those bird species reported within a 5-mile buffer of the project and/or listed on the USGS quadrangle where the project is located. Additional bird species of concern are reported for the region but were not observed (e.g., Allen's hummingbird, Nuttall's woodpecker, oak titmouse; USFWS 2021). These species are not described further in this report but should be protected in accordance with the protected bird species recommendations below.

Native birds are protected under several federal and state regulations, including the Migratory Bird Treaty Act of 1918 (MBTA; 50 CFR 10.13), Bald and Golden Eagle Protection Act of 1940 (16

USC 668-668c), Endangered Species Acts, California Fish and Wildlife Code (§3503, 3503.5, and §3513), and California Endangered Species Act. All native nesting birds, with a few exceptions, are protected under these laws. Non-nesting protections extend to golden and bald eagles, CDFW fully protected species (e.g., golden eagle, white-tailed kite), and listed species and their habitats listed under the ESA and CESA. Burrowing owls, a California Species of Special Concern and primarily winter-dwelling species in Napa County, are also protected.

Under the federal MBTA, "it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg or any such bird unless authorized under a permit issued by the Secretary of the Interior. Take is defined as: 'pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect". The Migratory Bird Treaty Reform Act (MBTRA) of 2004 updated the criteria for species to be protected under the MBTA to include "all species native to the United States or its territories, which are those that occur as a result of natural biological or ecological processes." The MBTA does not protect "nonnative species whose occurrence in the US are solely the result of intentional or unintentional human-assisted introduction." Within California, these exceptions include non-native European starling (*Sturnus vulgaris)*, house sparrow (*Passer domesticus*), rock pigeon (*Columba livia)*, and non-migratory game birds such as California quail, pheasant, and grouse, wild turkey in the families Odontophoridea and Phasianidae. However, non-migratory game birds are protected under the California Fish and Game Code. Under §3503 of the California Fish and Game Code, "it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." Under §3513 of the California Fish and Game Code, "it is unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA."

Construction activities in areas with nesting birds can result in the alteration of the nesting habitat and disruption of nesting activities. Construction activities (including grading, vegetation removal, and worker presence) can result in the destruction of eggs or occupied nests, mortality of young, and the abandonment of nests with eggs or young birds before fledging. If construction-related activities are scheduled during the nesting season, preconstruction nesting bird surveys are required to be completed by a qualified biologist. If nesting birds are found, protection buffers are required, and daily monitoring may be necessary. If work is delayed, additional surveys may also be required. Implementation of standard construction Best Management Practices that limit construction activities, including vegetation removal, to the non-nesting season (September 1 – January 31) can avoid impacts on native nesting birds. Native birds typically associated with urban settings and tolerant of human disturbance may occur seasonally or year-round within the project site and surrounding area. Nesting birds should be protected per the recommendations provided below.

Swainson's Hawk

Listing Status. The Swainson's hawk (*Buteo swainsoni*) was listed as threatened by the California Fish and Game Commission in 1983 and is protected under the California Endangered Species Act (CESA). It is also listed as a Bird of Conservation Concern with the US Fish and Wildlife Service. Swainson's hawk are protected from direct take under the federal Migratory Bird Treaty Act, and their nests, eggs, and young are protected under the California Fish and Game Code; see *Protected Birds* above. The Swainson's hawk is also protected under CEQA.

Life History. The Swainson's hawk is a medium-sized hawk with slender and long wings and a short tail. Their coloration is variable but typically uniform: dark upper side, dark chest, and dark gray flight feathers. They occur in open grasslands and prairies but have become increasingly dependent on agricultural areas and managed wetlands as native communities have been converted. They have a variable diet, but the California vole is a staple. They will also take other small mammals, birds, and insects. They breed in the western United States and Canada. In California, breeding is concentrated in the Central Valley and in the Great Basin area of northeastern California. They are generally monogamous, show a high degree of site fidelity, and will return to the same breeding territory year after year. Shortly after arriving on their breeding grounds, pairs nest and lay eggs between late March and early April. Clutch size is 1 to 4 eggs, with an average of 2 or 3. Eggs are incubated for 34 to 35 days, and young fledge after six weeks. Most young will have fledged by mid to late August. Nesting generally occurs at the periphery of riparian forests or in riparian corridors, but they will also use lone trees in agricultural fields, pastures, and roadside trees near suitable foraging habitat. They require large open areas of suitable foraging habitat with abundant and available prey. They use primarily crops, grassland, and pasture for foraging. Migration to their wintering grounds begins in mid-August. They winter from early November through mid-March in isolated areas of California, Mexico, and Central America, through South America, and as far south as Argentina. The primary threats contributing to their decline are the loss of habitat, primary foraging habitat, and nesting habitat in some portions of the species' breeding range.

Regional Occurrences. Swainson's hawk are known to occur in Napa County; they are considered a rare visitant and can be found in spring, summer, and fall (Napa-Solano Audubon Society updated). During the Napa-Solano Breeding Bird Atlas from 1989 to 1993, Swainson's hawk were not documented breeding in Napa County (Berner et al. 2003). However, CDFW CNDDB records show that Swainson's hawks have been reported nesting in Napa County's lowlands since 2007 (CDFW 2024a). There are 13 processed CNDDB occurrences of Swainson's hawk within 5 miles of the project site dating from 2007 through 2022: these include observations of copulation, nesting building, incubation, and nestlings in nests. There are also two occurrences of Swainson's hawk in the unprocessed data set in CDFW's BIOS (CDFW 2024b) – an observation of copulation south of the Napa County Airport from April 2023 and 2024 and copulation and incubation near Highway 221/29 from 2023; the same location as a previous nest observation in 2022. Swainson's hawks

have also been observed throughout Napa County, as reported in eBird[4]. These recent CNDDB reports indicate the Swainson's hawk has expanded/reestablished nesting in Napa County since the early 2000s when the entire county was censused for the Breeding Bird Atlas (Berner et al. 2003).

Protocol-level Surveys. Swainson's hawk surveys were completed by Dana Riggs, SolEcology and species expert, and Jennifer Michaud, Swift Biological and trained surveyor, from March through May 2024. Prior to conducting the surveys, CDFW's CNDDB and BIOS (2024a and 2024b) were consulted for the location of reported nesting activity in the project's vicinity. The field surveys followed protocols outlined in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee; SWHA TAC 2000). Seven surveys were completed over three periods per the recommended timing in SWHA TAC (2000). Surveys were conducted on March 20, 25, and April 1 in Period II, April 9, 16, and 22 in Period III, and May 9 in Period IV; see Table 1. Surveys were performed in both the morning (between sunrise and 10:00 am) and evening (between 4:30 pm and sunset). Surveys were completed under suitable weather conditions to maximize the potential for detecting birds, bird nesting activity, and nests. Binoculars (Swarovski 10x42), a 65x Canon camera, and a spotting scope (Vortex Razor HD) were used during the surveys. The surveys focused on behavioral observations and vocalizations of each hawk encountered. Observations relied primarily on behavioral cues such as perched adults and adults displaying any of the following: copulating, positioning, aerial acrobatics, territorial displays (chasing), circular flight patterns, and nest building/or nest cleaning. Careful attention was paid to any vocal communications between hawks as this is common during territorial displays, courtship, and mating and during the nestling phase to communicate food is available or that a threat exists. Suitable nest trees were visually inspected for nest structures.

The surveys were primarily focused on the Annexed Parcel as the remaining parcels within the project site are fully developed and do not support Swainson's hawk habitat. The undeveloped wetland mitigation site adjacent to the Annexed Parcel was also included in the survey due to its proximity to the project site and potential for SWHA presence. Additional accessible lands and the adjacent Napa Valley Business Park were also visited, where Swainson's hawks have previously been reported. This included Fagan Creek, Devlin Road, North Kelly Road, Highway 221/12 interchange, and Napa Sanitation District property off Suscol Ferry Road. Locations outside the project site were visited to determine the current status of Swainson's hawk nesting activity and the potential for use of the project site if nesting nearby. During each survey, the Annexed Parcel, wetland mitigation site, and other nearby sites (e.g., Fagan Creek along Devlin Road) were examined on foot. Driving or windshield surveys were performed from nearby roads to ensure coverage of all surrounding areas. This method is preferred over walking surveys as the observer can typically approach a hawk closer without causing a disturbance and causing the bird to fly off (SWHA TAC 2000).

[4] eBird is an observational database. It is not collected in a systematic fashion. It is not meant to track the breeding status or trends of any species.

Results. During the 2024 spring protocol-level surveys, no Swainson's hawks or other raptor species were observed using the Annexed Parcel or other developed areas within the project site. The closest raptor observation was on the wetland mitigation site directly to the east. This site supports open grassland and seasonal wetland habitat and a large eucalyptus tree; this is the nearest tree to the project site with the potential to support nesting raptors; it is 600 feet east of the Annexed Parcel. The wetland mitigation site was found to support a raptor nest in the large eucalyptus tree along the site's eastern edge. The nest is located in the top center of the tree. During the field visits, a red-tailed hawk or pair of hawks were observed in the nest tree, including sitting on top of the tree and the nest. Even though the nest was occupied from the onset of the surveys, it continued to be visited until the surveys were completed. Swainson's and red-tailed hawks are known to compete for nest sites. The nest was visited during all of the site visits to confirm that it was still occupied by the red-tailed hawk pair and that they were not displaced by Swainson's hawk.

As access allowed, additional documented locations of Swainson's hawk nesting activity were visited within the surrounding lands and Napa Valley Business Park area to monitor local nesting activity and determine the closest Swainson's hawk nesting location based on CDFW records. The nearest processed nesting sighting to the project site is along Fagan Creek (nesting was confirmed in 2020 and 2021), 0.15 miles from the developed 600 Tower Road Parcel and Napa Material Diversion Facility and 0.35 miles north of the Annexed Parcel. This area was visited during all site visits, and no hawks were detected. Common ravens were seen nesting directly west of the documented nest site, which may have deterred Swainson's hawk from re-establishing along Fagan Creek. The other nearest sighting is from unprocessed sightings from 2023 and 2024 south of the airport, 0.5 miles west of the project site (CDFW 2024b). This area was not visited due to access restrictions. However, nesting was confirmed by the observer during their survey effort (CDFW 2024b).

During the surveys, the first sighting of a Swainson's hawk was on the afternoon of April 22. This included a pair of hawks perched and potentially copulating along North Kelley Road (1.5 miles from the project site) and then taking flight to the southwest and circling over a vacant field (1.25 miles from the project site). On the morning of May 9, Swainson's hawk nesting activity was confirmed at previously documented sites along Suscol Creek; these sites are 2.3 miles from the project site (Figure 8). An additional sighting to the east of Highway 221/29 was also potentially active, as a male was seen circling on May 9; this site is 2.5 miles from the project site. Additionally, Swainson's hawk may have nested in the region as a comprehensive survey of the entire area was not part of this survey effort, and some birds may have been undetected.

Conclusions. The 600 Tower Road Parcel, Napa Material Diversion Facility, and Annexed Parcel are located within a highly industrialized and commercial area. These sites support existing industrial uses or are adjacent to industrial sites; the Annexed Parcel is between the Napa Material Diversion Facility and the Devlin Road Transfer Station. All of these sites experience high levels of noise and

human activity within or adjacent to them. Devlin Road, east of the project site, experiences high traffic volumes through the Napa Valley Business Park area, including truck traffic to and from the transfer station and other industrial businesses and commuter traffic.

The 600 Tower Road Parcel and the Napa Material Diversion Facility are fully developed and do not support foraging or nesting habitat for Swainson's hawk. The 600 Tower Road Parcel and Napa Material Diversion Facility are within 0.15 miles of an active nest site along Fagan Creek[5]. However, these sites support existing industrial uses. The proposed project would include a change from one industrial use to another; there would be no new impacts on Swainson's hawk or their habitat.

The Annexed Parcel is an undeveloped parcel that supports ruderal non-native grassland comprised of disturbed soils and weedy species. The Annexed Parcel does not support any trees for Swainson's hawk nesting. The Annexed Parcel does support open ruderal grassland and some fossorial mammal activity. However, this small site, situated between two industrial sites with high noise levels, human activity, and vehicular traffic, provides low-quality Swainson's hawk foraging habitat. It should be noted that this species generally forages for prey by soaring in open country and agricultural fields with abundant and available prey. There is extensive high-quality foraging habitat, including agricultural lands and other permanently protected species within several miles of the project site. There are no active nest sites within 0.25 miles of the Annexed Parcel. This site is located near the wetland mitigation site that supports raptor nesting habitat but does not currently support Swainson's hawk. It is unlikely that Swainson's hawk would forage within the Annexed Parcel based on its size, current condition, and location.

According to the CDFW's *Staff Report Regarding Mitigation for Impacts to Swainson's Hawk (Buteo swainsoni) in the Central Valley of California* (CDFG 1994), "cities, counties, and project sponsors should be encouraged to focus development on open lands within already urbanized areas. Since small disjunct parcels of habitat seldom provide foraging habitat needed to sustain the reproductive effort of a Swainson's hawk pair, CDFW (staff) does not recommend requiring mitigation pursuant to CEQA nor a Management Authorization by the Department for infill (within an already urbanized area) projects in areas which have less than 5 acres of foraging habitat and are surrounded by existing urban development, unless the project area is within 0.25 miles of an active nest tree." However, if during the preconstruction surveys, Swainson's hawk was found nesting within 0.25 miles of the project or within an area of influence around the Annexed Parcel (e.g., auditory or visual disturbances), the project would be required to implement avoidance measures to ensure that active Swainson's hawk nests are not be impacted by the project; see *Conclusions and Recommendations* below. In the absence of nest observations within 0.25 miles of the Annexed Parcel, the activities proposed would not cause nest abandonment, loss of nest trees, loss of foraging habitat that would reduce nesting success (e.g., loss or reduce health or vigor of eggs, or young), or direct mortality to Swainson's hawk.

[5] A nest site is active if it was used at least once during the past 5 years (page 3; CEC and CDFW 2010).

Table 1. Summary of Swainson's Hawk Surveys

Date	Period	Timing	Weather Conditions	Observations
3/20/2024	II	Morning	Cool, no cloud cover or wind, air temperature 45°F at 7:30 am	**No raptors were observed within the project site.** Red-tailed hawk was observed at the wetland mitigation site perched on top of a eucalyptus tree; nest structure in the eucalyptus tree. No SWHA were observed in the survey area.
3/25/2024	II	Late afternoon	Clear and sunny, no cloud cover, wind 5-10 mph, air temperature 59°F at 4:15 pm	**No raptors were observed within the project site.** Red-tailed hawk on the nest in the eucalyptus tree on the wetland mitigation site. Red-tailed perched in coast live oak tree at Highway 221/12 interchange at a location of previously reported SWHA nest. No SWHA were observed in the survey area.
4/1/2024	II	Morning	Cool, no cloud cover, wind 0-5 mph, air temperature 45°F at 7:00 am	**No raptors were observed within the project site.** Red-tailed hawk on the nest in the eucalyptus tree on the wetland mitigation site. Common ravens nesting along Fagan Creek near previously reported SWHA nest. Red-tailed hawk nesting near Napa Sanitation District near old SHWA nest site. No SWHA were observed in the survey area.
4/9/2024	III	Morning	Cool, no cloud cover, wind 0-5 mph, air temperature 48°F at 7:30 am	**No raptors were observed within the project site.** Red-tailed hawk on the nest in the eucalyptus tree on the wetland mitigation site. Red-tailed hawk nesting near Napa Sanitation District near old SHWA nest site. No SWHA were observed in the survey area.
4/16/2024	III	Morning	Cool, log fog, clearing during the survey, no wind, air temperature 52°F at 8:00 am	**No raptors were observed within the project site.** Red-tailed hawk on the nest in the eucalyptus tree on the wetland mitigation site. Red-shouldered hawk perched in a field. No SWHA were observed in the survey area.

Date	Period	Timing	Weather Conditions	Observations
4/22/2024	III	Late afternoon	Clear, sunny, no cloud cover, wind 10-15 mph, air temperature 62°F at 5:30 pm	**No raptors were observed within the project site.** Red-tailed hawk on the nest in the eucalyptus tree on the wetland mitigation site; flew off and perched on a building adjacent to the site. Red-tailed hawk nesting near Napa Sanitation District near old SHWA nest site. Two SWHA were observed within the survey area – birds perched and potentially copulating along North Kelly Road (1.5 miles from the project site), the same pair also foraging together over a vacant field (1.25 miles from the project site).
5/9/2024	IV	Morning	Clear, sunny, no cloud cover, wind 10-15 mph, air temperature 70°F at 9:30 am	**No raptors were observed within the project site.** Red-tailed hawk on the nest in the eucalyptus tree on the wetland mitigation site. SWHA activity observed at two known nests near Suscol Creek near Devlin Road both west and east of Highway 12 (CNDDB Occurrence Numbers 1619, 2621).

Swainson's Hawk Survey Photographs



Wetland mitigation site near Annexed Parcel (March 20)



Eucalyptus tree on wetland mitigation site (March 20)



Red-tailed hawk on eucalyptus tree (March 20)



Red-tailed hawk on nest (March 25)



Annexed Parcel (March 25)



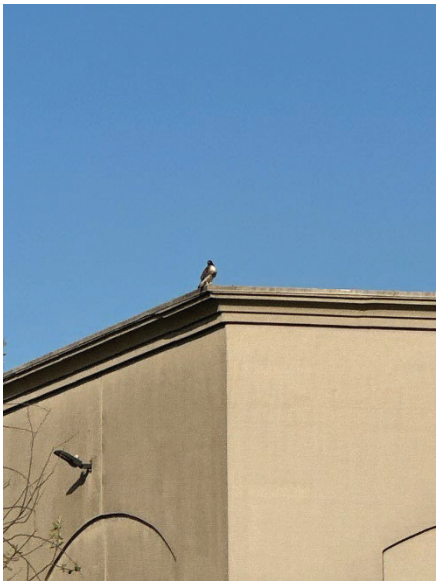
Red-tailed hawk on nest (April 1)



Wetland mitigation site (April 9)



Annexed Parcel (April 16)



Red-tailed hawk perched on building near wetland mitigation site (April 22)



Pair of Swainson's hawks foraging over a field, 1.25 miles from the project site (April 22)

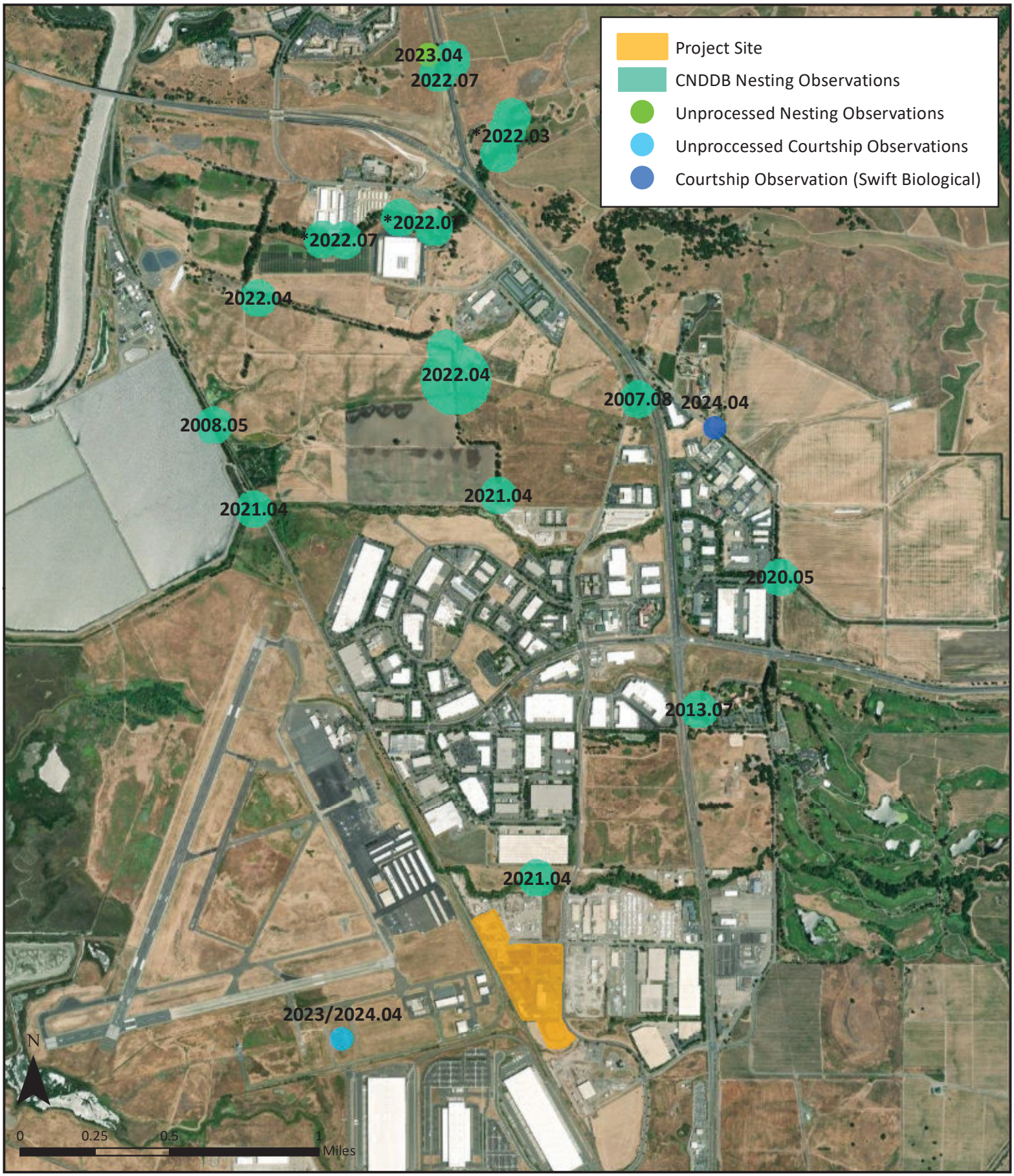


Figure 8. Swainson's Hawk Reported Observations

Biological Resources Assessment
Napa Renewable Resources Project 2.0
Napa Material Diversion Facility, Napa County
September 2024

Sources: Aerial - ESRI

SWHA observations are included from the published CNDDB sightings and unprocessed records in CDFW's BIOS

* Active based on field observations on 5/9/2024

5 Sensitive Natural Communities

Sensitive natural communities are vegetation communities that are considered sensitive by the California Department of Fish and Wildlife based on the range and distribution of a given type of vegetation, the proportion of occurrences that are of good ecological integrity, and threats and trends. Communities are evaluated at both a global (full range within and outside of California) and state (within California) using NatureServe's Heritage Program methodology. Rankings include a single G (global) and S (state) rank ranging from 1 (very rare and threatened) to 5 (demonstrably secure), with those alliances ranked globally (G) or statewide (S) as 1 through 3 considered sensitive. CDFW (2023a) maintains the *California Sensitive Natural Communities* list of current vegetation alliances, associations, special stands, and their global and state rarity ranks, as well as the *Manual of California Vegetation* (Sawyer et al. 2009). It should be noted that some alliances that are not considered sensitive may contain associations that are listed as sensitive by CDFW. Sensitive natural communities may also be identified in local or regional plans, policies, or regulations. Oak woodlands are also protected by local ordinances under the Oak Woodlands Protection Act. Impacts on sensitive natural communities must be considered and evaluated under the CEQA (CCR Title 14, Div. 6, Chap. 3, Appendix G).

As described under *Plant Communities*, the project site is fully developed or dominated by ruderal non-native annual grassland and forbs. The plant composition reflects a history of mowing and soil disturbance, with non-native grasses as the dominant herbaceous plant layer. The non-native grassland is not a sensitive plant community. The seasonal wetland adjacent to the Annexed Parcel would be considered sensitive based on the CDFW ranking and their wetland nature. However, the wetlands are located outside of the project development, and no wetlands are proposed for disturbance. The project will not impact sensitive natural communities.

6 Conclusions and Recommendations

The City of Napa is proposing to expand its Napa Materials Diversion Facility to increase its resource recovery capabilities at the site to meet evolving state regulations for solid waste, compostable, and recyclable materials. The project would include the expansion of the existing NMDF facility, the development of a vacant parcel to be annexed to the City to the south, and the reuse of an industrial parcel to the north owned by 600 Tower Road Holdings, LLC. The project would include increasing NMDF's permitted maximum incoming daily tonnage from 760 to 1,000 tons and include the construction of a biomass conversion facility, anaerobic digester, and solar panel installation.

Swift Biological and Jane Valerius Environmental Consulting completed a biological resources report to support the City of Napa's California Environmental Quality Act analysis and/or agency consultations. This section summarizes the biological resources present on the site based on the background literature, data search, and field surveys and provides measures to avoid, minimize, or mitigate potential impacts that should be incorporated into the project. The following discussion is based on preliminary project descriptions.

6.1 Plant Communities

The project includes three sites in an industrial and commercial business park. The existing Napa Materials Diversion Facility and 600 Tower Road Parcel are fully developed, and there are no native plant communities. The Annexed Parcel is comprised of ruderal non-native grassland with adjacent seasonal wetlands. This ruderal grassland community is comprised of non-native annual grasses and other predominantly non-native herbaceous plant species. The plant composition across the site reflects a history of mowing and soil disturbance. The non-native grassland is not a sensitive plant community, and no wetlands are on the project site; see below.

6.2 Jurisdictional Features

An assessment of potential jurisdictional features was completed for the project. Seasonal wetlands are adjacent to the Annexed Parcel. These areas were delineated in 2018, and boundaries were confirmed in 2024 (Jane Valerius Environmental Consulting 2018). These wetlands encompass the lands to the west and south of the Annexed Parcel. The property to the east of Devlin Road is a created wetland that was mitigation for the recycling and transfer facility. These wetlands are outside of the Annexed Parcel and will be avoided. The proposed project includes a 50-foot setback for all development along the delineated wetland boundary. No direct impacts on jurisdictional wetlands are anticipated from the project. However, the project should ensure the protection of the adjacent wetlands during project construction, and the following measures should be implemented:

- For all wetlands, a wetland protection zone should be identified. The wetland protection zone should extend from the delineated boundary of the wetland and include a 50-foot

buffer. All wetland protection zones should be clearly delineated and marked before ground-disturbing activities.

- Wetland protection fencing should be installed before any site work. Fencing should remain in place until construction is complete. Fencing should be constructed of orange construction fencing or other high-visibility materials.
- Fencing should be routinely inspected to ensure it is intact and functional.
- No construction materials, equipment storage, or parking areas should be located within the wetland protection zone.
- Best Management Practices (BMPs) to protect water quality and prevent erosion and sedimentation during and following construction should be implemented.
- Drainage plans should be designed to prevent direct runoff into the adjacent wetlands.

6.3 Special-status Plants

Botanical surveys of the project were completed from February to June 2024. This included protocol-level special-status plant species surveys performed in accordance with state and federal plant survey protocols. No special-status plants were observed during the seasonal, protocol-level surveys. The non-native annual grassland provides low habitat suitability for special-status plant species as it is dominated by non-native grasses and forbs, which typically outcompete native species. In addition, past land disturbances, such as soil placement, reduced the site's suitability to support special-status plant species. No special-status plant species are expected to occur within the proposed project site. No mitigation is proposed.

6.4 Special-status Animals

No special-status animals were observed during the biological surveys of the project site. All special-status animal species identified during the background review were determined to have no or low potential to occur within the project site. However, protected birds may use the site for nesting, and the project is within the range of the Swainson’s hawk. Nesting bird and Swainson’s hawk protection measures are outlined below.

Nesting Birds

The project site supports breeding habitat for native birds typically associated with urban settings and tolerant of human disturbance. Breeding birds are protected under the Migratory Bird Treaty Act, California Fish and Game Code, and federal and state ESAs. Project activities (including vegetation removal, grading, or other ground-disturbing activities) could result in the alteration of the nesting habitat and disruption of nesting activities. Construction activities can result in the destruction of eggs or occupied nests, mortality of young, and the abandonment of nests with eggs or young birds before fledging. To avoid potential impacts on native nesting birds, the following precautionary measures should be implemented:

- Preconstruction nesting bird surveys should be completed from February 1- August 31. A survey should be completed within seven days before the beginning of project-related activities. The survey area should include the project site and an appropriate buffer around

the project site to identify any nesting that could be impacted directly or indirectly by the project-related activities. The survey should follow established nesting search protocols described in Martin and Geupel (1993) and CDFW and USFWS protocols, where appropriate. If the qualified biologist finds no active nests or breeding activity indicating nests are present, then work can proceed without restrictions. If there is a lapse in project-related activities for seven days or more, then a follow-up survey may be required per the recommendations of the qualified biologist.

- If active nests are identified during the survey and the nests are within the project site or the buffer area and nesting would be adversely affected, a no-disturbance buffer area should be demarcated around each nest site by the qualified biologist. Buffer distances for each bird's nest should be site-specific and established to protect the bird's normal behavior and prevent nesting failure or abandonment. The buffer distance will vary by species, nest location, existing visual and topographical buffers, and intensity and extent of the construction-related disturbance. The buffer area may be as small as 25-50 feet for common, disturbance-adapted species or much larger (e.g., 100-250 feet) for sensitive species like raptors. The no-disturbance buffer area should be established in the field with flagging, fencing, or other appropriate material and remain in place until all young in the nest have fledged or the nest otherwise becomes inactive due to predation or other natural causes as determined by the qualified biologist. The qualified biologist should continue to monitor the behavior of the birds at the nest site during construction activities to ensure that they are not disturbed by the project work. Nest monitoring should continue until the nesting attempt is complete. If state and/or federally-listed birds are found breeding within the area, consultation with the CDFW and USFWS may be required; see below.
- If initial ground-disturbing activities occur outside the nesting season (September 1 through January 31), then a preconstruction survey would not be required, and construction could begin unimpeded.

Swainson's Hawk

The project site is within the range of the Swainson's hawk. This species is state-listed as threatened and protected under the CESA and CEQA. Swainson's hawk are also protected from direct take under the federal Migratory Bird Treaty Act, and their nests, eggs, and young are protected under the California Fish and Game Code. No Swainson's hawks have been documented at the project site during protocol-level surveys in 2024. The closest known Swainson's hawk record to the project site is approximately 0.15 miles from 600 Tower Road Parcel and Napa Material Diversion Facility and 0.35 miles from the Annexed Parcel.

The 600 Tower Road Parcel and the Napa Material Diversion Facility are fully developed and do not support foraging or nesting habitat for Swainson's hawk. The proposed project at these sites would include a change from one industrial use to another; there would be no new impacts on Swainson's hawk or their habitat. However, the Annexed Parcel is an undeveloped parcel that supports ruderal non-native grassland comprised of disturbed soils and weedy species, which is

low-quality foraging habitat. The Annexed Parcel does not support any trees for Swainson's hawk nesting. The Annexed Parcel is adjacent to a wetland mitigation with a documented raptor (red-tailed hawk) nest. The Swainson's hawk is a mobile species whose nesting locations can change yearly. If this species establishes nesting within an area of influence around the Annexed Parcel, the following avoidance measures should be implemented to ensure that active Swainson's hawk nests are not impacted by the project.

- If construction on the Annexed Parcel commences at any time during the Swainson's hawk breeding season from February 1 through August 31, a preconstruction survey should be completed. Surveys should follow protocols outlined in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (SWHA TAC 2000). Surveys should be completed by a qualified biologist and initiated early in the Swainson's hawk breeding season to maximize the potential to observe nesting behavior; the survey timing should be adjusted in consideration of early and late nesting seasons. The surveys should be conducted within a minimum of a 0.5-mile radius around the project.
- If active Swainson's hawk nests are identified within 0.25 miles of the Annexed Parcel or in any area that could be directly or indirectly affected by the project, a no-disturbance buffer area should be established around the nest site to avoid take or adverse impacts to active Swainson's hawk nests. The buffer distance will vary by nest location, existing visual buffers, and intensity and extent of the construction-related disturbance. The buffer area size and types of construction activities restricted within the buffer area should be determined in consultation with CDFW. The no-disturbance buffer area should be established in the field with flagging, fencing, or other appropriate material and remain in place until all young in the nest have fledged or the nest otherwise becomes inactive due to predation or other natural causes as determined by the qualified biologist.
- The qualified biologist should monitor the behavior of the birds at the nest site during construction activities to ensure that they are not disturbed by the project work. Nest monitoring should continue until the nesting attempt is complete.
- If initial ground-disturbing activities occur outside of the nesting season (September 1 through January 31), then the preconstruction Swainson's hawk survey would not be required, and construction could begin unimpeded.

6.5 Wildlife Corridors and Native Nursery Sites

The project site is currently fully developed or supports ruderal grassland with adjacent development. It is adjacent to a heavily trafficked roadway, Devlin Road. The 600 Tower Road Parcel and the Napa Material Diversion Facility are fully fenced. The Annexed Parcel is fenced along the northern boundary and shared fence line with the Napa Material Diversion Facility; fencing is also located further to the south at the Devlin Road Transfer Station. The majority of the area is for industrial and commercial use. The area already experiences a high level of human activity. Wildlife using the project site are likely habituated to human activity. The construction-related disturbance would not have a significant impact on wildlife movement activity in the surrounding

area as the impacts would be temporary. The project would not result in any negative long-term impacts on wildlife movement and use of wildlife nursery locations and would not require any additional mitigation.

7 References

Berner, M., B. Grummer, R. Leong, and M. Rippey. 2003. Breeding Birds of Napa County, California. Napa-Solano Audubon Society, Vallejo, CA.

Calflora. 2024. Calflora database – a non-profit database providing information on wild California plants. http://www.calflora.org/

California Department of Fish and Game (CDFG). 1994. Staff Report Regarding Mitigation for Impacts to Swainson's Hawk (*Buteo swainsoni*) in the Central Valley of California. November 8. 1994.

California Department of Fish and Wildlife (CDFW). 2016. VegCAMP Vegetation Classification and Mapping Program. California Department of Fish and Wildlife. Sacramento, CA.

California Department of Fish and Wildlife (CDFW). 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. California Department of Fish and Wildlife. Sacramento, CA.

California Department of Fish and Wildlife (CDFW). 2023a. California Sensitive Natural Communities, June 1, 2023. California Department of Fish and Wildlife. Sacramento, CA. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153609&inline

California Department of Fish and Wildlife (CDFW). 2023b. Survey Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species. June 6, 2023.

California Department of Fish and Wildlife (CDFW). 2024a. California Natural Diversity Database (CNDDB) Rare Find Version 5.3.0 Spotted Owl Observations Database and CNDDB GIS Data. California Department of Fish and Wildlife. Sacramento, CA. https://apps.wildlife.ca.gov/rarefind/view/RareFind.aspx

California Department of Fish and Wildlife (CDFW). 2024b. BIOS - Unprocessed Data from CNDDB Online Field Survey Forms. California Department of Fish and Wildlife. Sacramento, CA. https://wildlife.ca.gov/Data/CNDDB/Maps-and-Data#43018408-cnddb-in-bios

California Department of Fish and Wildlife (CDFW). 2024c. Special Animals List – July 2024. California Department of Fish and Wildlife. Sacramento, CA. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline

California Department of Fish and Wildlife (CDFW). 2024d. Special Vascular Plants, Bryophytes, and Lichens List, July 2024. California Department of Fish and Wildlife. Sacramento, CA. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109383&inline

California Energy Commission (CEC) and Department of Fish and Game (DFG). 2010. Swainson's Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in The Antelope Valley of Los Angeles and Kern Counties, California. State of California, California Energy Commission, and Department of Fish and Game. June 2, 2010.

California Native Plant Society (CNPS). 2024a. A Manual of California Vegetation Online. California Native Plant Society. Sacramento, CA. https://vegetation.cnps.org/
California Native Plant Society (CNPS). 2024b. Inventory of Rare Plants. California Native Plant Society. Sacramento, CA. https://www.cnps.org/rare-plants/cnps-inventory-of-rare-plants

Jane Valerius Environmental Consulting. 2018. Delineation of Waters of the United States, including Wetlands, for the South Napa Waste Management Authority, Devlin Road, Napa, Napa County, California. Prepared for Public Works Department, City of Napa. November 2018.

Jepson Flora Project (eds.) 2024. Jepson eFlora. http://ucjeps.berkeley.edu/eflora/

Martin, T.E. and G.R. Geupel. 1993. Nest-Monitoring Plots: Methods for Locating Nests and Monitoring Success. Journal of Field Ornithology 64:507–519.

Napa County. 2016. Attachment B Guidelines for Preparing Biological Resources Reconnaissance Surveys. August 2016.

Napa-Solano Audubon Society. Updated. Checklist of Common Birds of Napa County.

Natural Resources Conservation Service (NRCS). 2024. Web Soil Survey (WSS). https://websoilsurvey.sc.egove.usda.gov/App?HomePage.htm

Ruygt, J. 2020. A Flora of Napa County. Published by the California Native Plant Society, Sacramento, CA.

Sawyer, J., T. Keeler-Wolf, and J. Evens. 2009. A Manual of California Vegetation. Second Edition. California Native Plant Society and California Department of Fish and Game. Sacramento, CA.

Swainson's Hawk Technical Advisory Committee (SWHA TAC). 2000. Recommended Timing and Methodology for Swainson's hawk Nesting Surveys in California's Central Valley. May 31, 2000.

U.S. Army Corps of Engineers (Corps). 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Vicksburg, MS: U.S. Army Corps of Engineers Waterways Experiment Station.

U.S. Army Corps of Engineers (Corps). 2008a. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. A Delineation Manual. ERDC/CRREL TR-08-12. August 2008. Hanover, NH: U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory.

U.S. Army Corps of Engineers (Corps). 2008b. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. Version 2.0. ERDC/EL TR 08-28. September 2008. Vicksburg, MS: U.S. Army Corps of Engineers Research and Development Center.

U.S. Department of Agriculture (USDA). 1978. Soil Survey of Napa County, California.

U.S. Fish and Wildlife Service (USFWS). 2000. Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants. January 2000.

U.S. Fish and Wildlife Service (USFWS). 2021. Birds of Conservation Concern 2021. United States Department of the Interior, U.S. Fish and Wildlife Service, Migratory Birds, Falls Church, Virginia. http://www.fws.gov/birds/management/ managed-species/birds-of-conservation-concern.php

U.S. Fish and Wildlife Service (USFWS). 2024a. Information for Planning and Conservation (IPaC). https://ecos.fws.gov/ipac/.

U.S. Fish and Wildlife Service (USFWS). 2024b. National Wetlands Inventory – Surface Waters and Wetlands. https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/

Wildlife Research Associates. 2017. Wildlife Habitat Assessment. +/- 4-acre Portion of 889 Devlin Road, American Canyon, Napa County, CA. September 11, 2017.

8 Photographs



Existing conditions at the 660 Tower Road Parcel





Existing conditions at the 660 Tower Road Parcel (above) and entrance gate to the site (below)





Entrance to the NMDF site (above) and compost material (below)





Recycling area on the NMDF site





Green waste recycling (above) and storage pond at NMDF site (below)





Looking north (above) and east (below) at the Annexed Parcel





Looking northeast (above) and southeast (below) at the Annexed Parcel





Looking southeast (above) and northwest (below) at the Annexed Parcel





Wetland along the southern edge of the Annexed Parcel





Wetland to the west (above) and frontage road to the east (below) of the Annexed Parcel



9 Tables

Table 2. Plants Species Observed During Botanical Surveys, February – June 2024

Scientific Name	Common Name
Amaranthus sp.	Amaranthus*
Atriplex prostrata	Fat-hen*
Avena barbata	Wild oats*
Avena fatua	Oats*
Baccharis pilularis	Coyote brush
Brassica nigra	Black mustard*
Bromus caroli-henrici	Weedy brome*
Bromus diandrus	Ripgut brome*
Bromus hordaeceus	Soft chess*
Calendula arvensis	Calendula*
Cichorium intybus	Chicory*
Cirsium vulgare	Bull thistle*
Convolvulus arvensis	Bindweed*
Cyperus eragrostis	Tall flat sedge
Daucus carota	Queen Anne's lace*
Dittrichia graeveolens	Stinkwort*
Elymus caput-medusae	Medusa head grass*
Epilobium brachyantherum	Willow herb
Erigeron bonariensis	Horseweed*
Erodium spp.	Filarees*
Eryngium aristulatum	California eryngium
Eschscholzia californica	California poppy
Festuca perennis	Ryegrass*
Foeniculum vulgare	Fennel*
Galium aparine	Bedstraw
Geranium dissectum	Cut-leaf geranium*
Geranium robertianum	Herb Robert
Helminthotheca echioides	Bristly ox-tongue*
Hirschfeldia incana	Shortpod mustard*
Holcus lanatus	Velvet grass*
Hordeum brachyantherum	Meadow barley
Hordeum marinum ssp. gussoneanum	Mediterranean barley*
Hordeum murinum ssp. leporinum	Hare barley*
Hypochaeris radicata	Rough cat's-ear*
Lactuca serriola	Prickly lettuce*
Leymus triticoides	Creeping wildrye
Lotus corniculatus	Bird's-foot trefoil*
Malva parviflora	Cheeseweed*
Medicago polymorpha	Bur-clover*
Phalaris aquatica	Harding grass*
Plantago lanceolata	English plantain*

Scientific Name	Common Name
Poa annua	Annual bluegrass*
Polygonum aviculare	Knotweed*
Polypogon monspeliensis	Rabbitsfoot grass*
Pyrus calleryana	Callery pear or Bradford pear
Quercus lobata	Valley oak
Raphanus sativus	Wild radish*
Rubus armeniacus	Himalayan blackberry*
Rumex crispus	Curly dock*
Silybum marinum	Milk thistle*
Sonchus arvensis	Prickly sow thistle*
Stipa miliacea var. miliacea	Smilo grass*
Tragopogon porrifolius	Salsify*
Trifolium hirtum	Rose clover*
Trifolium incarnatum	Crimson clover*
Trifolium subterraneanum	Subterranean clover*
Vicia sp.	Vetch*
Species with an * are non-native.	

Table 3. Special-status Plants Evaluated for Potential to Occur within the Project Site

Scientific Name Common Name	Listing Status[6] USFWS/ CDFW/ CNPS Rank	Habitat Affinities and Blooming Period/Life Form	Potential for Occurrence
Astragalus tener var. *tener* Alkali milk-vetch	-/-/1B	Playas, grassland (adobe clay), and vernal pools (alkaline). Blooms March to June. Elevation: 1-60m.	No Potential. Typical habitat not present within the project site. Not observed during 2024 surveys.
Carex lyngbyei Lyngbye's sedge	-/-/2B	Freshwater or brackish marshes and swamps. Blooms April to August. Elevation 0-10m.	No Potential. No habitat present within the project site.
Castilleja ambigua var. *ambigua* Johnny-nip	-/-/4	Coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland, vernal pools margins. Blooms March to August. Elevation: 0-435m.	Low Potential. Potential habitat within the project site. Not observed during 2024 surveys. Wetland areas will be avoided.
Chloropyron molle ssp. *molle* Soft salty bird's-beak	FE/CR/1B	Coastal salt marshes and swamps. Blooms July-November. Elevation: 0-3m.	No Potential. No habitat present within the project site.

[6] Plant Listing Status Codes:
Federal Endangered Species Act (ESA):
FE-federally listed as endangered
FT-federally listed as threatened
FC-federal candidate species
California Endangered Species Act (CESA):
SE-state listed as endangered
ST-state listed as threatened
SCE-state candidate to be listed as endangered
SCT-state candidate to be listed as threatened
SR - listed as rare
California Rare Plant Rank (CRPR):
1A - presumed extirpated in California and either rare or extinct elsewhere;
1B - rare or endangered in California and elsewhere;
2A - presumed extirpated in California but common elsewhere;
2B - rare or endangered in California, but more common elsewhere;
3 - plants for which we need more information, a review list;
4 - plants of limited distribution, a watch list.
The CRPR uses a decimal-style threat rank. The threat rank is an extension added onto the CRPR and designates the level of threats by a 1 to 3 ranking.

Scientific Name Common Name	Listing Status[6] USFWS/ CDFW/ CNPS Rank	Habitat Affinities and Blooming Period/Life Form	Potential for Occurrence
Downingia pusilla Dwarf downingia	-/-/2B	Valley and foothill grassland (mesic), vernal pools. Blooms March to May. Elevation: 1-445m.	No Potential. No habitat present within the project site. Not observed during 2024 surveys.
Eleocharis parvula Small spikerush	-/-/4	Marshes and swamps. Blooms April to September. Elevation: 1-3020m.	No Potential. No habitat present within the project site. Not observed during 2024 surveys.
Etriplex joaquinana San Joaquin spearscale	-/-/1B	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland in alkaline soils. Blooms April to October. Elevation: 1-835m.	No Potential. Typical habitat not present within the project site. Not observed during 2024 surveys.
Lasthenia conjugens Contra Costa goldfields	FE/-/1B	Cismontane woodland, playas (alkaline), valley and foothill grassland, vernal pools/ mesic. Blooms March-June. Elevation: 0-470m.	No Potential. Typical habitat not present within the project site. Not observed during 2024 surveys. Wetland areas will be avoided.
Lathyrus jepsonii var. *jepsonii* Delta tule pea	-/-/1B	Freshwater and brackish marshes and swamps. Blooms May to September. Elevation: 0-5m.	No Potential. No habitat present within the project site. Not observed during 2024 surveys.
Legenera limosa Legenere	-/-/1B	Vernal pools. Blooms April to June. Elevation: 1-880m.	No Potential. Typical habitat not present within the project site. Wetland areas will be avoided. Not observed during 2024 surveys.
Lessingia hololeuca Woolly-headed lessingia	-/-/3	Broadleafed upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland on clay or serpentinite. Blooms June to October. Elevation: 15-305 m.	No Potential. No habitat present within the project site. Not observed during 2024 surveys.

Scientific Name Common Name	Listing Status[6] USFWS/ CDFW/ CNPS Rank	Habitat Affinities and Blooming Period/Life Form	Potential for Occurrence
Lilaeopsis masonii Mason's lilaeopsis	-/-/1B	Brackish or freshwater marshes and swamps, riparian scrub. Blooms April to November. Elevation: 0-10m.	No Potential. No habitat present within the project site.
Polygonum marinense Marin knotweed	-/-/3	Coastal salt or brackish marshes and swamps. (April) May-August (October). Elevation: 0-10m.	No Potential. No habitat present within the project site.
Ranunculus lobbii Lobb's aquatic buttercup	-/-/4	Cismontane woodland, North Coast coniferous forest, valley and foothill grassland and vernal pools in mesic sites. Blooms February to May. Elevation: 15-470m.	No Potential. Typical habitat not present within the project site. Wetland areas will be avoided. Not observed during 2024 surveys.
Symphyotrichum lentum Suisun Marsh aster	-/-/1B	Brackish and freshwater marshes and swamps. Blooms April to November. Elevation: 0-3m.	No Potential. No habitat present within the project site. Not observed during 2024 surveys.
Trifolium amoenum Two-fork clover	/-/1B	Coastal bluff scrub, valley and foothill grassland, sometimes on serpentinite. Blooms April to June. Elevation: 5-415m	No Potential. Typical habitat not present within the project site. Not observed during 2024 surveys.
Trifolium hydrophilum Saline clover	-/-/1B	Marshes and swamps, valley and foothill grassland (mesic, alkaline), vernal pools. Blooms April to June. Elevation: 0-300m.	No Potential. Typical habitat not present within the project site. Wetland areas will be avoided. Not observed during 2024 surveys.
Special Natural Communities			
Coastal Brackish Marsh			No Potential
Northern Coastal Salt Marsh			No Potential

Scientific Name Common Name	Listing Status[6] USFWS/ CDFW/ CNPS Rank	Habitat Affinities and Blooming Period/Life Form	Potential for Occurrence
Northern Vernal Pool			Not present within the project site
Serpentine bunchgrass			No Potential

Table 4. Wildlife Species Observed During Surveys of the Project Site and Focused Swainson's Hawk Surveys, February – May 2024

Scientific Name	Common Name
Agelaius phoeniceus	Red-winged Blackbird
Anas platyrhynchos	Mallard
Aphelocoma californica	California Scrub-Jay
Ardea alba	Great Egret
Bombycilla cedrorum	Cedar Waxwing
Branta canadensis	Canada Goose
Buteo jamaicensis	Red-tailed Hawk
Buteo swainsoni	Swainson's Hawk - observed approximately 1.25 miles from the project site during protocol-level surveys; not present within the project site.
Butorides virescens	Green Heron
Calypte anna	Anna's Hummingbird
Cathartes aura	Turkey Vulture
Charadrius vociferus	Killdeer
Columba livia	Rock Pigeon
Corvus brachyrhynchos	American Crow
Corvus corax	Common Raven
Euphagus cyanocephalus	Brewer's Blackbird
Haemorhous mexicanus	House Finch
Larus californicus	California Gull
Mareca strepera	Gadwall
Melospiza melodia	Song Sparrow
Melozone crissalis	California Towhee
Mimus polyglottos	Northern Mockingbird
Molothrus ater	Brown-headed Cowbird
Odocoileus hemionus	Black-tailed Deer
Psaltriparus minimus	Bushtit
Sayornis nigricans	Black Phoebe
Setophaga coronata	Yellow-rumped Warbler
Streptopelia decaocto	Eurasian Collared-Dove
Sturnella neglecta	Western Meadowlark
Sturnus vulgaris	European Starling
Turdus migratorius	American Robin
Zonotrichia atricapilla	Golden-crowned Sparrow

Table 5. Special-status Animals Evaluated for Potential to Occur within the Project Site

Common Name *Scientific Name*	Listing Status[7]	Habitat Requirements	Local Observations[8] and Potential for Occurrence within the Project Site
Amphibians			
Foothill Yellow-legged Frog *Rana boylii pop.1* North Coast DPS	SSC	Found in small tributary streams with perennial water. Breeding and rearing streams are generally sunlit with microhabitat features (e.g., boulders) and low flow velocities. Typically found within close proximity to the stream channel, small upland movements have been noted. Non-breeding habitat also includes adjacent terrestrial riparian habitat and nearby features that provide high-flow refuge. Breeding occurs in spring after winter runoff has subsided (typically May-June). Eggs attached to rock and vegetative substrates in shallow, slow-moving water. Mostly active during daylight. Adults consume a variety of aquatic invertebrates. Tadpoles graze algae and detritus.	No potential. Foothill yellow-legged frogs are known from a 1930s collection near the Napa Junction; the population is assumed to be extirpated. Suitable aquatic habitat is not present within the project site.
California Red-legged Frog *Rana draytonii*	FT, SSC	Largest native frog in the western US. Breed in a variety of aquatic habitats with still to slow-moving water and emergent vegetation, must hold water into late summer or early fall. Found in streams, ponds, marshes, sag ponds, dune ponds, and lagoons including both natural and manmade features. Non-breeding habitat includes areas used for breeding and other non-breeding habitats such as springs, vegetated seeps, riparian habitat, and oftentimes other less conspicuous upland locations like burrows and leaf litter. Breeding occurs between November and April (egg-laying is generally January – February). Eggs are deposited in a large grapefruit-sized mass on emergent vegetation just below the water's surface. Variable diet.	No potential. California red-legged frogs are known in North Slough Creek, a large quarry pond and tributary to American Canyon Creek within 5 miles of the project site. Frogs were observed in these locations in the 2000s and within 1.4 to 3.8 miles. These sightings are east of Highway 29; this highway would be considered a barrier to movement. It is unlikely that frogs would move from the east to the west into nearby aquatic habitats. Suitable habitat is not present within the project site; the nearby wetland mitigation site is a created wetland and isolated from known populations and also not likely to support frogs.

[7] Animal Listing Status Codes
Federal: FE-federally listed as endangered, FT-federally listed as threatened, FC-federal candidate species, BCC-USFWS Bird of Conservation Concern
State: SE-state listed as endangered, ST-state listed as threatened, Candidate SE-state candidate to be listed as endangered under CESA, Candidate ST-state candidate to be listed as threatened under CESA, FP-CDFW fully protected, SSC-CDFW Species of Special Concern, and WL-CDFW Watch List (CDFW 2024c).
[8] Occurrence information based on CDFW's California Natural Diversity Database (CDFW 2024a)

Common Name *Scientific Name*	Listing Status[7]	Habitat Requirements	Local Observations[8] and Potential for Occurrence within the Project Site
Western Spadefoot *Spea hammondii*	FC (Threatened), SSC	A small 1 ½ to 2 ½-inch toad of mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Requires open areas with sandy or gravelly soils, spends most of its life buried underground in earth-filled burrows. The species is completely terrestrial, only entering the water to breed. Breeds from January through May, peaking in February and March, 1-2 days after heavy rains. Breeding occurs in temporary pools or quiet streams without bullfrogs, fish, and crayfish. Eggs hatch after 3 to 4 days on average. Tadpoles transform in 4 to 11 weeks. Both juveniles and adults are nocturnal.	No potential. There are no reported occurrences of this species within 5 miles of the project. Species reported on USFWS IPac list. Suitable aquatic and upland habitat is not present within the project site.
Reptiles			
Green Sea Turtle *Chelonia mydas*	FT	Marine turtle occurring in open ocean and coastal areas in tropical and subtropical waters along continental coasts and islands; occur worldwide. Consume seagrass and algae. Require beaches for nesting. Eleven Distinct Population Segments are listed under the ESA. In California, green sea turtles are common in coastal waters near San Diego.	No potential. There are no reported occurrences of this species within 5 miles of the project. Species reported on USFWS IPac list. Suitable open marine and sandy beach habitats are not present within the project site.
Western Pond Turtle *Emys marmorata*	FC (Threatened), SSC	Only native turtle in Napa County. Found in ponds, lakes, rivers, streams, creeks, marshes, irrigation ditches, and upland areas. Nest dug in upland areas along stream or pond margins in sunny, grassy areas. Mating occurs from April to May (8-10 years old). 2-11 eggs laid. Hatchlings emerge in late summer-fall and sometimes overwinter in the ground. Active February-March. Diurnal and aquatic. Requires basking sites – logs, banks, etc. Eat plants, invertebrates, carrion, and occasionally frogs and fish.	No potential. The western pond turtle is known from the Napa River, off-channel ponds, and other slough and creek settings within 5 miles of the project site. Pond turtles may be present in Fagan Creek to the north, but movement from the creek channel to nearby uplands is not likely given the heavy industrial and commercial uses. The nearby wetland mitigation site is a created wetland isolated from known populations that is also not likely to support turtles. Suitable habitat is not present within the project site.

Common Name *Scientific Name*	Listing Status[7]	Habitat Requirements	Local Observations[8] and Potential for Occurrence within the Project Site
Birds			
Tricolored Blackbird *Agelaius tricolor*	ST (nesting colony), BCC SSC,	A gregarious species, found year-round in large flocks. Historically, occupied wetlands with cattails, bulrushes, and willows, but as wetlands were converted, they are now common in agricultural fields and remaining wetlands. A colonial-nesting species, breeding from mid-April into late July. They form the largest breeding colonies of any North American passerine. Females construct an open-cup nest, just above ground level to up to 8 feet. This species is highly social; they nest, roost, and forage in large groups. The diet consists of mostly insects and seeds. They are most common in California's Central Valley.	Low potential. Tricolored blackbirds occur as a summer resident in Napa County. Several breeding colonies are reported within a 5-mile buffer of the project site. These colonies were active in the 1990s but were not documented during surveys in the 2000s. There are no recent confirmations of tricolored blackbirds nesting in the general vicinity. Suitable breeding habitat is not present within the project site. Blackbirds may forage in the region on a limited basis.
Golden Eagle *Aquila chrysaetos*	FP, WL (nesting and wintering)	The golden eagle is the most widely distributed bird in the Northern Hemisphere and one of the largest birds in North America. It occurs in open country, especially around mountains, hills, and cliffs. It is primarily solitary and feeds on mammals. It nests in large trees or on cliffs. The nest is a bulky platform of sticks lined with weeds, grass, leaves, and moss. It breeds from late January through August. Birds may mate for life. It is a year-round resident of Napa County, where it occupies mountain and ranch areas in the eastern portion of the county (Napa).	No potential. Golden eagles are known from mountainous and ranch country in eastern Napa County. There are historic and unprocessed records of this species in the CNDDB. They are also reported in the Berner et al. 2003. Suitable habitat is not present within the project site.
Burrowing Owl *Athene cunicularia*	BCC, SSC (burrowing sites and some wintering sites)	A small, ground-dwelling owl of open landscapes. They are common in grasslands, rangelands, agricultural areas, deserts, and other open habitats with low-growing vegetation. They are active both day and night and can frequently be seen standing at burrow entrances during the day. They nest and roost in burrows. Burrows are most commonly dug by ground squirrels, but they will also use badger, coyote, fox dens or holes, and pocket-gophers to start. They may excavate their own burrows if the soil conditions allow. Culverts, pipes, and piles of concrete rubble may also be used.	Low potential. Burrowing owls were reported in the Napa Valley Business Park area in 2006 when the area supported open grasslands before development. This species is known to overwinter in Napa County, but there are no reported breeding occurrences (Berner et al. 2003). No evidence of burrows or burrowing animals were observed during repeat surveys of the project site. Given the lack of recent confirmed sightings within the general vicinity of the site,

Common Name *Scientific Name*	Listing Status[7]	Habitat Requirements	Local Observations[8] and Potential for Occurrence within the Project Site
		They are generally found on their breeding grounds from mid-March through September. They are opportunistic feeders consuming primarily arthropods, small mammals, birds, amphibians, and reptiles. Historically, they breed in Sonoma County but now are an uncommon winter resident. There are no recent breeding confirmations.	existing development, and high levels of vehicular traffic in the general area, burrowing owls are not expected.
Swainson's Hawk *Buteo swainsoni*	ST	See report for detailed discussion.	Low potential. See report for detailed discussion.
Western Snowy Plover *Charadrius nivosus nivosus*	FT, SSC	The western snowy plover is a small shorebird occurring along the Pacific Coast (part of the Pacific Coast DPS). It breeds from Washington to Baja California with a bulk of the population nesting in California. Breeding occurs primarily above the high tide line on coastal beaches, sand spits, dune-backed beaches, sparsely vegetated dunes, beaches at creek and river mouths, and salt pans at lagoons and estuaries. Less commonly, they breed on bluff-backed beaches, dredged material disposal sites, salt pond levees, dry salt ponds, and river bars. Breeding occurs from March through September, with peak activity from mid-April through mid-August. The nest is a shallow scrape or depression on the ground. They feed primarily on invertebrates. They winter in coastal California and Mexico.	No potential. Western snowy plovers are known for limited occurrences in Napa County. They were reported breeding on a sandy island levee in 2009 in a marsh habitat along the lower Napa River and a confirmed sighing at Little Island salt evaporation bonds in 1989 (Berner et al. 2003). Suitable habitat is not present within the project site.
Ferruginous Hawk *Buteo regalis*	WL	The ferruginous hawk is the largest hawk in North America. It occurs in North America, from southwestern Canada through the western United States and into northern Mexico, and occupies prairies, deserts, and open-range land. It is a predator of open country. It forages for ground squirrels, rabbits, hares, mice, and pocket gophers while soaring or hunting from low perch or ground. It is one of the most adaptable nesting raptors and will use various features, including trees, ledges, nest platforms,	No potential. Ferruginous hawks were reported in the Napa Valley Business Park area in 1989 when the area supported open grasslands before development. This species is known to overwinter in Napa County, but there are no reported breeding occurrences (Berner et al. 2003). Suitable habitat is not present within the project site.

Common Name *Scientific Name*	Listing Status[7]	Habitat Requirements	Local Observations[8] and Potential for Occurrence within the Project Site
		power poles, and other manmade structures. A pair will build or refurbish their stick nest, which may be re-used year after year. Winters in Napa County, no documented occurrences of breeding.	
White-tailed Kite *Elanus leucurus*	FP	A small hawk with a white body and black wingtips and shoulders. They are common in savannas, open woodlands, marshes, desert grasslands, partially cleared lands, cultivated fields, and even highway median strips. Hovers in flight and parachutes down on their prey. Feeds primarily on small mammals. Breeding occurs from February to October, with a peak in May to August. Nests are typically constructed in large bushes or trees, open in an isolated stand. During the non-breeding season, may roost communally. Fairly common permanent resident in Napa County.	Low potential. White-tailed kites are known to occur year-round in the valley and grasslands habitat of Napa County. This species has reported occurrences within 5 miles of the project site. Kites may nest in surrounding areas, riparian areas along Fagan Creek to the north, and wetlands to the east. However, suitable breeding habitat is not present within the project site. Kites may forage in the area on a limited basis.
American Peregrine Falcon *Falco peregrinus anatum*	Delisted	The peregrine falcon is the most widely distributed bird of prey, with 16 recognized subspecies. It is the world's fastest bird, with diving speeds of 186 mph, and feeds primarily on birds. It forages in woodlands, wetlands, forests, and coastal habitats, as well as agricultural areas and cities. Nests are typically constructed on cliff ledges, snags or old nests of other birds, and manmade structures. No nest is built; eggs are laid in a simple scrape. Birds may mate for life.	No potential. Peregrine falcons are known from mountainous areas in Napa County. There are no reported occurrences of this species within 5 miles of the project. Species reported on USFWS IPac list. Suitable habitat is not present within the project site.
Saltmarsh Common Yellowthroat *Geothlypis trichas sinuosa*	BCC, SSC	The San Francisco or saltmarsh common yellowthroat is one of 13 recognized subspecies. It is endemic to the greater San Francisco Bay region, where it occupies wetlands with adjacent riparian thickets. This species is insectivorous and forages for insects and spiders. It constructs an open cup nest that is well-concealed near the ground in grasses and herbaceous vegetation. Breeding occurs from mid-March to late July and occurs year-round within its breeding range.	No potential. Saltmarsh common yellowthroats are reported in the tidal areas along the lower Napa River. Yellowthroats may occasionally nest in surrounding areas, riparian areas along Fagan Creek to the north, and wetlands to the east. However, suitable foraging and nesting habitat is not present within the project site.

Common Name *Scientific Name*	Listing Status[7]	Habitat Requirements	Local Observations[8] and Potential for Occurrence within the Project Site
California Black Rail *Laterallus jamaicensis coturniculus*	ST, FP	A small, secretive marsh bird. It is rarely seen and prefers running in the cover of marsh vegetation rather than flying. There are two subspecies of black rail in the US. The California subspecies occurs in coastal central California, including the San Francisco Bay area and a few other sites in the State. This subspecies occurs as a year-round resident in both fresh and saltwater marshes. It is distinguished from other subspecies by its shorter bill, and brown crown and upper back. Nests are placed on the ground in dense vegetation. The black rail is an opportunistic feeder and consumes a wide range of food.	No potential. California black rails are reported in the tidal areas along the lower Napa River. Suitable marsh habitat is not present within the project site.
San Pablo Song Sparrow *Melospiza melodia samuelis*	BCC, SSC	The San Pablo song sparrow is a subspecies of song sparrow occurring in the north San Francisco Bay and San Pablo Bay. They occur in tidal marsh habitats with dense vegetation for nesting, song perches, and cover from predators. They are generally associated with high marsh areas, particularly pickleweed. This subspecies occurs year-round and is nonmigratory. It breeds from early March to July. Habitat loss, fragmentation, and habitat degradation are the primary threats to this subspecies.	No potential. San Pablo song sparrow are reported in the tidal areas along the lower Napa River. This subspecies distribution is highly localized. Song sparrows were documented within the project site, their location coincides with the subspecies *M. m. gouldii* and not *M. m. samuelis*. Based on the location and habitat composition, San Pablo Song Sparrow are not likely present within the project site.
California Ridgway's Rail *Rallus obsoletus obsoletus*	FE, SE, FP	Previously known as the clapper rail, the Ridgway's rail is one of three subspecies in California. They occupy salt and brackish marshes within the San Francisco and San Pablo Bays. They rely on marsh plants such as pickleweed (*Salicornia virginica*) and Pacific cordgrass (Spartina foliosa) for breeding and foraging. They are omnivores and animals comprise a bulk of their diet. Breeding occurs from mid-March through July, with peak activity in late June. They are very secretive and difficult to observe.	No potential. California Ridgway's rails are reported in the tidal areas along the lower Napa River. Suitable marsh habitat is not present within the project site.

Common Name *Scientific Name*	Listing Status[7]	Habitat Requirements	Local Observations[8] and Potential for Occurrence within the Project Site
Northern Spotted Owl *Strix occidentalis caurina*	FT, ST	Occupies old-growth forests in the northern range and mixed old-growth and younger forest types in the southern range. Consumes primarily small mammals, other birds, and insects. It requires a large territory size for nesting and foraging. Nests in cavities or platforms in large trees. Breeding season occurs from early March through September. Permanent year-round resident in Sonoma County in old-growth and mixed forest habitats. Spotted owls have experienced a population decline due to the loss and degradation of existing mature and old-growth forests and, most recently, the establishment of barred owls in the west.	No potential. Spotted owls are known to occur in forested locations to the northwest, but not within 5 miles of the project. Suitable forested habitat is not present within the project site.
Fish			
Green Sturgeon - Southern DPS Acipenser medirostris	FT, SSC	An anadromous fish with two genetically identifiable populations. Southern DPS green sturgeon are found in the Sacramento and San Joaquin Rivers and Delta. Northern DPS are known to spawn in the Klamath River, California, and Rogue River, Oregon. Migrates into freshwater reaches of larger coastal rivers in March-June. Spawn in cool, deep, swift-flowing river reaches with gravel and cobble bottoms. Adults typically move back to the ocean after spawning. Young rear in freshwater and then move downstream into estuarine habitats at approximately one year. Reach reproductive maturity at 15 years, and live up to 60 years.	No potential. Green sturgeon are known from the San Francisco Bay Estuary. Suitable aquatic habitat is not present within the project site.
Tidewater Goby *Eucyclogbius newberryi*	FE, SSC	Small benthic fish of coastal lagoons, estuaries, and marshes from Del Norte County south to San Diego County. Their habitat is characterized by brackish water in shallow lagoons, estuaries, and lower stream reaches where the water is fairly still but not stagnant. They typically occur in the upper estuary within the fresh-saltwater interface. They are absent from areas where the coastline is steep, and streams do not form lagoons or estuaries. A small, elongated fish rarely exceeding	No potential. There are no reported occurrences of tidewater goby within 5 miles of the project. Species reported on USFWS IPac list. Suitable aquatic habitat is not present within the project site.

Common Name *Scientific Name*	Listing Status[7]	Habitat Requirements	Local Observations[8] and Potential for Occurrence within the Project Site
		two inches in length. Males construct a spawning burrow in the substrate, but females guard and defend the chamber until breeding commences. Males remain at the burrow after spawning to guard the eggs until they hatch. Gobies feed on bottom-dwelling invertebrates. They are an annual species with rapid growth and frequent spawning.	
Steelhead - Central California Coast DPS *Oncorhynchus mykiss*	FT, SSC	Steelhead transition from freshwater, tidal zones, to the ocean during different life stages. Steelhead immigrate during high flow events and sand bar breaches between December and April and spawn shortly after reaching their spawning grounds. Juvenile freshwater residence can range from one to three years depending on environmental conditions and growth rates. Adults typically spend one to two years in the ocean before returning to their natal streams to spawn. Steelhead may spawn more than one season before dying; however, the majority of adults only spawn one time.	No potential. Steelhead are known from the San Francisco Bay Estuary and the Napa River. Suitable aquatic habitat is not present within the project site.
Longfin Smelt *Spirinchus thaleichthys*	FC – (Endangered), ST	Small fish found along the Pacific coast from Alaska to California Estuary. In California they use a variety of habitats from nearshore waters, to estuaries and lower portions of freshwater streams. A slender-bodied fish, reaching 90-124 mm. A pelagic (lives in the open water column away from the bottom) and euryhaline species (tolerant of a wide salinity range). They consume primarily opossum shrimp but eat copepods and other small crustaceans. Spawning occurs from November through May, with a peak in February through April. Longfin smelt is semelparous, living two, sometimes three years, and dying after spawning.	No potential. Longfin smelt are known from the San Francisco Bay Estuary. Suitable aquatic habitat is not present within the project site.
Invertebrates			
Western Bumble Bee *Bombus occidentalis*	Candidate SE	The western bumble bee has a broad range extending from Canada to northern Mexico. Historically, it occurred in a range of habitats within California (shrublands, chaparral, gardens, and urban parks) from sea level to high elevations. It is currently	No potential. The western bumble bee is known from a 1962 collection in the Vallejo hills. This species is not known to currently occur within Napa County (CDFW 2023b). Given the lack of Napa

Common Name *Scientific Name*	Listing Status[7]	Habitat Requirements	Local Observations[8] and Potential for Occurrence within the Project Site
		restricted to coastal grasslands in northern California and high-elevation meadows, forests, and riparian areas in the Sierra Nevada and Cascade Range. It lives in small, highly social, and interdependent colonies. They are a generalist forager.	County sightings, historic land disturbance, and current plant composition, suitable habitat is not present within the project site.
Vernal Pool Fairy Shrimp *Branchinecta lynchi*	FT	A small freshwater crustacean measuring ½ to 1-inches. It occurs in a variety of vernal pool habitats, from small to large pools in California and southern Oregon. It was first identified in 1990. Fairy shrimp cysts (eggs) can withstand extensive periods of dry conditions, cold, and heat. Eggs hatch after pools begin to fill; however, they can survive several years without water. They are opportunistic filter feeders. The average life span is 91 days. They are currently found in 32 counties across California's Central Valley, Central Coast, and southern California, and Jackson County in southern Oregon.	No potential. Vernal pool fairy shrimp are reported near the south end of the Napa County Airport; this sighting is within 1 mile of the project site. Suitable vernal habitat is not present within the project site.
Monarch Butterfly-California Overwintering Population *Danaus plexippus plexippus pop.1*	FC	Large, brightly colored butterfly. Two populations are separated by the Rocky Mountains. Populations along the California coast overwinter within 1.5 miles of the coastline. Overwintering sites are typically dominated by eucalyptus but are also found on Monterey pine, Monterey cypress, western sycamore, coast redwood, and coast live oak. Requires good solar radiation exposure and wind shelter. Arrives at overwintering grounds in September-October and disperses by February-March. Migrates to inland locations during the breeding season. Requires native narrow-leaf milkweed (*Asclepias fascicularis*) or showy milkweed (*A. speciosa*) for egg deposition. Larvae develop on milkweed plants.	Low potential. Monarch butterflies are known to overwinter in the coastal regions. Suitable overwintering habitat is not present on the project site. Monarchs can breed in inland locations, but suitable larval host plants are not present. Monarchs may occur in the region on a limited basis as a seasonal migrant. Plants on the project site provide limited adult nectar sources. Monarchs would not be expected to occur on the project site at any frequency.

Common Name *Scientific Name*	Listing Status[7]	Habitat Requirements	Local Observations[8] and Potential for Occurrence within the Project Site
California Freshwater Shrimp *Syncaris pacifica*	FE, SE	Endemic to Marin, Sonoma, and Napa Counties. Occur in low elevation (less than 380 feet), low gradient streams (less than 1%) with perennial flow, or intermittent streams with perennial pools. Streams are generally structurally diverse with undercut banks, overhanging woody debris and vegetation, and exposed roots. Reproduction occurs once a year in the fall. Females retain eggs through the winter and remain attached to the abdominal swimming legs until May or early July. Forage on fine particulate organic matter, but have been observed feeding on dead fish as well.	No potential. California freshwater shrimp are known from the Napa River and tributaries. Suitable aquatic habitat is not present within the project site.
Mammals			
Pallid Bat *Antrozous pallidus*	SSC	Grassland, shrubland, forest, and woodland habitats from sea level up through mixed coniferous forests. Found from south-central British Colombia to central Mexico and Cuba. Most common in open, dry habitats with rocky areas for roosting. A social species forming small colonies. Roosting sites include caves, mines, crevices, buildings, and hollow trees during the day, and more open sites are used at night. Feed on a variety of insects and arachnids; most prey are taken on the ground. The mating season ranges from October to February. One to three (typically twins) pups are born from April to July. A yearlong resident throughout most of its range.	Low potential. The pallid bat is reported from the 1990s in a house near Cuttings Wharf Road; this sighting is approximately 3.5 miles from the project site. It is possible that bats may roost within some of the buildings and structures within the project site; however, given the high levels of human activity and existing disturbance, the potential is low. Bats may forage over the project site.
Salt Marsh Harvest Mouse *Reithrodontomys raviventris*	FE, SE, FP	Endemic to the San Francisco Bay Estuary. Occupies salt and brackish marshes and adjacent uplands. Prefers habitat dominated by pickleweed, alkali bulrush, and fat hen. Pickleweed is their primary food source. Breeding occurs from spring through autumn with up to two litters per year. Nests are constructed in wetland habitats with dense cover. Can live up to 18 months or possibly longer. Two subspecies are recognized, northern and southern, based on range and morphological characters.	No potential. Salt marsh harvest mice are reported in the tidal areas along the lower Napa River. Suitable marsh habitat is not present within the project site.

Common Name *Scientific Name*	Listing Status[7]	Habitat Requirements	Local Observations[8] and Potential for Occurrence within the Project Site
American Badger *Taxidea taxus*	SSC	Common in open grassland habitats may also occur in forest meadows, marshes, and brushy areas, with friable soils for digging for prey. They are fossorial carnivores. Prey includes pocket gophers, ground squirrels, moles, mice, and voles in this region. They will also eat snakes, birds, and other wildlife. They are typically nocturnal and do not hibernate, but become less active in winter. Mating occurs in late summer and early fall. Young are born from late March to early April. They dig their own burrows or enlarge other animal burrows.	No potential. The American badger is known from a 1911 collection southwest of Napa and approximately 3 miles northwest of the project site. Additional sightings are reported from the 1980s in CDFW's unprocessed CNDDB data. Evidence of American badgers was not observed during repeat surveys of the site. Given the lack of recent confirmed sightings within the general vicinity of the site, existing development, and high levels of vehicular traffic in the general area, suitable habitat is not present within the project site.

APPENDIX E

ARCHAEOLOGICAL SURVEY REPORT (CONFIDENTIAL)

Alta Archaeological Consulting prepared the Archaeological Survey Report for the Project. The findings of the report and additional cultural resource details are confidential so the report will not be released as part of this Environmental Impact Report. The Archaeological Survey Report is on file at the City of Napa.

APPENDIX F

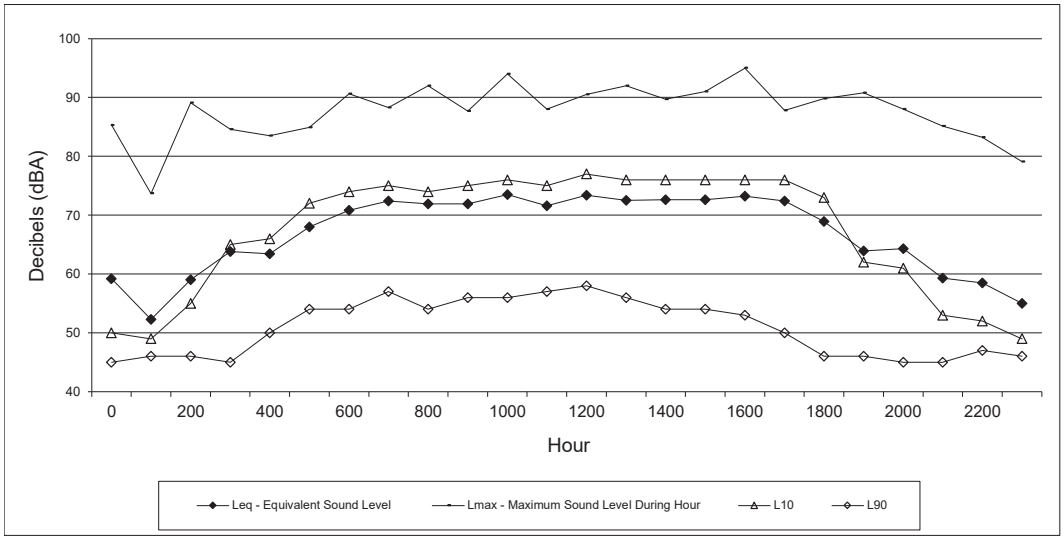
NOISE SUPPORTING INFORMATION

Noise Appendix

Long Term Noise Measurement Graphs for Sites 1 and 2

RCNM Modeling Results

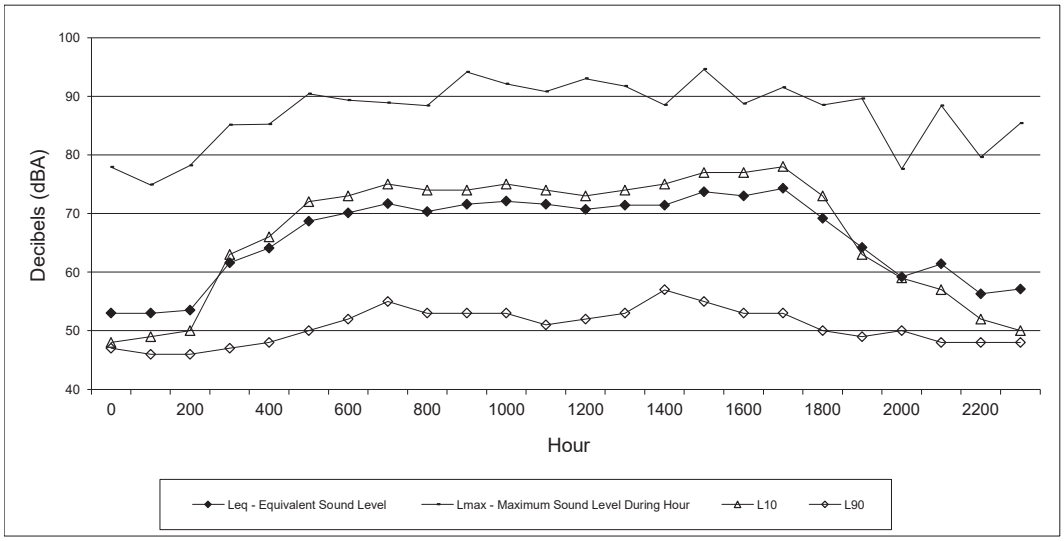
RCH GROUP
planning & environmental consulting



Site 1: Northeastern NMDF boundary, attached to a tree, 60 feet south of intersection of Tower Road and Devlin Road
Tuesday April 2, 2024

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L10	L90
0	59	85	50	45
100	52	74	49	46
200	59	89	55	46
300	64	85	65	45
400	63	84	66	50
500	68	85	72	54
600	71	91	74	54
700	72	88	75	57
800	72	92	74	54
900	72	88	75	56
1000	74	94	76	56
1100	72	88	75	57
1200	73	91	77	58
1300	73	92	76	56
1400	73	90	76	54
1500	73	91	76	54
1600	73	95	76	53
1700	72	88	76	50
1800	69	90	73	46
1900	64	91	62	46
2000	64	88	61	45
2100	59	85	53	45
2200	59	83	52	47
2300	55	79	49	46

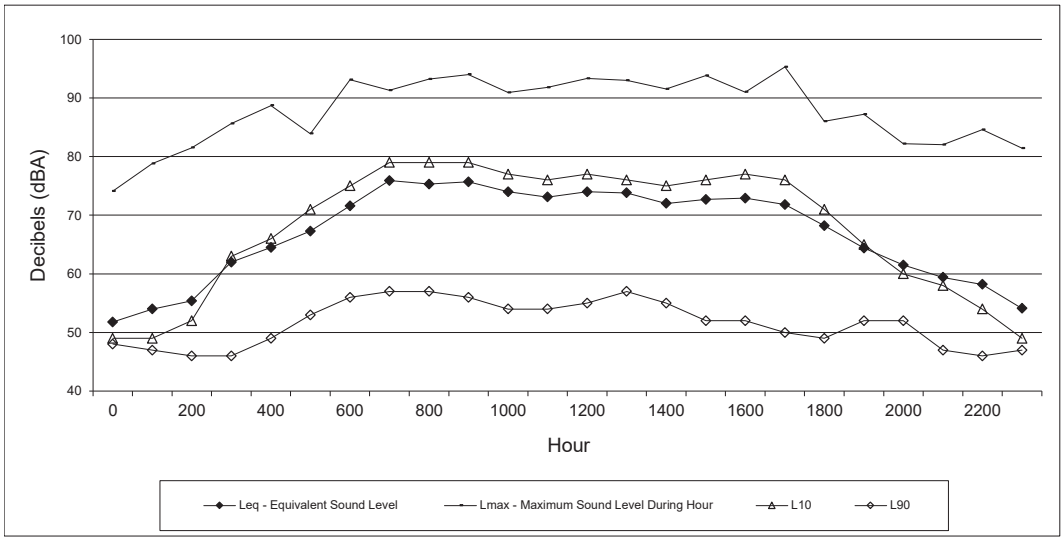
CNEL 73



Site 1: Northeastern NMDF boundary, attached to a tree, 60 feet south of intersection of Tower Road and Devlin Road
Wednesday April 3, 2024

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L10	L90
0	53	78	48	47
100	53	75	49	46
200	54	78	50	46
300	62	85	63	47
400	64	85	66	48
500	69	90	72	50
600	70	89	73	52
700	72	89	75	55
800	70	88	74	53
900	72	94	74	53
1000	72	92	75	53
1100	72	91	74	51
1200	71	93	73	52
1300	71	92	74	53
1400	71	89	75	57
1500	74	95	77	55
1600	73	89	77	53
1700	74	92	78	53
1800	69	89	73	50
1900	64	90	63	49
2000	59	78	59	50
2100	61	88	57	48
2200	56	80	52	48
2300	57	85	50	48

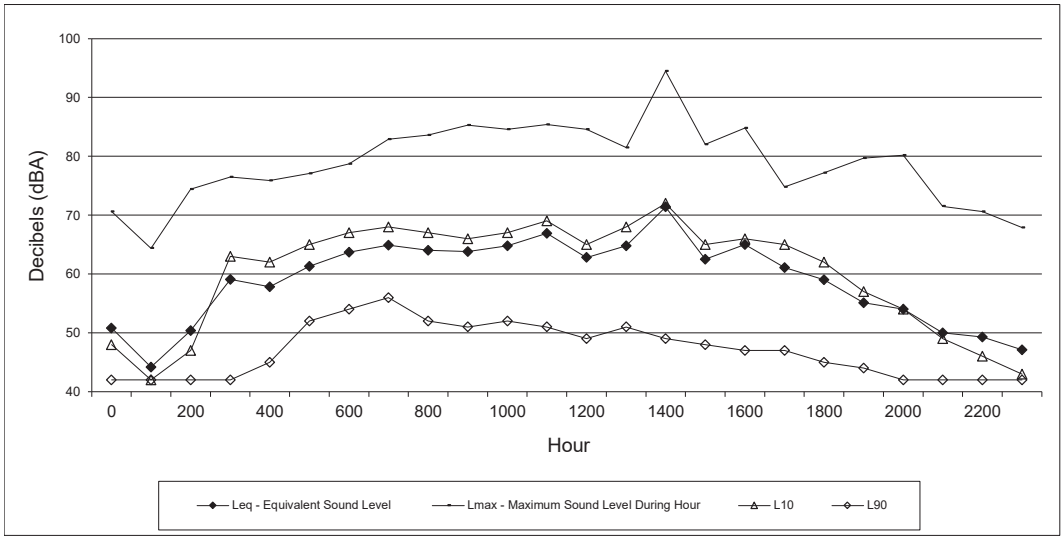
CNEL: 73



Site 1: Northeastern NMDF boundary, attached to a tree, 60 feet south of intersection of Tower Road and Devlin Road
Thursday April 4, 2024

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L10	L90
0	52	74	49	48
100	54	79	49	47
200	55	82	52	46
300	62	86	63	46
400	65	89	66	49
500	67	84	71	53
600	72	93	75	56
700	76	91	79	57
800	75	93	79	57
900	76	94	79	56
1000	74	91	77	54
1100	73	92	76	54
1200	74	93	77	55
1300	74	93	76	57
1400	72	92	75	55
1500	73	94	76	52
1600	73	91	77	52
1700	72	95	76	50
1800	68	86	71	49
1900	64	87	65	52
2000	62	82	60	52
2100	59	82	58	47
2200	58	85	54	46
2300	54	81	49	47

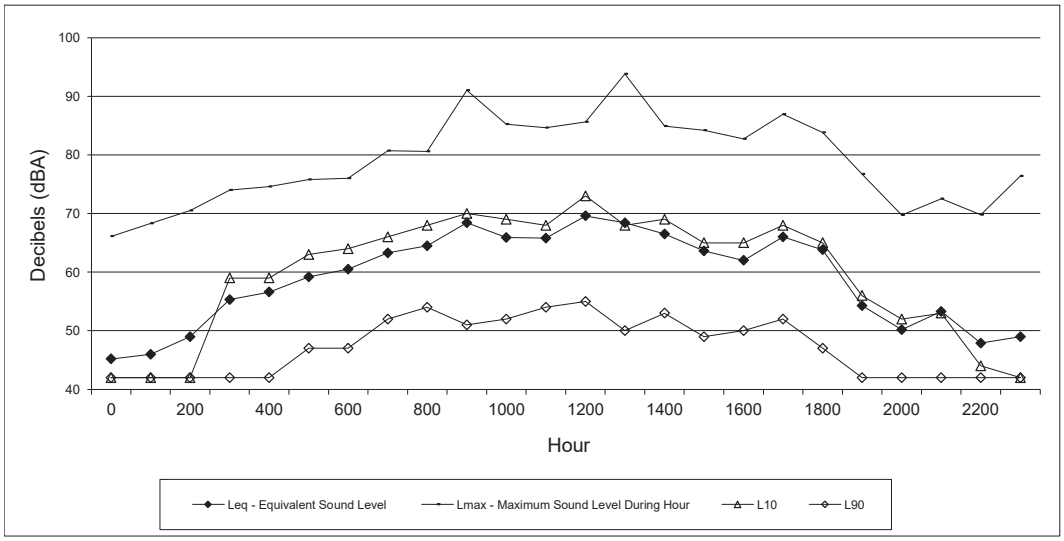
CNEL: 74



Site 2: Southeastern NMDF boundary, attached to a fence, 60 feet west of centerline of Devlin Road
Tuesday April 2, 2024

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L10	L90
0	51	71	48	42
100	44	64	42	42
200	50	74	47	42
300	59	77	63	42
400	58	76	62	45
500	61	77	65	52
600	64	79	67	54
700	65	83	68	56
800	64	84	67	52
900	64	85	66	51
1000	65	85	67	52
1100	67	85	69	51
1200	63	85	65	49
1300	65	82	68	51
1400	71	95	72	49
1500	63	82	65	48
1600	65	85	66	47
1700	61	75	65	47
1800	59	77	62	45
1900	55	80	57	44
2000	54	80	54	42
2100	50	72	49	42
2200	49	71	46	42
2300	47	68	43	42

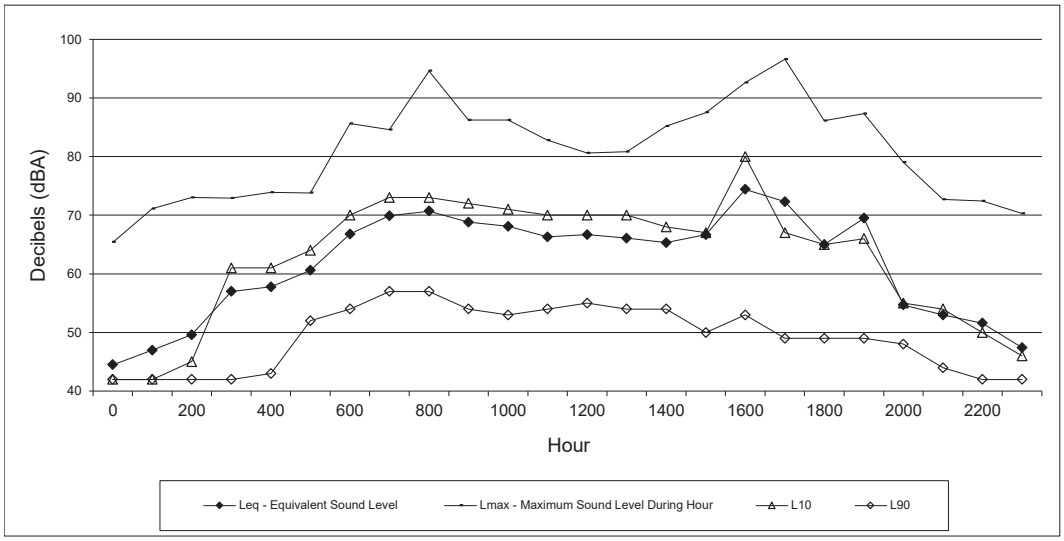
CNEL 66



Site 2: Southeastern NMDF boundary, attached to a fence, 60 feet west of centerline of Devlin Road
Wednesday April 3, 2024

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L10	L90
0	45	66	42	42
100	46	68	42	42
200	49	71	42	42
300	55	74	59	42
400	57	75	59	42
500	59	76	63	47
600	61	76	64	47
700	63	81	66	52
800	65	81	68	54
900	68	91	70	51
1000	66	85	69	52
1100	66	85	68	54
1200	70	86	73	55
1300	68	94	68	50
1400	67	85	69	53
1500	64	84	65	49
1600	62	83	65	50
1700	66	87	68	52
1800	64	84	65	47
1900	54	77	56	42
2000	50	70	52	42
2100	53	73	53	42
2200	48	70	44	42
2300	49	76	42	42

CNEL: 65



Site 2: Southeastern NMDF boundary, attached to a fence, 60 feet west of centerline of Devlin Road
Thursday April 4, 2024

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L10	L90
0	45	65	42	42
100	47	71	42	42
200	50	73	45	42
300	57	73	61	42
400	58	74	61	43
500	61	74	64	52
600	67	86	70	54
700	70	85	73	57
800	71	95	73	57
900	69	86	72	54
1000	68	86	71	53
1100	66	83	70	54
1200	67	81	70	55
1300	66	81	70	54
1400	65	85	68	54
1500	67	88	67	50
1600	74	93	80	53
1700	72	97	67	49
1800	65	86	65	49
1900	70	87	66	49
2000	55	79	55	48
2100	53	73	54	44
2200	52	72	50	42
2300	47	70	46	42

CNEL: 69

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 04/09/2024
Case Description: Construction Noise - Napa Biomass Project

**** Receptor #1 ****

Description	Baselines (dBA) Land Use	Daytime	Evening	Night
Construction at nearest industrial property line - 70 feet	Industrial	75.0	70.0	65.0

Equipment Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	70.0	0.0
Front End Loader	No	40		79.1	70.0	0.0
Dump Truck	No	40		76.5	70.0	0.0

Results

Calculated (dBA)	Day		Evening		Night		Noise Limits (dBA)		Noise Limit Exceedance (dBA)			
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq

Excavator		77.8	73.8	N/A	N/A	N/A		
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		76.2	72.2	N/A	N/A	N/A		
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck		73.5	69.5	N/A	N/A	N/A		
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	77.8	77.0	N/A	N/A	N/A		
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX G

TRAFFIC GENERATION ANALYSIS

PHA Transportation Consultants
2711 Stuart Street Berkeley CA 94705
Pangho1@yahoo.com
(510) 848-9233

Traffic Generation Analysis

Napa Renewable Resource Project (NRRP) 2.0

July 2025

Introduction

The Napa Materials Diversion Facility (NMDF) is an 18.6-acre fully permitted Solid Waste Facility located at 820 Levitin Way that currently receives and processes all solid waste, compostable and recyclable materials generated within the City that are collected by the City's authorized operator Napa Recycling & Waste Services (NRWS). The NMDF also receives, and processes materials delivered by haulers servicing surrounding jurisdictions (such as unincorporated Napa County) and by private (self-haul) customers. NMDF operates under Solid Waste Facility Permit (SWFP) 28-AA-0030, which limits the facility to a maximum tonnage of 760 tons per day (tpd) and 386 waste hauling vehicles per day.

The proposed Napa Renewable Resources Project 2.0 (NRRP 2.0, the "Project") consists of an increase of the NMDF site's overall permitted tonnage for all waste types to a weekly average of 1,000 tpd with a daily peak of 1,500 tpd, the construction and operation of a biomass conversion facility (BCF), and the construction and operation of an anaerobic digestion facility (ADF) as part of an initiative to enhance sustainable waste management at the NMDF site. The proposed daily permitted tonnage increase is reflective of recent equipment upgrades at the NMDF site (e.g., organics shredder, trommel screens, optical sorters, sorting robots, etc.) that have improved processing efficiency and would provide accommodations for peak days that have higher tonnage of certain waste streams (e.g., dirt, rock, grape pomace, leaf fall season, etc.).

The proposed increase of NMDF's overall permitted tonnage for all waste types to a weekly average of 1,000 tpd with a daily peak of 1,500 tpd would not require increasing the facility's permitted maximum daily vehicle count of 386 waste hauling vehicles per day. Employee and other maintenance or visitor vehicles are not included in the vehicle count limit.

Receipt of refuse/waste/feedstock is permitted 7 days per week with commercial vehicles limited to 5 a.m. to 5 p.m. and public vehicles limited to 8 a.m. to 5 p.m. The Project does not propose any changes to NMDF hours of operation. Currently, approximately 40 to 50 employees and maintenance workers travel to the site each day, with most employees arriving at 4:30 a.m.

Attachment A - C includes the Regional Project Location, the existing NMDF Site Plan (showing existing vehicle access), and the proposed BCF Site Plan (proposed secondary vehicle access).

Existing Conditions and Operations

Existing 2023 vehicle counts provided by the facility indicated October was the month with the highest vehicle count at 6,317 total waste hauling vehicles or 12,634 trips, representing inbound and outbound trips. The average daily waste hauling vehicle count during October 2023 was 204 (6,317 vehicles /31 days).

Vehicle mix varies day-to-day for the facility. Existing vehicle count data from October 2023 indicated self-haul (pickup trucks) account for 41% of all wase hauling vehicles. Collection route trucks account for 44% and transport trucks account for 15%.

The facility currently has between 40 and 50 employees and maintenance workers traveling to the site each day.

NRWS staff indicated most site-related traffic uses Highway 29, Tower Road, and S. Kelly Road/Devlin Road to travel to and from the facility.

Future Operation with 1,000 Tons per Day (Weekly Average)

The added 240 tpd (on average) of daily waste received would be transported by route collection trucks or transport trucks; the added tonnage would not be expected to increase self-haul vehicles.

Future incoming waste associated with the average 240 tpd increase would arrive at the facility via 10-ton garbage collection trucks or 20-ton transfer trucks. The vehicle mix would vary daily and was assumed to be the same as for the existing condition (roughly three garbage collection trucks to one transfer truck). Below are the vehicle mix assumptions for the added 240 tpd.

100 tpd / (20 tons/truck) = 5 transport trucks (peak daily)
140 tpd / (10 tons/truck) = 14 collection trucks (peak daily)
240 tpd = 19 heavy trucks (peak daily)

As indicated above, assuming the same ratio of garbage collection trucks to transport trucks as the existing condition (three garbage collection trucks to one transfer truck), the estimated average daily increase associated with the 240 tpd increase would result in an increase of 19 waste hauling vehicles (heavy trucks) per day.

It should be noted that the expansion of the BCF would eliminate 4 average daily truckloads (20-ton transfer trucks) of processed wood waste and compost overs that is currently sent to

Woodland and Potrero. Thus, the BCF would result in the net reduction of approximately 4 heavy trucks daily.

The Project would also require one additional light heavy duty diesel truck (miscellaneous business) and one diesel fuel truck for transporting fuels to the site. **Therefore, the Project would result in a net increase of approximately 17 average daily heavy trucks.**

Based on studies of traffic circulation experience and the assumption of 10% traffic occurs during the peak hour, the proposed Project would result in an additional 1 to 2 heavy trucks during the peak hour on an average day.

17 heavy trucks X 10% (Peak hour) = 1.7 heavy trucks during peak hour (average day)

The net increase of approximately 17 average daily heavy trucks that would result from the proposed Project fit well within the existing permitted level of 386 waste hauling vehicles per day and would not require an increase in permitted vehicles.

Future Operation with 1,500 Tons per Day (Peak Daily)

The existing NMDF is limited to a permitted peak daily tonnage limit of 760 tpd. Although the proposed Project would only increase the incoming tonnage limit by an average of 240 tpd, waste approximately double the current permitted limit could be received on any given day. If the amount of waste received approached the proposed 1,500 tpd peak daily limit, this would result in much lower tonnage days throughout a given week because the facility would also be restricted to a 1,000 tpd weekly average.

Future incoming waste associated with the peak daily increase of 740 tpd would arrive at the facility via 10-ton garbage collection trucks or 20-ton transfer trucks. The vehicle mix would vary daily and was assumed to be the same as for the existing condition (roughly three garbage collection trucks to one transfer truck). Below are the vehicle mix assumptions for the added 740 tpd on a peak day.

308 tpd / (20 tons/truck) = 15 transport trucks (peak daily)
432 tpd / (10 tons/truck) = 43 collection trucks (peak daily)
740 tpd = 58 heavy trucks (peak daily)

As indicated above, assuming the same ratio of garbage collection trucks to transport trucks as the existing condition (three garbage collection trucks to one transfer truck), the estimated peak daily tonnage increase would result in an increase of 58 waste hauling vehicles (heavy trucks) on a peak day.

It should be noted that the expansion of the BCF would eliminate 4 average daily truckloads (20-ton transfer trucks) of processed wood waste and compost overs that is currently sent to

Woodland and Potrero. Thus, the BCF would result in the net reduction of approximately 4 heavy trucks daily.

The Project would also require one additional light heavy duty diesel truck (miscellaneous business) and one diesel fuel truck for transporting fuels to the site. **Therefore, the Project would result in a net increase of approximately 56 peak daily heavy trucks.**

Based on studies of traffic circulation experience and the assumption of 10% traffic occurs during the peak hour, the proposed Project would result in an additional 5 to 6 heavy trucks during the peak hour on a peak day.

56 heavy trucks X 10% (Peak hour) = 5.6 heavy trucks during peak hour (peak day)

The net increase of approximately 56 heavy trucks on a peak day that would result from the proposed Project fit well within the existing permitted level of 386 waste hauling vehicles per day and would not require an increase in permitted vehicles.

VMT Impacts

The facility currently has between 40 and 50 employees and maintenance workers traveling to the site each day and is expected to generate up to 100 daily passenger vehicle trips in addition to the above waste hauling trips. The Project is expected to add six new employees, or a maximum of 12 daily trips, for future BCF and ADF operations.

The proposed expansion would not trigger CEQA's Vehicle Miles Travel (VMT) analysis requirement. First, the added traffic associated with the increased daily tonnage is all trucks, which is exempted from VMT analysis according to the California office of Planning and Research (OPR). The OPR directive specially focuses on the need to evaluate residential and employment-based travel, either from the standpoint of home-based trips or through evaluation of commute trips associated with employment centers. Consistent with Section 15604.3 of the State CEQA Guidelines, impacts from regional truck traffic are not included in the VMT estimates, but are considered from an operational standpoint as they relate to safety. Second, the Project would add up to 6 employees or 12 daily trips, which is under the 110 daily-employee-trip screening threshold for VMT analysis. Therefore, the Project would result in a less-than-significant VMT impact.

Site Access and Site Distance

The Project would add a new private access driveway along Devlin Road to access the parcel to the south (BCF) to be annexed into the City (**See Attachment C**). The new access driveway would be for employees and maintenance workers but could also accommodate commercial vehicles. However, most commercial vehicles are expected to continue to use the current access at Levitin Way (**Attachment B**). The proposed access driveway location would provide in

excess of 200 feet of stopping sight distances in both directions. The posted speed limit on Delvin Road is 35 mph and sight distance requirement is about 150 feet.

Emergency Vehicle Access

Internal access will be provided between the existing NMDF and the parcel to the south Thus, the new private access driveway along Devlin Road to access the parcel to the south to be annexed into the City will improve emergency vehicle access to the existing NMDF.

Pedestrian, Bicycle and Transit

The Project site and the land uses in the vicinity are industrial and there are no bike lanes or paved pedestrian sidewalks near the Project site along Devlin Road and Tower Road. According to “Vine” the Napa County Public Transit Operator, there are no public transit services in the Project area. The employees of the facility will drive to work while customers will mostly drive their recycle materials in trucks. The Project is not expected to have an impact on transit service and pedestrian and bicycle activities.

Attachments

A. Project Site Location Map
B. Existing NMDF Site Plan
C. Proposed Biomass Conversion Facility Site Plan



Source: RCH Group; Google Earth Pro, 2023

Attachment A
Regional Site Location

RCH GROUP
planning & environmental consulting

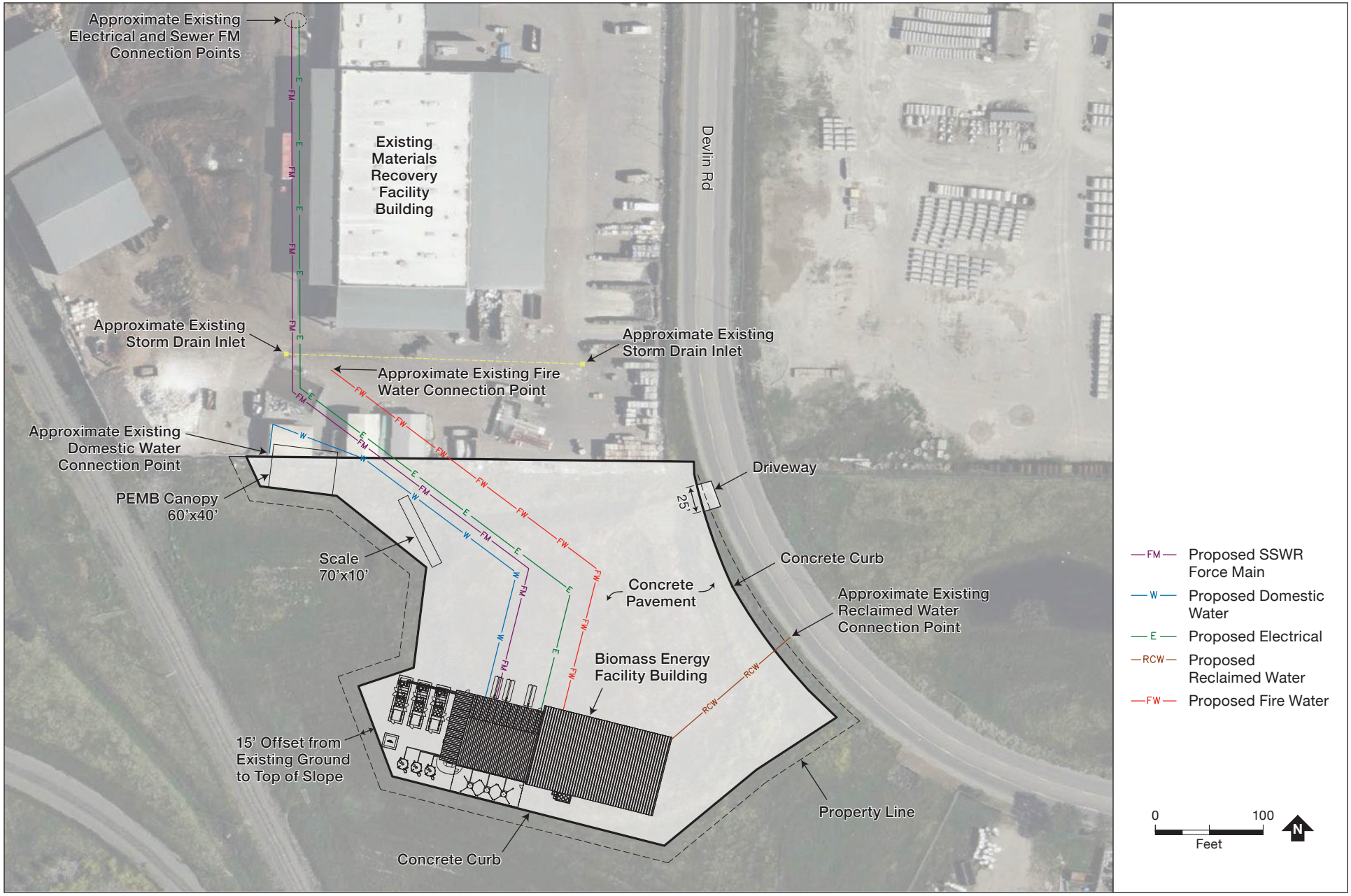


Source: Edgar & Associates, 2023

Attachment B

Existing NMDF Site Plan

RCH GROUP
planning & environmental consulting



Source: Cunningham Engineering, 2025

Attachment C

Biomass Conversion Facility Site Plan

RCH GROUP
planning & environmental consulting

APPENDIX H

FAA AERONAUTICAL STUDY

Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2025-AWP-8897-OE

Issued Date: 07/29/2025

WILL KELLEY
NAPA RECYCLING AND WASTE SERVICES
PO Box 239
NAPA, CA 94559

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure: Power Plant Napa Biomass Facility
County, State: Napa, California

Collected Point(s):

Label	Latitude	Longitude	SE	DET AGL	AMSL
North West Corner	38-12-29.46N	122-15-51.50W	48 Ft	45 Ft	93 Ft
South West Corner	38-12-28.55N	122-15-51.44W	48 Ft	45 Ft	93 Ft
South East Corner	38-12-29.34N	122-15-48.99W	49 Ft	45 Ft	94 Ft
North East Corner	38-12-28.48N	122-15-48.88W	49 Ft	45 Ft	94 Ft

In accordance with the provisions of 49 U.S.C., Section 44718 and as applicable Title 10 of the Code of Federal Regulations, part 183a, this aeronautical study was sent to the Military Aviation and Installation Assurance Clearinghouse established by the Secretary of Defense for review. The results of that review resulted in a finding of no risk to national security.

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M Change 1.

This determination expires on 01/29/2027 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at 1-816-329-2525, or natalie.schmalbeck@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2025-AWP-8897-OE.

Signature Control No: 661669460-671699093 (DNE)
natalie.schmalbeck@faa.gov
Technician

Attachment(s)
Map(s)

Verified Map for ASN 2025-AWP-8897-OE

