

VALERO CRUDE BY RAIL PROJECT

Initial Study/Mitigated Negative Declaration
Use Permit Application 12PLN-00063

Prepared for
City of Benicia

May 2013



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Mitigated Negative Declaration

Date of this Notice: May 31, 2013

Lead Agency: City of Benicia
Community Development Department
250 East L Street
Benicia, CA 94510

Project Title: Valero Crude by Rail Project
Project Sponsor: Valero Refining Company-California
Contact Person: Don Cuffel
Telephone: 707-745-7545

Project Location: 3400 East Second Street
Benicia, CA 94510

Assessor's Parcel Numbers: 0080110480

City and County: City of Benicia, Solano County

Project Description:

The proposed Valero Crude by Rail Project would allow the Valero Benicia Refinery (Refinery) access to additional North American-sourced crude oil for delivery to the Refinery by railroad. The Project would involve the installation and modification of Refinery non-process equipment that would allow the Refinery to receive a portion of its crude oil deliveries by railcar replacing equal quantities of crude currently being delivered to the Refinery by marine vessel. Valero intends to replace up to 70,000 barrels per day of the crude oil currently supplied to the Refinery by marine vessel with an equivalent amount of crude oil transported by rail cars. The crude oil to be transported by rail cars is expected to be of similar quality compared to existing crude oil imported by marine vessels. Crude delivered by rail would not displace crude delivered to the Refinery by pipeline.

The City of Benicia, serving as Lead Agency under the California Environmental Quality Act (CEQA), is completing the required environmental review for Project pursuant to CEQA, prior to approval of the project. In accordance with Section 15071 of the CEQA Guidelines, the City has prepared an Initial Study to determine the potential environmental consequences of approval and implementation of the Project.

Basis for Mitigated Negative Declaration Recommendation:

The City of Benicia finds that although the proposed project could have a significant effect on the environment, **there will not be a significant effect in this case because mitigation measures have been added to the project that avoid or reduce all impacts to a less than significant level.** This determination is based upon the criteria of the Guidelines of the State Secretary for Resources Sections 15064 (Determining the Significance of the Environmental Effects Caused by a Project), 15065 (Mandatory Findings of Significance), and 15070 (Decision to Prepare a Negative or Mitigated Negative Declaration), and the mitigation measures listed below.

Mitigation Measures: Mitigation measures are included in this project to avoid potentially significant effects (see below).

Air Quality

Mitigation Measure AIR-1: Implement BAAQMD Basic Mitigation Measures. Valero and/or its construction contractors shall comply with the following applicable BAAQMD basic control measures during Project construction:

- All exposed dirt non-work surfaces (e.g., parking areas, staging areas, soil piles, and graded areas, and unpaved access roads) shall be watered two times a day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California Airborne Toxics Control Measure Title 13, Section 2485 of California of Regulations). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- A publicly visible sign with the telephone number and person to contact at the City of Benicia regarding dust complaints shall be posted throughout construction. Valero and/or contractor shall respond and take corrective action within 8 hours of notification by the City. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

Biological Resources

Mitigation Measure BIO-1: Project construction activities should avoid the nesting season of February 15 through August 31, if feasible. If seasonal avoidance is not possible then no sooner than 30 days prior to the start of any Project activity a biologist experienced in conducting nesting bird surveys shall survey the Project area and all accessible areas within 500 feet. If nesting birds are identified, the biologist shall implement a suitable protective buffer around the nest and no activities shall occur within this buffered area. Typical buffers are 250 feet for songbirds and 500 feet for raptors, but may be increased or decreased according to site-specific, Project-specific, activity-specific considerations such as visual barriers between the nest and the activity, decibel levels associated with the activity, and the species of nesting bird and its tolerance of the activity. Construction activities that are conducted within a reduced buffer shall be conducted in the presence of a qualified full-time biological monitor.

Cultural Resources

Mitigation Measure CUL-1: Inadvertent Discovery of Cultural Resources. If prehistoric or historic-period archaeological resources are encountered, all construction activities within 50 feet shall halt and Valero shall be notified. A Secretary of the Interior-qualified archaeologist shall inspect the findings within 24 hours of discovery. If it is determined that the Project could damage a historical resource or a unique archaeological resource (as defined pursuant to the CEQA Guidelines), mitigation shall be implemented in accordance with PRC Section 21083.2 and Section 15126.4 of the CEQA Guidelines, with a preference for preservation in place. Consistent with Section 15126.4(b)(3), preservation in place may be accomplished through planning construction to avoid the resource; incorporating the resource within open space; capping and covering the

resource; or deeding the site into a permanent conservation easement. If avoidance is not feasible, a qualified archaeologist shall prepare and implement a detailed treatment plan in consultation with Valero and the affiliated Native American tribe(s), if applicable. Treatment of unique archaeological resources shall follow the applicable requirements of PRC Section 21083.2. Treatment for most resources would consist of (but would not be not limited to) sample excavation, artifact collection, site documentation, and historical research, with the aim to target the recovery of important scientific data contained in the portion(s) of the significant resource to be impacted by the Project. The treatment plan shall include provisions for analysis of data in a regional context, reporting of results within a timely manner, curation of artifacts and data at an approved facility, and dissemination of reports to local and state repositories, libraries, and interested professionals.

Mitigation Measure CUL-2: Inadvertent Discovery of Paleontological Resources. In the event of an unanticipated discovery of a fossil or fossilized deposit during construction, excavations within 50 feet of the find shall be temporarily halted or diverted until a qualified paleontologist examines the discovery. The paleontologist shall notify the appropriate agencies to determine procedures that would be followed before construction is allowed to resume at the location of the find. The paleontologist shall oversee implementation of these procedures once they have been determined.

Mitigation Measure CUL-3: Inadvertent Discovery of Human Remains. In the event of discovery or recognition of any human remains during construction activities, such activities within 50 feet of the find shall cease until the Solano County Coroner has been contacted to determine that no investigation of the cause of death is required. The Native American Heritage Commission (NAHC) will be contacted within 24 hours if it is determined that the remains are Native American. The NAHC will then identify the person or persons it believes to be the most likely descendant from the deceased Native American, who in turn would make recommendations to Valero for the appropriate means of treating the human remains and any grave goods.

Geology and Soils

Mitigation Measure GEO-1: A site-specific, design level geotechnical investigation shall be required as part of this Project to identify geologic hazards and provide recommendations to mitigate any such hazards in the final design of the proposed Project. The analyses would be completed in accordance with applicable City ordinances and policies and consistent with the most recent version of the California Building Code, which requires structural design that can accommodate ground accelerations expected from known active faults. The geotechnical investigation report shall evaluate the potential for ground shaking, liquefaction, and landslide hazards and shall include recommendations to ensure slope stability. The investigation shall be conducted by a California registered engineer or certified engineering geologist and all recommendations made in the investigation report shall be incorporated into the proposed Project design specifications.

Hydrology and Water Quality

Mitigation Measure HYD-1: The Applicant and/or its contractor shall prepare and implement a storm water management plan (SWMP) for construction of the proposed Project. The proposed project is covered under the Applicant's National Pollutant Discharge Elimination System (NPDES) permit and storm water pollution prevention plan (SWPPP). A notice of intent (NOI) application and notice of termination (NOT) application are not required. Implementation of the SWMP shall start with the commencement of construction and continue through the completion of the proposed Project. The SWMP shall identify pollutant sources (such as sediment) that may affect the quality of stormwater discharge and implement best management practices (BMPs) consistent with the California Stormwater Quality Association's BMP Handbook for Construction to reduce pollutants in stormwater. The Applicant or the construction contractor shall install erosion and stormwater control measures on the construction site such as installation of a silt fence and other BMPs, particularly at locations close to storm drains and water bodies. The BMPs shall also include practices for proper handling of chemicals such as avoiding fueling at the construction site and overtopping during fueling and installing spill containment pans.

Transportation and Traffic

Mitigation Measure TRAN-1:

- Prohibit scheduling crude train crossings during the weekday lunch hour (12:00 – 1:00 PM).

Mitigation Measure TRAN-2:

- Coordinate with the City of Benicia Fire Department to prepare an action plan in the event that an emergency occurs during a Project train crossing. The action plan would provide methods of adequately informing the Fire Department of the expected train crossing schedule and alternate routes to access the Park Road and Bayshore Road industrial areas during the event that a train crosses Park Road.
- Utilize the Refinery's existing onsite emergency response team to assist with responding to off-site emergencies within the Park Road and Bayshore Road industrial areas as requested by the City of Benicia Fire Department under the existing mutual aid agreement, if an emergency occurs during the event of a train crossing on Park Road.

With adoption of the proposed mitigation measures, this project could not have a significant effect on the environment and an environmental impact report is not required. A reporting or monitoring program must be adopted for measures to mitigate significant impacts at the time the Mitigated Negative Declaration is approved, in accord with the requirements of Section 21081.6 of the Public Resources Code.

Charlie Knox
Community Development Director
City of Benicia



Signature

May 31, 2013

Date

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VALERO CRUDE BY RAIL PROJECT

Initial Study

Summary Information

1. **Project Title:** Valero Crude by Rail Project
(12PLN-00063)
2. **Lead Agency Name and Address:** City of Benicia
250 East L Street
Benicia, CA 94510
3. **Contact Person and Phone Number:** Charlie Knox
Community Development Director
(707) 746-4280
4. **Project Location:** Valero Benicia Refinery
3400 East Second Street
Benicia, CA 94510
5. **Project Sponsor's Name and Address:** Valero Refining Company-California
Don Cuffel
3400 East Second Street
Benicia, CA 94510
(707) 745-7545
6. **General Plan Designation(s):** General Industrial and Waterfront Industrial
7. **Zoning Designation(s):** IG (General Industrial) and IW (Water Related Industrial)
8. **Description of Project:** (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)

See Project Description following Item 10.
9. **Surrounding Land Uses and Setting.** (Briefly describe the project's surroundings.)

The proposed Project is located within the eastern portion of the City of Benicia along the northern edge of the Suisun Bay below a low range of coastal hills. The proposed Project would include changes in the northeastern portion of the main Refinery property, between the eastern side of the lower tank farm and Sulphur Springs Creek.

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement. Indicate whether another agency is a responsible or trustee agency.)

The Crude by Rail Project would require a Use Permit from the City of Benicia as well as grading and building permits not covered by the Annual Permit Agreement. The following additional permits by other agencies would also be required:

- Bay Area Air Quality Management District: Authority to Construct/Permit to Operate, Title V Permit Amendment

Environmental Factors Potentially Affected

The proposed Project could potentially affect the environmental factor(s) checked below. The following pages present a more detailed checklist and discussion of each environmental factor.

- | | | |
|--|---|--|
| <input type="checkbox"/> Aesthetics | <input type="checkbox"/> Agriculture and Forestry Resources | <input checked="" type="checkbox"/> Air Quality |
| <input checked="" type="checkbox"/> Biological Resources | <input checked="" type="checkbox"/> Cultural Resources | <input checked="" type="checkbox"/> Geology, Soils and Seismicity |
| <input type="checkbox"/> Greenhouse Gas Emissions | <input type="checkbox"/> Hazards and Hazardous Materials | <input checked="" type="checkbox"/> Hydrology and Water Quality |
| <input type="checkbox"/> Land Use and Land Use Planning | <input type="checkbox"/> Mineral Resources | <input type="checkbox"/> Noise |
| <input type="checkbox"/> Population and Housing | <input type="checkbox"/> Public Services | <input type="checkbox"/> Recreation |
| <input checked="" type="checkbox"/> Transportation and Traffic | <input type="checkbox"/> Utilities and Service Systems | <input checked="" type="checkbox"/> Mandatory Findings of Significance |

DETERMINATION: (To be completed by Lead Agency)

On the basis of this initial study:

- I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- I find that the proposed project MAY have a “potentially significant impact” or “potentially significant unless mitigated” impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, no further environmental documentation is required.

Charlie Knox

Signature

May 31, 2013

Date

Charlie Knox

Printed Name

City of Benicia

For

CHAPTER I

Project Description

1. Overview

The Valero Benicia Refinery (Refinery) currently receives crude oil both by pipeline and by marine vessels. Crude oil originating within California (primarily San Joaquin Valley crude oil) is delivered by pipeline. Marine vessels transport a variety of crude oil (e.g., Alaskan North Slope crude oil and shipments from outside the U.S.) by marine vessel.

The primary purpose of the Valero Crude by Rail Project (proposed Project) is to allow the Refinery access to additional North American-sourced crudes that have recently become available, and that can be received by railroad. This involves installation and modification of Refinery non-process equipment that would allow the Refinery to receive a portion of its crude oil deliveries by railcar replacing equal quantities of crude currently being delivered to the Refinery by marine vessel. Valero intends to replace up to 70,000 barrels per day of the crude oil currently supplied to the Refinery by marine vessel with an equivalent amount of crude oil transported by rail cars. The crude oil to be transported by rail cars is expected to be of similar quality compared to existing crude oil imported by marine vessels. Crude delivered by rail would not displace crude delivered to the Refinery by pipeline.

The proposed Project would install a railcar unloading rack, repurpose an existing tank to include crude oil service, and construct associated infrastructure, including on-site rail lines, to allow the Refinery to receive crude oil by train. The proposed Project would permit the Refinery to receive crude oil by train in quantities up to 70,000 barrels per day (100 rail cars per day split into two 50 car trains), but it would not increase the volume of crude oil delivered to the Refinery because crude oil quantities delivered by train would be offset by a corresponding decrease in crude oil deliveries by marine vessels. The Refinery's crude oil processing rate is limited to an annual average of 165,000 barrels per day (daily maximum of 180,000 barrels per day) by Bay Area Air Quality Management District (BAAQMD) permit. This limit would remain unchanged. The proposed Project would not result in an increase in the production of existing products or byproducts. No modifications would be made to Refinery process equipment.

The proposed Project proposes to change the shipment method of up to 70,000 barrels per day of crude oil to rail cars (crude oil sources originating in North America) rather than by marine vessel (variety of domestic and international sources). Thus, the proposed Project could reduce marine vessel deliveries by up to 25,550,000 barrels per year. Based on the 3-year baseline period from December 10, 2009 through December 9, 2012, annual marine vessel deliveries could be reduced by up to 81 percent.

The quality of crude oil varies by oil well locations and reservoir formations; therefore, the quality of crude oil received from the same source may vary over time. Refineries are designed and equipped to process crude oil of a specific quality that is broadly defined by a range of gravity and sulfur content. The Refinery currently processes a blended slate of crude oil in a gravity range from 20° to 30° API and sulfur content range from 0.6 to 1.9 weight percent, based on 2011 to 2012 laboratory data. A blended crude oil slate is comprised of multiple individual crudes that when combined provide a crude mix that refinery hardware is designed to process. The proposed North American-source crudes will be a constituent in the Refinery's blended crude oil slate.

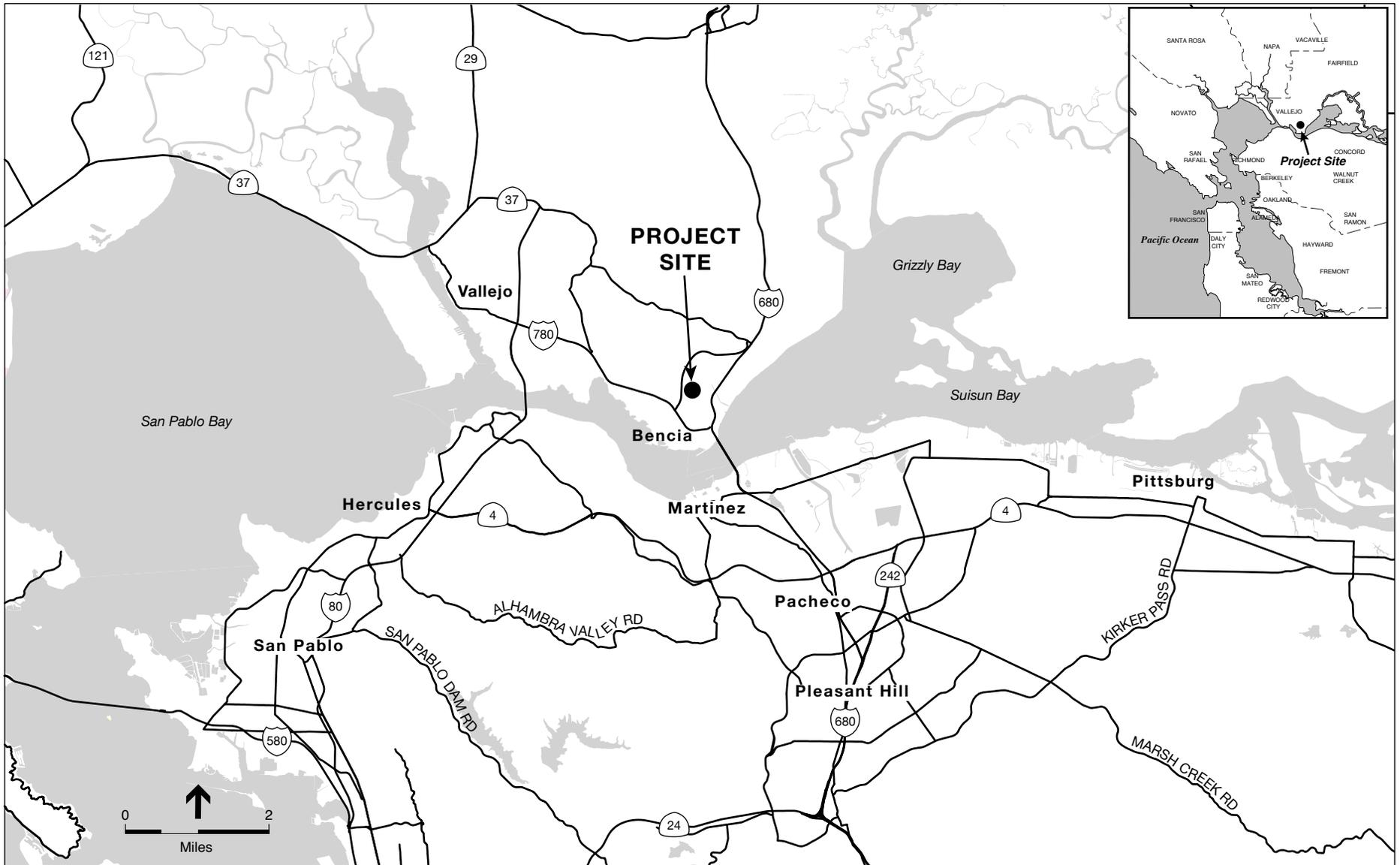
The North American-sourced crude oil gravity is expected to range from 20° to 43.5°API, so it would be similar or somewhat lighter than some of the current constituent crude oils used in blending. The North American-sourced crude oil sulfur content would range from 0.06 to 3.1 weight percent, but on average would be similar to that of the current constituent crude oil used in blending. The North American-sourced crude oils are expected to replace crude oils of similar gravity and sulfur content currently brought in by ship. The Refinery's various crude oil feedstocks are currently blended to achieve Refinery feedstock specifications, and the North American-sourced crude oils would be blended in the same manner. Since the North American-sourced crude oils would be replacing crude oils with similar properties, it is anticipated that the Refinery would continue to operate within its existing specifications for crude oil gravity and sulfur content range.

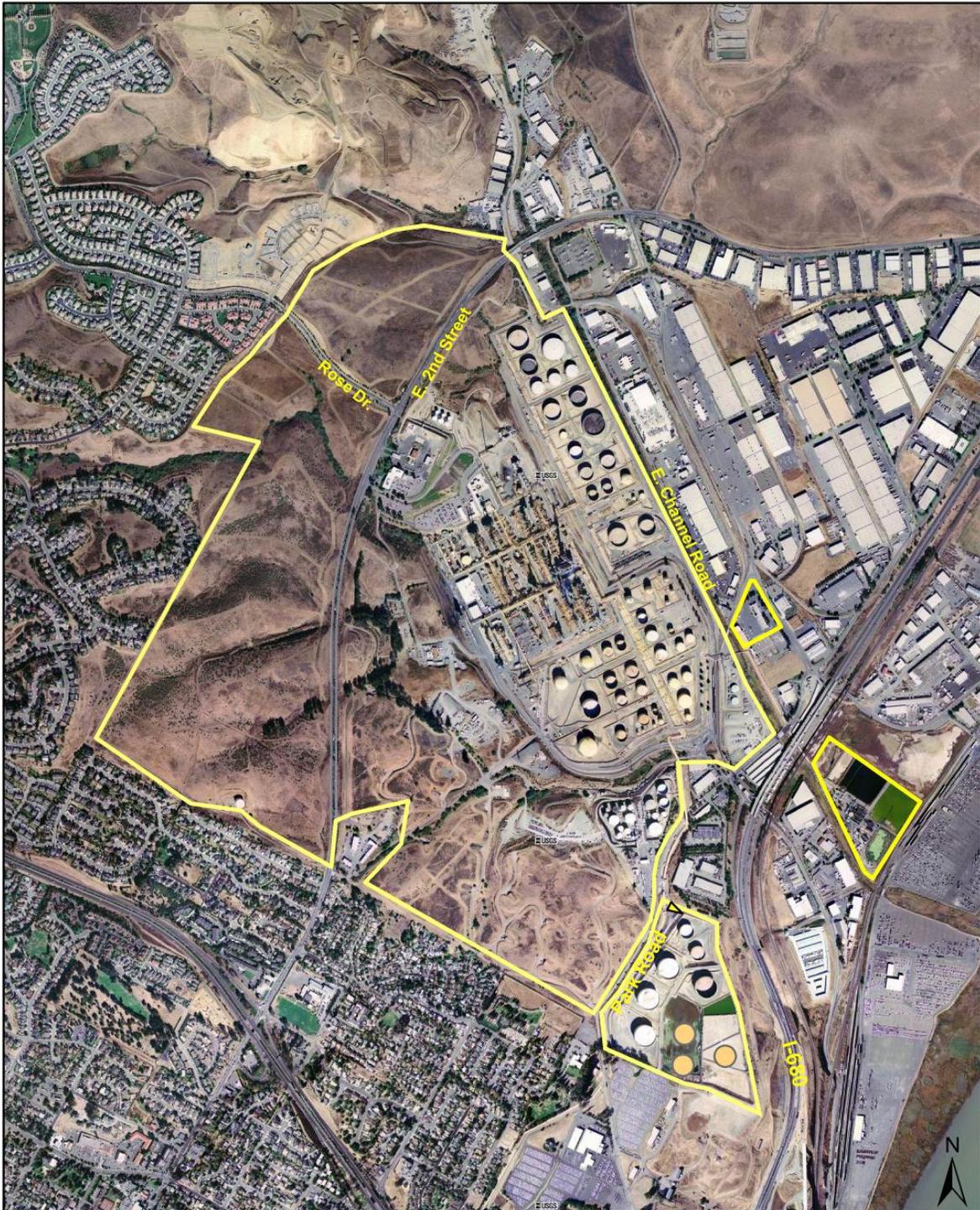
The Refinery does not anticipate a need to change the existing Refinery operations or process equipment, nor would emissions from Refinery operations change (with the exception of the storage tank service and rail unloading emissions) as a result of accepting and refining the proposed North American-sourced crudes.

2. Location

The Refinery is located at 3400 East Second Street, an industrial area in the eastern portion of the City of Benicia, in Solano County. The Refinery lies in a general north-south orientation near and west of Interstate 680. The Refinery is located along the northern edge of the Suisun Bay below a low range of coastal hills. To the west of East Second Street is open space, and the closest residential areas are approximately 3,000 feet to the south, west, and north-west of the Refinery and proposed Project site. Figure 1 shows the map of the region.

The Refinery occupies approximately 330 acres of the 880-acre Valero property; the remaining portion of the property is undeveloped. The Union Pacific Railroad Company (UPRR) line serves the Refinery as well as the Benicia Industrial Park that lies across Sulphur Springs Creek from the Refinery, via Track 700. The Refinery dock, located on the Carquinez Strait between the Benicia-Martinez Bridge and the Port of Benicia wharf, provides Refinery access to bulk transport by ship. The lands and facilities of the existing Refinery are shown in Figure 2.





0 0.125 0.25 0.5
 Miles

Legend
 — Property Boundary

SOURCE: ERM

Valero Crude by Rail Project Initial Study . 202115

Figure 2
 Valero Refinery Boundary

3. Project Site

The Refinery and proposed Project site (within the Refinery) location are zoned General Industrial. Present land use at the proposed Project site is petroleum refining and storage. The elements of the proposed Project are compatible with the existing land use and would not result in substantial alterations of the planned land use in the area. Construction and operation of facilities associated with this proposed Project would be within the Refinery's property boundaries.

4. Existing Refinery Operations

The Refinery converts crude oil into many finished products, including California Air Resources Board-required cleaner-burning gasoline and diesel fuels, liquefied petroleum gas, jet fuel, fuel oil, and asphalt. Major equipment used for processing crude oil into finished products includes distillation columns, storage tanks, reactors, vessels, heaters, boilers, and other ancillary equipment. The Refinery also operates its own asphalt plant, wastewater treatment plant, and a marine terminal, which services crude oil, refinery products, and feedstock deliveries and exports via ships and barges. The Refinery also uses rail to transport materials such as asphalt, caustic, petroleum coke, and liquefied petroleum gas (LPG).

Crude oil is currently delivered to the Refinery only by pipeline and marine vessels. The crude oil delivered via marine vessels is received at the Valero Marine Terminal on Bayshore Road just south of the Benicia-Martinez Bridge, in the Port of Benicia. Crude oil is unloaded from the vessels and transferred into the storage tanks located at the tank farm north of the marine terminal. The Refinery currently uses external floating roof tanks (e.g., Tank 1707 and 1708) with the same configuration as the tank proposed to store crude oil for the proposed Project (Tank 1776). These tanks are configured and operated to comply with the same control requirements as applicable to organic liquid storage tanks under BAAQMD Regulation 8-5. This crude oil is combined with other crude oil receipts and refined in process units located north of the tank farm. The Refinery is limited by its BAAQMD permit (condition 20820, part 50) to processing crude oil at a feed rate of 180,000 barrels per day on a maximum daily basis and 165,000 barrels per day on an annual average basis.

The Refinery currently exports petroleum coke and LPG from the Refinery to off-site customers. Once per day, typically between 11:00 a.m. and noon, rail cars loaded with petroleum coke leave the Refinery via Track 700, cross Park Road, and head towards the AMPORTS Benicia Terminal facility directly to the south for the product to be loaded onto ships. After the coke products are loaded near the dock into storage silos for eventual loading onto ships for export, the empty coke rail cars are brought back onto the Refinery site for reloading for the next day's transfer operations. A similar operation takes place with rail cars transporting LPG destined for customers. The Refinery also occasionally imports LPG.

5. Specific Project Components

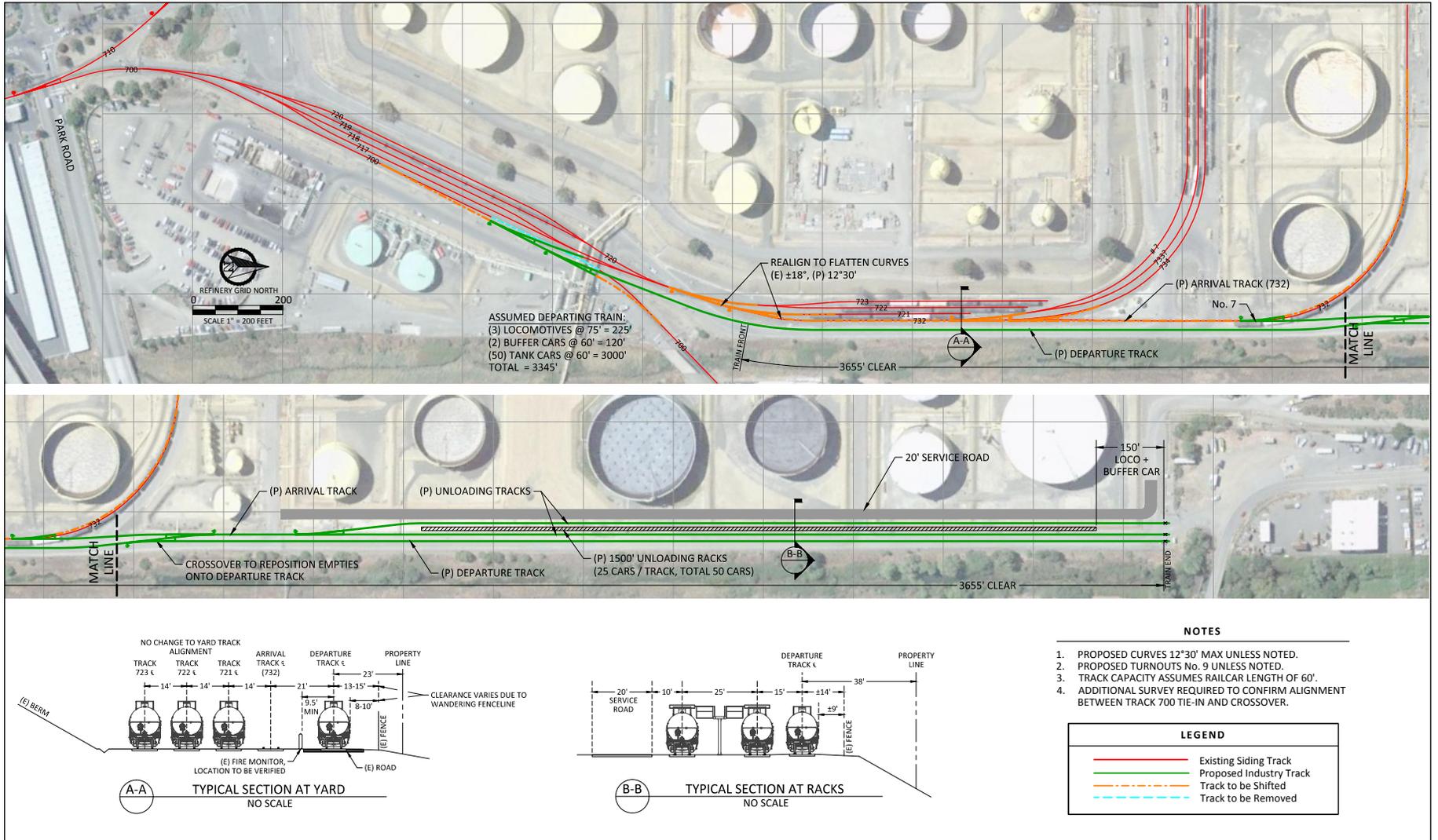
The proposed Project is shown in Figure 3, and would consist of the following primary components:

- Installation of one rail car unloading rack capable of offloading two parallel rows of 25 crude oil rail cars.
- Construction of two parallel, offloading rail spurs to access the rail car unloading rack and store rail cars in preparation for departure, and a parallel departure track.
- New BAAQMD permit condition to include the ability to store crude in an existing external floating roof tank (Tank No. 1776) in addition to Jet “A”, Diesel, and mogas (automotive gasoline) service.
- Installation of approximately 4,000 feet of 16-inch diameter crude oil pipeline and associated components and infrastructure between the offloading rack and Tank 1776, and from Tank 1776 to the existing crude supply piping.
- Replacement and relocation of approximately 1,800 feet of tank farm dikes.
- Relocation of an existing firewater pipeline, compressor station, and underground infrastructure.
- Relocation of groundwater wells along Avenue “A.”
- Construction of a service road adjacent to the proposed unloading rack.

Crude Oil Delivery Changes

The proposed Project would change the shipment method of up to 70,000 barrels (bbl) per day of crude oil to be delivered by rail cars (crude oil sources originating in North America) rather than by marine vessel (variety of domestic and international sources). Thus, the proposed Project could reduce marine vessel deliveries by up to 25,550,000 bbl per year. Based on a 3-year baseline period from December 10, 2009 through December 9, 2012, annual marine vessel deliveries could be reduced by up to 81 percent. Crude delivered by rail would not displace crude delivered to the Refinery by pipeline.

The North American-sourced crude oil gravity is expected to range from 20 to 43.5°API, so it would be similar or somewhat lighter than some of the current constituent crude oils used in blending. The North American-sourced crude oil sulfur content would range from 0.06 to 3.1 by weight percent, but on average would be similar to that of the current constituent crude oil used in blending. The North American-sourced crude oils are expected to replace crude oils of similar gravity and sulfur content that are currently brought in by ship. The Refinery’s crude oil feedstock is currently blended to achieve Refinery feedstock specifications, and the North American-sourced crude oils would be blended in the same manner. Since the North American-sourced crude oils would replace crude oils with similar properties, it is anticipated that the Refinery would continue to operate within its existing specifications for crude oil gravity and sulfur content range.



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The Refinery does not anticipate a need to change the existing Refinery operations or process equipment, nor would emissions from Refinery operations change (with the exception of the storage tank service and rail unloading emissions described as part of the Project on pages 10 and 11, below) as a result of accepting and refining the proposed North American-sourced crudes.

Tank 1776 Service Change

Tank 1776 (BAAQMD Source No. S-97) is an external floating roof (EFR) tank with a diameter of 128 feet, a height of 48 feet, and a working capacity of 101,400 barrels (4,258,800 gallons). It is currently permitted to store primarily Jet “A” or mogas, as well as other less volatile materials (e.g., diesel) and has a limit of 62,800,000 barrels per year throughput combined with seven other storage tanks. The tank has a welded steel shell and a pontoon-type floating roof with tight-fitting double seals that comply with BAAQMD Regulation 8-5 for the storage of organic liquids.

EFR tanks are commonly used to store large quantities of petroleum products such as crude oil or condensate. This type of tank is comprised of an open-topped cylindrical steel shell equipped with a roof that floats on the surface of the stored liquid. The roof rises and falls with the liquid level in the tank. It eliminates breathing losses and greatly reduces the evaporative loss of the stored liquid. It has a rim-seal system between the tank shell and roof to reduce rim evaporation.

The proposed Project would allow for a change in service for Tank 1776 from Jet “A”, mogas, and diesel service to also allow for crude oil service. Though Tank 1776 would be allowed to store crude oil as part of this proposed Project, it would also retain the capability in the future to store jet fuel, mogas, diesel, and other Refinery products it has been previously permitted to store, as required. The storage capacity of the tank would not change as a result of the proposed Project, nor would there be the need for new emissions control measures for Tank 1776. The tank’s existing control measures, which include tight-fitting double seals, satisfy BAAQMD’s Regulation 8-5 and Best Available Control Technology (BACT) requirements for the services proposed.

There would be no physical modifications to Tank 1776 that would impact breathing emissions. However, the tank would be repurposed for crude oil storage. The tank would be outfitted with additional nozzles for crude oil service and for potential future connections as found on typical crude oil storage tanks. The bottom interior surface of the tank would be coated, if required, for crude water draw service. The overall exterior appearance of the tank would remain unchanged. Tank 1776 would not require heating because the proposed North American crude oil stored would flow readily at ambient temperatures. The proposed Project would not increase Refinery steam demand and production.

As noted above, the proposed Project would not result in any net increase in crude oil deliveries to the Refinery. The existing crude storage tanks would continue to be utilized in their existing service. Because Tank 1776 is close to the proposed rail unloading rack, the use of this nearby tank would reduce the amount of new infrastructure, such as a new pipeline, required for the sole purpose of transporting the new crude oil to the Refinery’s crude oil tank farm situated farther

from the unloading rack. After the implementation of the proposed Project, material currently stored in Tank 1776 would be stored in existing storage tanks currently permitted for storage of similar materials.

Rail Car Unloading Rack

An unloading rack capable of unloading two parallel rows of rail cars (one on each side) and transferring crude oil to Tank 1776 would be constructed for the Project. The 1,500-foot-long unloading rack would be used only for unloading crude oil; there would be no loading of crude oil or other materials at this rack. The rack would be installed in the northeastern portion of the main Refinery property, between the eastern side of the lower tank farm and the fence adjacent to Sulphur Springs Creek. The fence would not be relocated to accommodate the new construction. The unloading rack platform walkway would be approximately 13 feet above grade. A majority of the lighting (primarily consisting of 25 new aluminum poles with lights mounted 12 feet above the platform) and rail car access walkways would be mounted to the unloading rack structure. A minimum of 23 feet vertical clearance is required by UPRR for facilities that bisect a railway track, and this would be the height of the proposed walkways. The rail car unloading rack would include directional lighting to illuminate rail car connecting points beneath the rail cars, walkways, access platforms, and a service road. The rack would use isolation valves specified to comply with BACT requirements for fugitive emissions.

The new rail car unloading facilities would include liquid spill containment. The rack area would be sloped inward towards the centerline of the rack. A roadside curb would be provided east of the tracks near the fenceline to further contain any minor spills and leaks. In addition, the existing liquid spill containment for tanks abutting the rail car unloading facilities would be modified to allow installation of the unloading facilities. Part of the existing containment berm for the tank field would be removed and a new concrete berm would be constructed approximately 12 feet west of the existing earthen berm. The resulting containment capacity would continue to meet or exceed minimum regulatory containment requirements.

Unloading Rail Spurs

Currently, the existing rail tracks at the Refinery serve the upper coke silo for petroleum coke loading and the intermediate tank farm for the light ends loading. There are no unloading rail spurs for crude oil deliveries at the Refinery.

As a part of the proposed Project, existing tracks would be realigned and two unloading rail spurs and a parallel storage and departure spur would be constructed to allow for receipt of rail cars at the unloading rack. The rail spurs and the parallel storage and departure spur would be constructed between the eastern side of the lower tank farm and the western side of the fence along Sulphur Springs Creek and would occupy a portion of Avenue "A." The distance between the existing fence and the centerline of the departure/storage track would be approximately 14 feet. The centerline of the adjacent rail spur would be 15 feet from the centerline of the departure/storage track, with another 25 feet between the centerline of this rail spur to the western spur.

The proposed Project would install approximately 8,880 track-feet of new track on Refinery property. This would primarily consist of tracks servicing the rail car unloading rack and the rail car departure spur. To allow the rail cars to migrate between spurs, one redesigned and five new track turnouts would be installed. The proposed Project also proposes realigning approximately 3,560 track-feet located on Refinery property.

Ancillary Facilities

Ancillary facilities affected by the proposed Project would include a crude oil pipeline, spill containment structures, a firewater pipeline, groundwater wells, and a service road.

Currently, there is no crude oil pipeline to Tank 1776. Approximately 4,000 feet of primarily 16-inch-diameter, aboveground piping and associated components and infrastructure would be installed as part of the proposed Project between the unloading rack and Tank 1776, and from Tank 1776 to the existing crude supply piping.

The existing spill containment structure around the lower tank farm consists of a 5- to 10-foot-tall, earthen berm to provide secondary containment for tanks. The existing liquid secondary containment structure for the tanks abutting the rail car unloading facilities would be modified to allow installation of the unloading facilities. Approximately 1,800 feet of the existing earthen containment berm along the eastern edge of the tank farm would be removed and a new, 8-foot-tall concrete berm would be constructed approximately 12 feet west of the existing earthen berm. The resulting containment capacity of the shared containment system would continue to meet or exceed minimum regulatory containment requirements.

There is an existing firewater pipeline, several groundwater monitoring wells, a compressor station, and a carbon dioxide line in the vicinity of Avenue "A." These facilities would be relocated to accommodate the new rail tracks.

Existing groundwater monitoring wells along Avenue "A" that interfere with the proposed facilities would be relocated or removed. The wells would be replaced in-kind or abandoned, as approved by the Regional Water Quality Control Board. Abandoned wells would be sealed and capped in accordance with Solano County and California Department of Water Resources procedures.

A new service road, approximately 20 feet wide, would be added along the western side of the new unloading rail spurs.

6. Project Operation

Once operational, the proposed Project would employ up to 30 full-time-equivalent personnel. The rail car unloading rack would accommodate up to 25 rail cars on each side at a time (two, 50-rail car "switches" per day would be transported to the rack by train). The tank cars would be emptied into a single pipeline located between the two rail spurs at slightly below ground level.

Each side of the rack would have 25 unloading stations, which would “bottom-unload” closed-dome rail cars using 4-inch-diameter hose, with dry disconnect couplings that would connect to a common header between the two sides of the rack (a check valve, connected to the top of each rail car via 2-inch-diameter hose would open to allow ambient air to enter during unloading and immediately close when unloading is finished). Three new pumps would be located on the western side of a new service road between Tanks 1720 and 1716. Two pumps operating in parallel would pump the crude oil from the unloading rack header via a new 16-inch pipeline to Tank 1776. The third pump will be installed as a spare pump. This will facilitate periodic maintenance on the primary pumps. Once emptied, the 50 rail cars would be disconnected from the rack, moved to an on-site departure spur, and then replaced by another 50-rail-car switch.

A typical rail car handling scenario is described below:

1. UPRR-operated locomotives would haul up to 100 crude oil rail cars (in two trains of up to 50 cars) a day from the UPRR Roseville Railyard to the Refinery. Each rail car is nominally 60 feet long, with a capacity of approximately 700 barrels and a maximum estimated load of 211,600 pounds.
2. For each delivery, UPRR-operated locomotives would haul in a full 50-rail-car train crossing Park Road on Track 700 and then travel on Track 732 to the unloading rack. Twenty-five rail cars would be spotted on each unloading track located on each side of the unloading rack. UPRR would leave its locomotives attached to each 25-rail-car train.
3. The Refinery would unload the delivered rail cars.
4. After the rail cars are emptied, the empty rail cars would be moved onto the “departure” spur on Refinery property adjacent to the unloading rack, to assemble a 50-rail-car train.
5. The empty 50-rail-car train on the departure spur would be moved onto Track 700, across Park Road, and transported off site by a UPRR operator.

Steps 2 through 5 would take approximately 8 to 10 hours for 50 rail cars. The proposed Project would result in four 50-car train crossings of Park Road per day (two trips into the Refinery and two trips out). UPRR would deliver one full 50-car train and pull out an empty 50-car train between the hours of 8:00 PM and 5:00 AM. A second 50-car train would either be delivered and empty 50-car train pulled out during this time period or during the non-peak daytime hours (avoiding 6:00 AM to 9:00 AM and 4:00 PM to 6:00 PM weekdays). A train with 200 feet of locomotive and 50 railcars in length would take about 7.3 minutes to cross Park Road at a speed of 5 mph. The at-grade crossing traffic controls provide a 30-second buffer time before and after each train crossing on Park Road. Each 50-railcar train movement is estimated to block traffic on Park Road for approximately 8.3 minutes. Operations would occur 24 hours per day/7 days per week/365 days per year.

7. Project Construction

The Refinery proposes to begin construction in 2013 and to commence operations in late-2013 or early 2014. Construction is expected to take approximately 25 weeks. Construction work would be conducted in two 10-hour shifts per day seven days per week for most activities.

Construction activities would take place mostly near the lower tank farm area, along Avenue “A” within the Refinery. Pipeline construction would take place between this area and Tank 1776, which includes Avenue “A”, Avenue “D”, 9th Street, and 14th Street.

Construction activities would include excavation and grading, demolition of the existing spill containment berm, realignment of existing track, and construction of a new containment wall, unloading rack, new rail tracks, and piping and associated equipment.

Most of the area that would be disturbed by the Project lies between the tank farm containment berm and the property fence, and is already graded. A part of this affected area that is graded and paved with asphalt forms Avenue “A.” New tracks would result in a cut volume of approximately 16,000 cubic yards and fill volume of 2,000 cubic yards. Containment berm work would result in a cut volume of 3,000 cubic yards. The new rail unloading rack would also result in a cut volume of 1,500 cubic yards. The net cut volume is approximately 18,500 cubic yards.

Material deliveries would include, but would not be limited to, pipes, valves, fittings, structural steel, plates, concrete, rebar, formwork, machinery and equipment, electrical equipment, electrical conduit and cable, instrumentation, insulation, gaskets, bolts, nuts, rail tracks, and fill material from off-site. Deliveries would also be required for additional services equipment (e.g., portable toilets and temporary office trailers for construction contractors).

The construction workforce would include workers conducting activities inside the Refinery in and around the Project site. The total workforce is estimated to include 121 construction workers.

The proposed Project would generate additional construction and personal vehicle trips during the construction period. Vehicle traffic would include employees, administrative personnel, management, materials, bus drivers, and soil deliveries.

Prior to commencing construction, a traffic control plan would be submitted to the appropriate agency. Public safety measures approved by the City Engineer would be maintained at key intersections or other driveways that may be affected by construction vehicle ingress and egress. No physical entrance, roadway, or intersection improvements would be needed to accommodate construction traffic volume.

Parking and on-site services would be provided for construction workers. Parking for the construction contractors would be in the two existing lots on the southern side of the main Refinery area. All temporary administrative, sanitary, and comfort services would be provided in the areas designated for these purposes on Refinery property. There would be no parking or other services off-site.

Laydown areas located off-site north and east of the Refinery at 251 West Channel Road and 443 Industrial Way, respectively, would host proposed Project equipment, and may also contain temporary office trailers, security lighting, and other incidental features.

CHAPTER II

Environmental Checklist

Evaluation of Environmental Impacts

- 1) A brief explanation is required for all answers except “No Impact” answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A “No Impact” answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A “No Impact” answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
- 2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
- 3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. “Potentially Significant Impact” is appropriate if there is substantial evidence that an effect may be significant. If there are one or more “Potentially Significant Impact” entries when the determination is made, an EIR is required.
- 4) “Negative Declaration: Less Than Significant With Mitigation Incorporation” applies where the incorporation of mitigation measures has reduced an effect from “Potentially Significant Impact” to a “Less Than Significant Impact.” The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less-than-significant level (mitigation measures from Section XVII, “Earlier Analyses,” may be cross-referenced).
- 5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. (see Section 15063(c)(3)(D)). In this case, a brief discussion should identify the following:
 - a) Earlier Analyses Used. Identify and state where they are available for review.
 - b) Impacts Adequately Addressed. Identify which effects from the checklist were within the scope of, and adequately analyzed in, an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analyses.

- c) Mitigation Measures. For effects that are “Less than Significant with Mitigation Measures Incorporated,” describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
- 6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
- 7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
- 8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project’s environmental effects in whatever format is selected.
- 9) The explanation of each issue should identify:
 - a) the significance criteria or threshold, if any, used to evaluate each question; and
 - b) the mitigation measure identified, if any, to reduce the impact to less than significant.

1. Aesthetics

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
1. AESTHETICS — Would the project:				
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

1a) *Would the Project have a substantial adverse effect on a scenic vista?*

The Refinery is located in the northeastern portion of the City of Benicia and is the dominant visual feature of the Benicia Industrial Park, which is located in a valley flanked by undeveloped hills above Suisun Bay. The topography of the area ranges between 10 feet to 300 feet above mean sea level. The main Refinery process and storage areas are located on terraced slopes that descend from East Second Street towards the Carquinez Strait. The site exhibits complex industrial forms, lines, and geometric shapes. Refinery structures are painted light colors such as yellow-gold to blend with dry season grassland colors and forest green intended to mimic tree color, and to better blend into the landscape from distant viewpoints. Major components of the Refinery process block include the 462-foot-tall main stack, crackers and furnaces, cooling towers, natural gas supply lines and other piping, pumps, and other equipment. With the exception of the main stack and two flares, most of the stacks and coolers are less than 150 feet tall. Some of these structures, such as the main stack, are equipped with night lighting and beacons. In the main process block the units are clustered, sometimes creating solid walls of mechanical equipment comparable to the size of five- to six-story buildings. The Refinery also includes a number of clustered tanks or “tank farms,” which also contribute to the industrial aesthetic. The utilitarian character and appearance of the Refinery produces a strong industrial statement in the landscape that contrasts sharply with the open space and undeveloped hills adjacent to the north and west.

The *City of Benicia General Plan* includes the following goal and policy regarding scenic vistas: Goal 3.9, which calls for the protection and enhancement of scenic roads and highways, and Policy 3.9.1, which states that vistas along I-680 (and I-780) should be preserved. The General Plan identifies five gateways to the City, two of which are located in the eastern portion of the City and have views of the Refinery. The Northern Gateway is

located on I-680 at Lake Herman Road, approximately three-quarter-mile northeast of the Refinery. Although this junction includes a Caltrans vista point, only the upper portions of the tallest stacks of the Refinery are visible from this gateway. The Southern Gateway is located south of the Refinery on the Benicia-Martinez Bridge. Motorists from this viewpoint have clear views of the storage tanks on the ridges above the highway, but hills block views of most of the Refinery with the exception of the upper portions of some stacks.

The Visual Character section of the General Plan further identifies three principal scenic streets and gateways from which a variety of Benicia's scenic resources can be viewed. Two of these corridors (I-680 between Morrow Road [north of the City limits] and the Benicia-Martinez Bridge, and Lake Herman Road) have views of the Refinery. Views of the Refinery along I-680 between the Caltrans vista point at Lake Herman Road and the Benicia-Martinez Bridge are partially obscured by buildings and landscaping in the Benicia Industrial Park. While the Refinery is visible from I-680, the Project may be discernable by motorists for a very short duration as they travel over the viaduct above Sulphur Springs Creek. The rolling hills above the Refinery obscure most views of the site along Lake Herman Road.

The Refinery is also visible from other areas not designated as official views and vistas by the General Plan. From the residential neighborhoods northwest and southwest of the Refinery, the upper portions of stacks are visible from some locations, with views of Mount Diablo across the Carquinez Strait in the background. Views of the Refinery are largely restricted to the tier of homes nearest the Refinery due to the topography and the visual screen presented by these homes.

Proposed Project elements would include a rail car unloading rack; two parallel rail spurs and a parallel departure track; modification of the existing Tank 1776; approximately 4,000 feet of 16-inch diameter crude oil pipeline; replacement and relocation of approximately 1,800 feet of tank farm dikes with an eight-foot-tall concrete retaining wall; and relocation of existing facilities such as a firewater pipeline, compressor station, groundwater wells, and underground infrastructure.

The proposed Project would be constructed and operated mostly near the lower tank farm area, along the existing Avenue "A," at an elevation of approximately 10 feet above mean sea level. New pipeline also would be installed between this area and Tank 1776 along Avenue "A", Avenue "D", 9th Street, and 14th Street.

Many of proposed Project elements, such as the rail tracks, crude oil pipeline, firewater pipeline, groundwater wells, and other utility infrastructure would be located either a few feet above grade (pipelines), on the ground itself (rail tracks), or underground (wells and other utilities). Tank 1776 would be outfitted with additional nozzles for crude oil service and for potential future connections but the overall exterior appearance of the tank would remain unchanged.

The most visible physical changes at the site would be the replacement of portions of the tank farm dikes with the eight-foot-tall retaining wall and the rail car unloading rack. The 1,500-foot-long unloading rack would be constructed along Avenue "A" between the eastern side of the lower tank farm and Sulphur Springs Creek. The unloading rack platform walkway would be approximately 13 feet above grade. The unloading rack platform also would have 25 evenly-spaced aluminum poles with lighting that would extend 12 feet above the platform. Access to the unloading rack platform would be provided by access walkways that reach 23 feet above ground level in order to meet minimum UPRR requirements for facilities that bisect a rail track. Eight-foot-tall aluminum light poles would be mounted to the access walkways. Approximately 1,800 feet of tank farm dikes would be removed and replaced with an eight-foot-tall concrete retaining wall. The new wall would be similar in height to the containment berms but would be located slightly westward from the existing berm location. The majority of the wall would be approximately 45 feet west of the westernmost rail spur.

The proposed facilities would be much shorter than the existing tanks in the lower tank farm area and views of the unloading rack would be blocked from most off-site viewpoints due its location within the Refinery, the surrounding topography, and the low height of the proposed structure. The proposed Project would generally blend in with the existing facilities in the Refinery and would not obstruct predominant visual elements of the area that include the nearby hills, Suisun Bay, and expanses of adjacent open space or lightly developed areas. Impacts to scenic vistas would be less than significant.

1b) ***Would the Project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?***

The Refinery is not located near a state designated scenic highway and is not subject to any state management requirements. A Caltrans vista point is located at I-680 and Lake Herman Road, approximately three-quarter-mile northeast of the Refinery. However, the proposed Project would not be visible from this location due to its location in a valley below undeveloped hills. The proposed Project would not substantially damage scenic resources within a state scenic highway because the proposed Project elements would not be visible in or from any area where scenic resources exist. The proposed Project would be located within the footprint of the existing Refinery, which does not presently contain scenic resources (e.g., trees, rock outcroppings, and historic resources). No impact would result.

1c) ***Would the Project substantially degrade the existing visual character or quality of the site and its surroundings?***

General Plan policies and goals relevant to visual character and quality include Policy 3.7.1, which states that new development should be compatible with the surrounding architectural and neighborhood character; Goal 3.12, which calls for the improvement of the Industrial Park's appearance; and Policy 3.12.1 that encourages attractive, quality development in industrial areas.

The City's Municipal Code includes two primary zoning ordinance sections related to visual impacts of general industrial development. Section 17.32.030 lists requirements for lot size and setback criteria and Section 17.108 concerns design review of structures to ensure visual harmony with the surrounding area.

The new facilities proposed as part of the proposed Project would conform to General Plan policies, which seek to ensure that new development is compatible with the surrounding architectural and neighborhood character. The Project elements as described above under 1a) would be similar in appearance and generally visually harmonious with the existing Refinery and industrial character of the site and the adjacent Benicia Industrial Park; the Project would avoid excessive grading or alteration of the existing topography; and new development would be largely confined to a relatively narrow strip of land located in one of the lowest areas of the Refinery property. Impacts to visual character or quality of the site would be less than significant.

1d) ***Would the Project create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?***

Lighting proposed by the proposed Project would be located as part of the rail car unloading rack and ancillary facilities. The 1,500-foot-long unloading rack would consist of 25, 60-foot-long segments. Each segment would include an aluminum pole with four LED lights mounted 12 feet above the unloading rack platform walkway and two LED pendant fixtures mounted underneath the platform, eight feet above grade. In addition, two pole-mounted LED lights would be located 18 inches above grade. Walkways extending over the rail spurs would include six stanchion-mounted LED fixtures along the walkway and stairs and four at stairway landings at each end of the unloading rack. Eleven stanchion-mounted LED fixtures would be mounted eight feet above eleven monitoring stations that would be evenly spaced along the length of the unloading rack. Eight stanchion mounted fixtures at eight feet above grade would be installed in the pumping station.

Projects zoned as General Industrial (IG) must comply with outdoor lighting performance standards listed in Section 17.70.240.D.2. These standards specify that lighting "shall be designed and installed to confine direct light rays to the site...Security lighting in any district may be indirect or diffused, or shall be shielded or directed away from adjoining properties and public rights-of-way."

All lighting would be directional to illuminate rail car connecting points beneath the cars, walkways, access platforms, and the service road. A majority of the lighting and rail car access walkways would be mounted to the unloading rack structure.

The Refinery currently illuminates facilities in order for operations to continue throughout the night. Lighting within the Refinery would increase as a result of the proposed Project, but would not exceed the performance standards specified in Section 17.240.D.2 of the

Zoning Ordinance. Structures that would be illuminated would be constructed within existing areas of the Refinery and would be directed appropriately to avoid disturbance to motorists or adjacent residential areas (the nearest residential neighborhood is located approximately 0.4-mile to the northwest of the terminus of the proposed rail spurs). The Project would not include structures that are constructed of highly reflective material, such as glass or mirror that would produce glare. The increased lighting resulting from the Project would not be substantial and would not adversely affect day or nighttime views in the area; the impact would be less than significant.

References

California Department of Transportation (Caltrans), Scenic Highway Program,
www.dot.ca.gov/hq/LandArch/scenic_highways/scenic_hwy.htm, accessed March 20,
2013.

City of Benicia, *General Plan*, 1999.

City of Benicia, Municipal Code, as amended through December 18, 2012.

2. Agricultural and Forest Resources

<u>Issues (and Supporting Information Sources):</u>	<u>Potentially Significant Impact</u>	<u>Less Than Significant with Mitigation Incorporation</u>	<u>Less Than Significant Impact</u>	<u>No Impact</u>
2. AGRICULTURAL AND FOREST RESOURCES —				
<p>In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.</p> <p>Would the Project:</p>				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- 2a) ***Would the Project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?***

According to the 2010 Solano County Important Farmland Map, the proposed Project site is classified as Urban and Built-up Land (DOC, 2011). As such, the proposed Project would not involve conversion of prime farmland, unique farmland, or farmland of statewide importance. No impact would result.

- 2b) ***Would the Project conflict with existing zoning for agricultural use, or a Williamson Act contract?***

No part of the proposed Project site property has an agricultural zoning or is under a Williamson Act contract. No impact would result.

- 2c) ***Would the Project conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production?***

The proposed Project would not conflict with existing zoning or cause rezoning regarding forest land or timberland. No impact would result.

- 2d) ***Would the Project result in loss of forest land or conversion of forest land to non-forest use?***

The proposed Project would not result in loss of forest land or conversion of forest land to non-forest use. No impact would result.

- 2e) ***Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?***

The proposed Project would not result in the conversion of farmland to non-agricultural use or conversion of forest land to non-forest use. No impact would result.

References

California Department of Conservation, 2010 Solano County Important Farmland Map, published June 2011.

3. Air Quality

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
3. AIR QUALITY —				
Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.				
Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

3a) ***Would the project conflict with or obstruct implementation of the applicable air quality plan?***

The most recently adopted air quality plan for the San Francisco Bay Area is the *Bay Area 2010 Clean Air Plan* (2010 CAP). The 2010 CAP is an update to the Bay Area Air Quality Management District’s (BAAQMD) 2005 Ozone Strategy to comply with State air quality planning requirements. The 2010 CAP also serves as a multi-pollutant air quality plan to protect public health and the climate. The 2010 CAP control strategy includes revised, updated, and new measures in the three traditional control measure categories, including stationary source measures, mobile source measures, and transportation control measures. In addition, the 2010 CAP identifies two new categories of control measures, including land use and local impact measures, and energy and climate measures (BAAQMD, 2010).

BAAQMD recommends that the agency approving a project where an air quality plan consistency determination is required analyze the project with respect to the following questions: 1) does the project support the primary goals of the air quality plan; 2) does the project include applicable control measures from the air quality plan; and 3) does the project disrupt or hinder implementation of any 2010 CAP control measures? If all the questions are concluded in the affirmative, BAAQMD considers the project consistent with air quality plans prepared for the Bay Area (BAAQMD, 2012). Any project that would not support the 2010 CAP goals would not be considered consistent with the 2010 CAP, and if

approval of the project would not result in significant and unavoidable air quality impacts after the application of mitigation, then the project would be considered consistent with the 2010 CAP.

As presented in the subsequent impact discussions, proposed Project-related construction and operation emissions would not exceed the BAAQMD significance thresholds; therefore, the proposed Project would support the primary goals of the 2010 CAP. As mentioned above, projects that incorporate all feasible air quality plan control measures are considered consistent with the 2010 CAP. There appear to be no 2010 CAP control measures that would be directly applicable to the proposed Project; however, implementation of Mitigation Measure AIR-1 (see discussion 3b), below) would ensure that BAAQMD basic construction control measures would be implemented.

The proposed Project would support the primary goals of the 2010 CAP and it would not disrupt or hinder implementation of any 2010 CAP control measures. Therefore, there would be no impact associated with conflicting or obstructing implementation of the applicable air quality plan.

3b) ***Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?***

Exhaust emissions significance thresholds recommended in the BAAQMD's *Revised Draft Options and Justification Report* (2009) were used to determine the significance of impacts related to air quality standard violations. The justification report provides substantial evidence to support the recommended thresholds and, therefore, the City of Benicia has determined they are appropriate for use in this analysis. Based on the following, construction and operation of the mitigated Project would not result in a violation of an air quality standard or contribute significantly to an existing or projected air quality violation. Therefore, the associated impact would be less than significant with mitigation.

Construction

The majority of proposed Project-related exhaust emissions would be generated on-site due to the use of heavy-duty off-road equipment (such as excavators, graders, front loaders, dump trucks, cranes, and paving equipment). Construction activities would occur each day with two 10 hours shifts, 7 days a week, for 25 weeks. Exhaust emissions would also be generated by construction worker daily commutes and by heavy-duty diesel tractor trailer truck trips. It is assumed that up to 11,380 light-duty auto roundtrips would be required to transport workers to and from the site and up to 437 truck roundtrips to haul materials (e.g., concrete, asphalt) and debris to and from the site.

Criteria pollutant and precursor exhaust emissions of reactive organic gases (ROG), nitrogen oxides (NO_x), particulate matter (PM₁₀), and fine particulate matter (PM_{2.5}) from construction equipment and vehicles would incrementally add to the regional atmospheric loading of these pollutants during construction of the proposed Project.

Impacts related to the proposed Project contributing to an existing or projected air quality violation are judged by comparing estimated direct and indirect proposed Project exhaust emissions to the significance thresholds, which for short-term construction emissions are 54 pounds per day for ROG, NO_x, and PM_{2.5}; and 82 pounds per day for PM₁₀. Only the exhaust portion of PM_{2.5} and PM₁₀ emissions are compared against the construction thresholds. BAAQMD recommends that analyses focus on implementation of dust control measures rather than comparing estimated levels of fugitive dust to a quantitative significance threshold. Rather, BAAQMD considers implementation of BAAQMD-recommended basic mitigation measures for fugitive dust sufficient to ensure that construction-related fugitive dust is reduced to a less-than-significant level.

Air pollutant emissions were estimated by ERM, a consultant to the Applicant. Table 3-1 shows the estimated total average daily exhaust emissions that would be associated with construction of the proposed Project. All assumptions and calculations used to estimate the Project-related construction emissions are available for review at the City of Benicia and online. As indicated in the table, the total average daily construction exhaust emissions would not exceed the BAAQMD’s significance thresholds. Therefore, impacts that would be associated with construction-related exhaust emissions would be less than significant.

**TABLE 3-1
AVERAGE DAILY CONSTRUCTION EXHAUST EMISSIONS**

Sources	Average Daily Emissions (lb/day)					
	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}
Equipment Exhaust	6.96	26.60	49.67	0.06	2.56	2.35
On-site Vehicle Exhaust	0.18	1.63	0.79	0.00	3.57	0.38
Off-site Vehicle Exhaust	0.91	8.47	1.43	0.01	0.53	0.17
Total Emissions	8.06	36.7	51.9	0.08	6.65	2.91
CEQA Threshold	54	---	54	---	82	54
Threshold Exceeded (Y/N)	No	---	No	---	No	No

SOURCE: ERM, 2013a

In addition to exhaust emissions, emissions of fugitive dust would also be generated by project construction activities associated with earth disturbance, travel on paved and unpaved roads, etc. With regard to fugitive dust emissions, the BAAQMD’s *Revised Draft Options and Justification Report* recommends that lead agencies focus on implementation of dust control measures to ensure that impacts would be less than significant rather than comparing estimated levels of fugitive dust to quantitative significance thresholds. Therefore, BAAQMD basic control measures (BAAQMD, 2012), which are recommended for every construction project and contained in Mitigation Measure AIR-1, would be implemented to ensure that impacts associated with fugitive dust emissions would be reduced to a less-than-significant level.

Mitigation Measure AIR-1: Implement BAAQMD Basic Mitigation Measures.

Valero and/or its construction contractors shall comply with the following applicable BAAQMD basic control measures during Project construction:

- All exposed dirt non-work surfaces (e.g., parking areas, staging areas, soil piles, and graded areas, and unpaved access roads) shall be watered two times a day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California Airborne Toxics Control Measure Title 13, Section 2485 of California of Regulations). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- A publicly visible sign with the telephone number and person to contact at the City of Benicia regarding dust complaints shall be posted throughout construction. Valero and/or contractor shall respond and take corrective action within 8 hours of notification by the City. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

Operations

Operation of the proposed Project would result in Valero replacing up to 70,000 barrels per day of the crude oil currently supplied to the Refinery by marine vessel with an equivalent amount of crude oil transported by rail cars. New stationary sources at the Refinery would include an unloading rack and pipeline, which would result in fugitive emissions of ROG. The project would also include a change in service to existing Tank 1776 to allow it to store crude oil; however, because there would be no change in the amount of crude oil stored at the Refinery, there would be no net increase in tank-related storage mass emissions relative to baseline conditions. Overall, the proposed Project would result in reduced air emissions compared to the existing operations because delivering crude oil by railcar results in less emissions within the BAAQMD compared to delivering crude oil by marine vessel. See Table 3-2 for a summary of net emissions reductions that would be associated with the project. It should be noted that the emissions reductions presented in Table 3-2 represent the maximum amount of reductions that would occur. If less than 70,000 barrels of crude oil are transported by rail, an equivalent lesser amount of crude oil would be delivered by marine vessel, resulting in proportionately less emissions reductions. Regardless, long-term operations of the proposed Project would result in a beneficial impact to air quality in the BAAQMD.

**TABLE 3-2
ANNUAL NET OPERATIONAL EXHAUST EMISSIONS**

Sources	Project Emissions, Net Change from Baseline (tons/yr)					
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
Unloading Rack and Pipeline Fugitive Components	1.71	---	---	---	---	---
Trains	1.70	33.04	5.6	0.02	0.83	0.81
Marine Vessels (Baseline)	(5.18)	(91.84)	(10.69)	(26.79)	(3.58)	(3.40)
Total Emissions	(1.77)	(58.80)	(5.09)	(26.77)	(2.75)	(2.59)
CEQA Threshold	10	10	---	---	15	10
Threshold Exceeded (Y/N)	No	No	---	---	No	No

SOURCE: ERM, 2013b

3c) ***Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?***

Based on BAAQMD guidance, if a project would result in an increase in ROG, NO_x, PM₁₀, or PM_{2.5} of more than its respective average daily mass significance thresholds, then it would also be considered to contribute considerably to a significant cumulative impact. In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project’s individual emissions would be cumulatively considerable. If a project would exceed the identified significance thresholds, its emissions would be cumulatively considerable, and if a project would not exceed the significance thresholds, its emissions would not be cumulatively considerable. As presented in item 3b) above, short-term construction and operational exhaust emissions would not exceed the applicable significance thresholds, and implementation of Mitigation Measure AIR-1 would ensure that impacts associated with fugitive dust emissions would be reduced to a less-than-significant level. Therefore, the project would not be cumulatively considerable and cumulative impacts would be less than significant.

3d) ***Would the project expose sensitive receptors to substantial pollutant concentrations?***

The BAAQMD recommends that lead agencies assess the incremental toxic air contaminant (TAC) exposure risk to all sensitive receptors within a 1,000-foot radius of a project’s fence line. Project construction would generate diesel particulate matter (DPM), which is considered to be a TAC, from the use of diesel off-road equipment. Long-term operations associated with the project would generate TAC emissions from locomotive idling, locomotive transit, locomotive, switching, and from fugitive equipment and routine Tank 1776 leaks. The Applicant provided a screening level health risk assessment, as summarized in Table 3-3, which modeled the following sources using the ISCST3 air dispersion model:

- 1) Locomotive idling- point source;
- 2) Locomotive transit- line of volume sources;
- 3) Locomotive switching- line of volume sources;
- 4) Tank 1776- circular area source; and
- 5) Fugitive equipment leak- rectangular area source.

**TABLE 3-3
MAXIMUM CANCER AND NONCANCER RISK**

Type of Estimated Health Impact	Cancer Risk	Chronic	Acute
	per million, (Receptor Location)	Hazard Index, (Receptor Location)	Hazard Index, (Receptor Location)
Maximum Exposed Individual Residential (MEIR)- Hypothetical residential receptors assumed at > 40m from the train tracks	2.27 Worst case risk at 150m west of train tracks (5786E,4215678N)	0.009 Worst case risk at 150m west of train tracks (578686E, 4215678N)	0.0057 (575494E, 4212545N)
Maximum Exposed Individual Worker (MEIW)	4.46 (576144E, 4214145N)	0.014 (576144E, 4214145N)	0.0473 (575944E, 4214395N)
Maximum Sensitive Receptor- Day Care Center	0.29 (574594E, 4212895N)	0.0006 (574594E, 4212895N)	0.0022 (574594E, 4212895N)

SOURCE: ERM, 2013c

The closest sensitive receptors to the proposed Project would be residences off Lansing Circle, approximately 2,700 feet northwest of the proposed Project site. There are no sensitive receptors within 1,000 feet of any of the proposed Project components. The dose to which receptors are exposed is the primary factor affecting health risk from exposure to TACs. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period when assessing TACs (such as DPM) that have only cancer or chronic non-cancer health effects (OEHHA, 2003). As shown in Table 3-3, the cancer risk at the maximum exposed individual residential (MEIR) receptor, maximum exposed individual worker (MEIW) receptor, and maximum sensitive receptor (MSR) is below 10 in a million. The chronic hazard index and the acute hazard index, at the MEIR, MEIW, and MSR are also below 1.0. Therefore, the impact related to exposing sensitive receptors to substantial pollutant concentrations would be less than significant.

3e) ***Would the project create objectionable odors affecting a substantial number of people?***

Diesel equipment used to construct the project may emit objectionable odors associated with combustion of diesel fuel. However, these emissions would be temporary and intermittent in nature, thus odor impacts associated with diesel combustion during

construction activities would be less than significant. There would be no change expected in the existing operational odors resulting from implementation of the proposed Project. This impact would be less than significant.

References

- Bay Area Air Quality Management District (BAAQMD), 2009. Revised *Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October, 2009.
- BAAQMD, 2010, *Bay Area 2010 Clean Air Plan, Final Clean Air Plan Volume 1*, adopted September 15, 2010.
- BAAQMD, 2012. *CEQA Air Quality Guidelines*, Updated May 2012.
- ERM, 2013a. Crude by Rail Air Permit Application, February 2013.
- ERM, 2013b. Valero Crude by Rail Construction Emissions. February.
- ERM, 2013c. Crude by Rail – BAAQMD Permit Application Revised Health Risk Assessment. Submitted May 1, 2013.
- Office of Environmental Health Hazard Assessment (OEHHA). 2003. *Air Toxics Hot Spots Program Risk Assessment Guidelines: The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. August, 2003.
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4. Biological Resources

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
4. BIOLOGICAL RESOURCES — Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Discussion

- 4a) ***Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?***

The proposed Project could have a substantial adverse indirect effect on nesting birds. While other special-status species occur in the vicinity, they are unlikely to be impacted by the Project due to lack of habitat at the Project site. For the purposes of this analysis, the term “special-status” species includes those species that are listed or proposed for listing by the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and/or the California Department of Fish and Wildlife (CDFW)¹ and receive specific

¹ The California Department of Fish and Game (CDFG) changed its name on January 1, 2013 to The California Department of Fish and Wildlife (CDFW). In this document, references to literature published by CDFW prior to Jan. 1, 2013 are cited as ‘CDFG, [year]’. The agency is otherwise referred to by its new name, CDFW.

protection defined in federal or state endangered species legislation, as well as species that are not formally listed as Threatened or Endangered but are designated as “Rare” or “Sensitive” on the basis of adopted policies and expertise of State resource agencies or organizations, or local agencies such as counties, cities, and special districts. Principal sources for these designations are CDFW’s Special Plant and Animal Lists (CDFW, 2013a) and NMFS Southwest Regional Office’s Protected Resources information (NMFS, 2013).

Sulphur Springs Creek flows adjacent to the Refinery and the riparian canopy extends to the property boundary. The creek is separated from the Refinery by a tall chain link fence. Sulphur Springs Creek and its associated riparian corridor and in-stream marshes provide suitable habitat for the following special-status species: California red-legged frog, western pond turtle, tri-colored blackbird, yellow-headed blackbird, Suisun song sparrow, Samuel’s song sparrow, grasshopper sparrow, loggerhead shrike, yellow-breasted chat, San Francisco common yellowthroat, and short-eared owl. Suisun song sparrow is documented within coastal brackish marsh associated with downstream reaches of Sulphur Springs Creek, and coastal brackish marsh is also recognized by the California Department of Fish and Wildlife (CDFW) as a special natural community (CDFW, 2013b). Brackish and salt marshes at the mouth of Sulphur Springs Creek provide habitat occupied by California black rail, California clapper rail, and salt marsh harvest mouse (CDFW, 2013a). Alameda whipsnake is documented from grasslands and chaparral surrounding the Refinery and American peregrine falcon is documented from undisclosed areas of Benicia (CDFW, 2013); peregrines often nest on tall buildings, and their nests could occur on Refinery structures, on industrial buildings in Benicia, or on rock outcrops associated with surrounding grasslands.

California red-legged frog and western pond turtle are unlikely to occur in the proposed Project area, which is defined for this analysis as the construction footprint where direct impacts to species could occur. Although the chain link fence is permeable to these species, there is no habitat in the proposed Project area and no protective cover. Nesting birds are also unlikely to occur in the proposed Project area, but could occur in the adjacent Sulphur Springs Creek corridor and could experience adverse indirect effects resulting from construction activities. The noise, vibrations, visual disturbance, and increased human activity associated with project construction could result in nest failure (disturbance, avoidance, or abandonment that leads to unsuccessful reproduction), or cause flight behavior that exposes an adult or its young to predators such as Cooper’s hawks (*Accipiter cooperii*). Nest failure is a possible but unlikely outcome of construction activities, since the baseline noise and activity levels at the Refinery would not be significantly increased by construction activities. However, if it were to occur, nest failure would be a significant effect under CEQA and a violation of California Fish and Game Code Sections 3503- 3513 and the federal Migratory Bird Treaty Act. Implementation of the following mitigation measure would reduce potentially significant project effects on nesting birds to a less-than-significant level.

Mitigation Measure BIO-1: Project construction activities should avoid the nesting season of February 15 through August 31, if feasible. If seasonal avoidance is not possible then no sooner than 30 days prior to the start of any Project activity a biologist experienced in conducting nesting bird surveys shall survey the Project area and all accessible areas within 500 feet. If nesting birds are identified, the biologist shall implement a suitable protective buffer around the nest and no activities shall occur within this buffered area. Typical buffers are 250 feet for songbirds and 500 feet for raptors, but may be increased or decreased according to site-specific, Project-specific, activity-specific considerations such as visual barriers between the nest and the activity, decibel levels associated with the activity, and the species of nesting bird and its tolerance of the activity. Construction activities that are conducted within a reduced buffer shall be conducted in the presence of a qualified full-time biological monitor.

- 4b) ***Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?***

Without mitigation, the Sulphur Springs Creek riparian corridor and downstream coastal brackish marshes could potentially experience adverse effects from project construction, resulting from excessive sediment loads generated by grading and other soil-disturbing activities adjacent to Sulphur Springs Creek that are carried into the streamflow. However, project construction would be restricted to active work areas within the Refinery that are devoid of vegetation, and indirect impacts to Sulphur Springs Creek would be prevented through implementation of appropriate mitigation. Proposed Project construction would occur primarily during the low-flow period of April 15 through October 15 when rainfall is not anticipated and the transport of sediments by surface flow would be unlikely. Additionally, the project would implement construction Best Management Practices and Storm Water Pollution Prevention measures identified in Section 9, *Hydrology and Water Quality*. Implementation of HYD-1 would reduce potential construction-related impacts on riparian habitat and downstream coastal brackish marshes to a less-than-significant level.

- 4c) ***Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?***

The proposed Project would not have a substantial adverse effect on federally protected wetlands defined by Section 404 of the Clean Water Act. No wetlands or waters occur in the project area. Without mitigation, Sulphur Springs Creek which is a federally protected waters, and downstream coastal brackish marshes, which are federally protected wetlands could potentially experience indirect adverse effects resulting from project construction. However, the implementation of HYD-1 would reduce potential indirect impacts on federally protected wetlands to a less than significant level. Water quality impacts potentially resulting from project operation would be addressed through the preparation and

implementation of on-site drainage improvements and stormwater capture and treatment systems described in Section 9, *Hydrology and Water Quality*.

- 4d) ***Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?***

The proposed Project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. No nursery sites such as monarch butterfly roosting groves, heron rookeries, or bat roosts are known to occur on the premises and migratory fish such as steelhead are not documented to occur in Sulphur Springs Creek. The Sulphur Springs Creek riparian zone is a likely movement corridor for wildlife, and could be adversely affected during proposed Project construction and operation by the use of nighttime lighting which may deter use of the corridor. Based on proposed Project lighting design the proposed downwards orientation of proposed Project lighting should result in a less than significant impact not substantially more than the Project baseline.

- 4e) ***Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?***

The proposed Project would not conflict with any local policies or ordinances protecting biological resources. The project would be constructed among active areas within the Refinery boundary and would not conflict with the *City of Benicia General Plan* (City of Benicia, 1999) or the *Solano County General Plan* (Solano County, 2008). While a variety of trees are protected by the City of Benicia's tree ordinance (City of Benicia, 2008), no trees are proposed for removal and no impact would occur.

- 4f) ***Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?***

The proposed Project would not conflict with the provisions of an adopted Habitat Conservation Plan (HCP). Solano County has a Final Administrative Draft Multispecies Habitat Conservation Plan (Solano HCP) (LSA, 2009), though neither the City of Benicia nor the Refinery are plan participants. The proposed Project would not result in impacts, either directly or through habitat modification, to any threatened or endangered species or California Species of Special Concern (SSC) or rare plants covered by the Solano HCP. Nesting birds, some of which are SSCs and are specified in the Solano HCP, have the potential to be present in the Sulphur Springs Creek riparian corridor and indirectly affected by project activities, but no formal consultation with the U.S. Fish and Wildlife Service or CDFW would be required for these species, and impacts on nesting birds would be avoided through implementation of Mitigation Measure BIO-1. A summary of the Solano County HCP is provided below for reference.

The Plan provides take coverage for 36 species, 25 of them listed as threatened or endangered under the federal Endangered Species Act (FESA); 16 listed as threatened or endangered under the California Endangered Species Act (CESA) or designated fully-protected species under California Fish and Game Code; a subset of 12 are jointly listed under both FESA and CESA; four are designated by CDFW and the California Native Plant Society as California Rare Plant Rank (CRPR) 1B species; and two are SSCs. The Plan also identifies Special Management Species, comprised of 20 additional CRPR plants and 15 wildlife SSCs. Plan species with potential to occur adjacent to the project area in Sulphur Springs Creek and downstream coastal brackish marshes are California red-legged frog, western pond turtle, tri-colored blackbird, yellow-headed blackbird, Suisun song sparrow, Samuel's song sparrow, grasshopper sparrow, loggerhead shrike, yellow-breasted chat, San Francisco common yellowthroat, and short-eared owl. Chinook, steelhead, smelt, and other anadromous species are not documented from Sulphur Springs Creek, likely due to the presence of a tidal gate at the creek mouth.

References

- California Department of Fish and Wildlife. 2013a. Special Plant and Animals Lists. Available online at dfg.ca.gov/wildlife/nongame/list.html. Accessed May 13, 2013.
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- California Department of Fish and Wildlife. 2013c. California Natural Diversity Database (CNDDDB), Rarefind 4. Online database. Accessed May 10, 2013.
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- National Marine Fisheries Service. 2013. Southwest Regional Office web page. Available online at swr.nmfs.noaa.gov/Default.htm. Last updated May 10, 2013. Accessed May 13, 2013.

5. Cultural Resources

<u>Issues (and Supporting Information Sources):</u>	<u>Potentially Significant Impact</u>	<u>Less Than Significant with Mitigation Incorporation</u>	<u>Less Than Significant Impact</u>	<u>No Impact</u>
5. CULTURAL RESOURCES — Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Discussion

5a) ***Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?***

CEQA Guidelines Section 15064.5 requires the lead agency to consider the effects of a project on historical resources. A historical resource is defined as any building, structure, site, or object listed in or determined to be eligible for listing in the California Register of Historical Resources (California Register), or determined by a lead agency to be significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, or cultural annals of California. The following discussion will focus on architectural and structural resources. Archaeological resources, including archaeological resources that are historical resources according to Section 15064.5, are addressed in b) below.

ESA conducted a records search of all pertinent survey and site data at the Northwest Information Center (NWIC) of the California Historical Resources Information System, dated July 31, 2002 and updated on January 28, 2013 (File No. 12-0760). The records were accessed by utilizing the Benicia USGS 7.5-minute quadrangle map, Sections 25 and 30, Township 2N, Range 3W and 2W. The review included the project Area of Potential Effect (APE) and a ½ mile buffer. Previous surveys, studies, and site records were accessed as they pertained to the APE. Records were also accessed and reviewed in the *Historic Property Data File for Solano County*, which includes listings from the *National Register of Historic Places*, the *California Register of Historical Resources*, the *California Inventory of Historic Resources*, the *California Historical Landmarks*, and the *California Points of Historical Interest*.

The proposed Project would not impact any previously recorded historic-period buildings or structures within the project APE. The nearest known recorded resource is the Benicia

Arsenal Igloo Bunker #C-425 (designated as P-48-000516; Dexter, 2001). This structure is a World War II-era concrete ammunition bunker previously recommended not eligible for listing in the California Register or the National Register of Historic Places. The bunker is located over 1,000 feet west of the APE and will not be impacted by the proposed Project.

The proposed Project would have no impact on historical resources and no mitigation is required.

5b) ***Would the project cause a substantial adverse change in the significance of a unique archaeological resource pursuant to §15064.5?***

This section discusses archaeological resources, both as historical resources according to CEQA Guidelines Section 15064.5 as well as unique archaeological resources as defined in Public Resources Code Section 21083.2 (g).

The records search at the NWIC discussed above indicates that no previously recorded archaeological resources are located within the project APE or within the ½-mile records search radius. Qualified archaeologists conducted a pedestrian survey of the Refinery in 2001 (URS, 2001). The surveyors noted that the extent of soil disturbance due to grading and identified no prehistoric archaeological resources within the boundaries of the Refinery.

No unique prehistoric or historic-period archaeological resources were identified within the APE during the background research or the 2001 surface survey. Nearby site distribution, proximity to the nearest natural watercourse, and previous development/disturbance in the APE reduces the potential to uncover previously unidentified archaeological resources. In the unlikely event that archaeological resources are uncovered during proposed Project construction, the following mitigation measure would reduce potential impacts to a less-than-significant level.

Mitigation Measure CUL-1: Inadvertent Discovery of Cultural Resources. If prehistoric or historic-period archaeological resources are encountered, all construction activities within 50 feet shall halt and Valero shall be notified. A Secretary of the Interior-qualified archaeologist shall inspect the findings within 24 hours of discovery. If it is determined that the Project could damage a historical resource or a unique archaeological resource (as defined pursuant to the CEQA Guidelines), mitigation shall be implemented in accordance with PRC Section 21083.2 and Section 15126.4 of the CEQA Guidelines, with a preference for preservation in place. Consistent with Section 15126.4(b)(3), preservation in place may be accomplished through planning construction to avoid the resource; incorporating the resource within open space; capping and covering the resource; or deeding the site into a permanent conservation easement. If avoidance is not feasible, a qualified archaeologist shall prepare and implement a detailed treatment plan in consultation with Valero and the affiliated Native American tribe(s), if applicable. Treatment of unique archaeological resources shall follow the applicable requirements of PRC Section 21083.2. Treatment for most resources would consist of (but would not be not limited to) sample excavation, artifact

collection, site documentation, and historical research, with the aim to target the recovery of important scientific data contained in the portion(s) of the significant resource to be impacted by the Project. The treatment plan shall include provisions for analysis of data in a regional context, reporting of results within a timely manner, curation of artifacts and data at an approved facility, and dissemination of reports to local and state repositories, libraries, and interested professionals.

5c) ***Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?***

Paleontological resources are the fossilized evidence of past life found in the geologic record. Despite the tremendous volume of sedimentary rock deposits preserved worldwide, and the enormous number of organisms that have lived through time, preservation of plant or animal remains as fossils is an extremely rare occurrence. Because of the infrequency of fossil preservation, fossils—particularly vertebrate fossils—are considered to be nonrenewable resources. Because of their rarity, and the scientific information they can provide, fossils are highly significant records of ancient life.

Rock formations that are considered of paleontological sensitivity are those rock units that have yielded significant vertebrate or invertebrate fossil remains. This includes, but is not limited to, sedimentary rock units that contain significant paleontological resources anywhere within its geographic extent. According to previous investigations, excavated native unconsolidated deposits and bedrock were placed as compacted fill, ranging from 18 to 53 feet in topographically low areas including the project APE (Woodward-Clyde, 1993). These disturbed deposits would not likely yield significant paleontological remains and as such, the proposed Project would have no impact to paleontological resources. In the unlikely event that paleontological resources are unearthed during proposed Project construction, the following mitigation measure would reduce potential impacts to a less-than-significant level.

Mitigation Measure CUL-2: Inadvertent Discovery of Paleontological Resources. In the event of an unanticipated discovery of a fossil or fossilized deposit during construction, excavations within 50 feet of the find shall be temporarily halted or diverted until a qualified paleontologist examines the discovery. The paleontologist shall notify the appropriate agencies to determine procedures that would be followed before construction is allowed to resume at the location of the find. The paleontologist shall oversee implementation of these procedures once they have been determined.

5d) ***Would the project disturb any human remains, including those interred outside of formal cemeteries?***

There is no indication that the project APE has been used for burial purposes in the recent or distant past. In the unlikely event of the discovery of any human remains during proposed Project construction activities, the following mitigation measure would reduce potential impacts to a less-than-significant level.

Mitigation Measure CUL-3: Inadvertent Discovery of Human Remains. In the event of discovery or recognition of any human remains during construction activities, such activities within 50 feet of the find shall cease until the Solano County Coroner has been contacted to determine that no investigation of the cause of death is required. The Native American Heritage Commission (NAHC) will be contacted within 24 hours if it is determined that the remains are Native American. The NAHC will then identify the person or persons it believes to be the most likely descendant from the deceased Native American, who in turn would make recommendations to Valero for the appropriate means of treating the human remains and any grave goods.

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6. Geology and Soils

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
6. GEOLOGY AND SOILS —				
Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- 6a.i) ***Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?***

The State of California, through the Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) prohibits the development of structures for human occupancy across active fault traces.² Under the Alquist-Priolo Act, the California Geological Survey (CGS, formerly the

² The Alquist-Priolo Act designates zones that are most likely to experience fault rupture, although surface fault rupture is not necessarily restricted to those specifically zoned areas. The zones are defined by the California Geological Survey (CGS). An active fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 11,000 years). A potentially active fault is defined as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years), unless direct geologic evidence demonstrates inactivity for all of the Holocene or longer. This definition does not, of course, mean that faults lacking evidence of surface displacement are necessarily inactive. Sufficiently active is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches. A structure for human occupancy is one that is intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy rate of more than 2,000 person hours per year (Hart, 1997).

California Division of Mines and Geology) must establish zones on either side of an active fault that delimits areas susceptible to surface fault rupture. These zones are referred to as fault rupture hazard zones and are shown on official maps published by the CGS.

The closest active fault to the proposed Project area mapped under the Alquist-Priolo Act is the Concord-Green Valley fault which is oriented north-south and is located approximately two miles east of the proposed Project area (USGS, 2013; CDMG, 1993). The proposed Project area is located approximately 1.7 miles outside of the fault rupture hazard zone for this fault. Although fault rupture is not necessarily bound by the limits of the hazard zone, it is considered unlikely to occur in areas outside of the mapped fault rupture hazard zone. The proposed Project area is situated in close proximity to the east-dipping Lake Herman fault which runs along the eastern portion of the Refinery property (Graymer *et al.*, 2002). This is a pre-Quaternary fault (no displacement has occurred during the previous 1.6 million years) and the CGS does not delineate this as an active fault under the Alquist-Priolo Act. No active faults are known to traverse through the proposed Project area and the possibility of surface fault rupture on-site is very low (City of Benicia, 1999). Therefore, based on the current proposed Project design, which does not include housing or facilities for human occupancy, the potential for damage to property or injury/loss of life to people as a result of fault rupture is considered less than significant.

6a.ii) ***Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?***

The proposed Project site is located in the San Francisco Bay Area, a seismically active region of California with numerous active faults. Seismic activity in the region is dominated by the San Andreas Fault system, which includes the San Andreas, Hayward, and Calaveras faults. Several other faults, including the Rodgers Creek, Concord-Green Valley, Southampton, and West Napa faults also accommodate some of this movement and are considered active.

According to the U.S. Geologic Survey Working Group on California Earthquake Probabilities, there is a 63 percent likelihood that an earthquake of magnitude 6.7 or higher will occur in the Bay Area between 2007 and 2037 (USGS, 2008). The Association of Bay Area Governments (ABAG) has developed Earthquake Shaking Hazard Maps, which predict the potential for ground shaking during major earthquakes on the active faults in the Bay Area. The Shaking Hazard Maps rank degrees of ground shaking intensity based on the Modified Mercalli Intensity (MMI) scale. The MMI scale, originally developed by G. Mercalli in 1902, is commonly used to measure earthquake effects due to ground shaking. It is a useful scale because it describes ground motion in terms of effects observed by people in various type structures during past earthquakes. The MM values for intensities

range from MMI-I (earthquake not felt by people), through more common, moderate earthquakes at MMI-VI to major catastrophic events at MMI-XII (damage nearly total)³.

The proposed Project site may be subject to high seismic ground motions. The 1989 moment magnitude⁴ (Mw) 6.9 Loma Prieta earthquake caused widespread damage throughout the Bay Area and produced shaking of MMI-VI in the area of Benicia. The strongest shaking experienced in the Benicia area during historic time was generated from the April 18, 1906, Great San Francisco earthquake on the San Andreas Fault that generated a Mw 7.9. This earthquake produced shaking intensities of MMI-VIII and IX (URS, 2002). This analysis considered an earthquake on the Concord-Green Valley fault due to the close proximity of this fault to the proposed Project site. This fault is capable of generating a Maximum Credible Earthquake (MCE) of Mw 7.1. The Working Group on California Earthquake Probabilities (USGS, 2008) assigns a 3% probability to the occurrence of a Mw 6.7 or larger earthquake on the Concord-Green Valley fault over the next 30 years. A 6.7 magnitude earthquake on the Concord-Green Valley fault is predicted to result in shaking intensities of MM-VIII (very strong) at the Project site (ABAG, 2013).

According to the CGS Probabilistic Seismic Hazard Assessment (PSHA), the peak ground acceleration at the proposed Project site could reach 0.5 g (CGS, 2013).⁵ The PSHA identifies the hazard from earthquakes that geologists and seismologists agree could occur in the future. With a 10 percent probability of exceedance in 50 years (equivalent to an earthquake with a 475-year recurrence interval), the expected ground motions at the site would be 0.5g.

Predicting seismic events is not possible, nor is providing mitigation that can entirely reduce the potential for injury and damage that can occur during a seismic event. Although some structural damage is typically not avoidable during an earthquake, building codes, construction ordinances, and modern construction materials have been established to protect against structural damage and major injury during a seismic event. While building codes assume that some damage will occur during an earthquake, they are designed to prevent loss of life and limb and reduce the potential of structural collapse. As described above, the proposed Project site is located in a seismically active area which is expected to experience a significant shaking event sometime in the future. Therefore, building codes

³ Intensities ranging from IV to X could cause moderate to significant structural damage. The damage level represents the estimated overall level of damage that will occur for various MM intensity levels. Some buildings will experience substantially more damage than this overall level, and others will experience substantially less damage. Not all buildings perform identically in an earthquake. The age, material, type, method of construction, size, and shape of a building all affect its performance.

⁴ While Richter Magnitude was historically the primary measure of earthquake magnitude, seismologists now use Moment Magnitude as the preferred way to measure earthquakes. The Moment Magnitude scale (Mw) is related to the physical characteristics of a fault, including the rigidity of the rock, the size of fault rupture, and the style of movement or displacement across the fault. Although the formulae of the scales are different, they both contain a similar continuum of magnitude values, except that Mw can reliably measure larger earthquakes and do so from greater distances.

⁵ g is gravity = 980 centimeters per second squared. Acceleration is scaled against acceleration due to gravity or the acceleration with which a ball falls if released at rest in a vacuum (1.0 g). Acceleration of 1.0 g is equivalent to a car traveling 100 meters (328 feet) from rest in 4.5 seconds.

contain the most stringent requirements for seismic design in this area. The proposed Project would be required to comply with the geotechnical and seismic design criteria required for construction in accordance with the California Building Code (Title 24). Project equipment would be designed, at minimum, to withstand a ground acceleration that has a 10 percent probability of being exceeded in 50 years.

With foundation and structural design in accordance with the current California Building Code (CBC) standards, seismic shaking should not result in significant structural damage to proposed Project components. Seismic design consistent with current professional engineering and Refinery industry standards would be employed in the proposed construction for resistance to strong ground shaking, especially for lateral forces. At a minimum, the CBC requirements would be followed during design and construction of all elements of the proposed Project. Additionally, the Applicant would be required to submit geotechnical engineering reports to the City that address site stability and foundation integrity for projects involving substantial grading in order to obtain grading or construction permits (City of Benicia, 1999). The following mitigation measure would ensure that the level of risk from ground shaking would be less than significant.

Mitigation Measure GEO-1: A site-specific, design level geotechnical investigation shall be required as part of this Project to identify geologic hazards and provide recommendations to mitigate any such hazards in the final design of the proposed Project. The analyses would be completed in accordance with applicable City ordinances and policies and consistent with the most recent version of the California Building Code, which requires structural design that can accommodate ground accelerations expected from known active faults. The geotechnical investigation report shall evaluate the potential for ground shaking, liquefaction, and landslide hazards and shall include recommendations to ensure slope stability. The investigation shall be conducted by a California registered engineer or certified engineering geologist and all recommendations made in the investigation report shall be incorporated into the proposed Project design specifications.

6a.iii) ***Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?***

Seismic shaking can also trigger secondary ground-failures caused by liquefaction. Liquefaction is a phenomenon where saturated subsurface soils lose strength because of increased pore pressure and exhibit properties of a liquid rather than those of a solid. The soils most susceptible to liquefaction are clean, loose, uniformly graded, saturated, and fine-grained and occur close to the ground surface, usually at depths of less than 50 feet. Seismic hazard mapping prepared by the Association of Bay Area Governments (ABAG, 2013), indicates that the proposed Project site is located in a very low risk area for liquefaction. However, geotechnical investigations conducted in the vicinity of the proposed Project (Kleinfelder, 2013) have identified subsurface conditions that have the potential for seismically induced liquefaction, including settlement and lateral migration towards Sulphur Springs Creek. This could result in vertical surface settlement of several

inches and horizontal ground displacement of several feet, resulting in damage to proposed Project components (such as piping, containment berms and walls, and rail lines). Although geotechnical investigations have concluded that the layers of concern detected to date are relatively thin (typically less than five feet in thickness), the full lateral extent of the liquefiable and lateral spreading areas has not been determined. Given the conditions identified at the site, mitigation is available that would ensure that the level of risk from seismic-related ground failure, including liquefaction and secondary ground failures associated with liquefaction, would be less than significant. Additionally, modern construction methods and materials can reduce the potential damage from liquefaction.

6a.iv) ***Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?***

The Refinery site is partially located on bedrock slopes and slopes covered with relatively unconsolidated colluvium. However, the topography within the vicinity of the proposed Project elements is relatively flat and approximately 0.2 miles from any noted slopes that could be subjected to seismically-induced landslides in the event of a major earthquake in the region. Additionally, ABAG (2013b) has mapped areas at risk of rainfall-induced landslides based on historic landslide information and the proposed Project area has not been subject to historic rainfall-induced landslides or earth flows. The proposed rail line extension is located directly adjacent (within 50 to 80 feet) to Sulphur Springs Creek (see Figure 3, Site Plan) which flows southeast towards Suisun Bay and is characterized by shallow creek banks. Therefore this portion of the Refinery is not considered to be at risk of slope failure; the potential for adverse effects involving landslides would be less than significant.

6b) ***Would the project result in substantial soil erosion or the loss of topsoil?***

Given that the majority of the proposed Project site is developed and is an operating refinery, the proposed Project is not expected to expose soils that could result in substantial loss of topsoil or significant, long-term erosion. However, temporary erosion hazards could be an issue during construction. Construction activities associated with the proposed Project would require land disturbing activities such as grading, earthmoving, backfilling, and compaction that would expose soils to the effects of wind and stormwater runoff, and could result in erosion or soil loss (see Section 9, *Hydrology and Water Quality*, for additional discussion of sedimentation).

In order to minimize erosion impacts during construction, the Applicant would implement best management practices (BMPs) as required under the National Pollutant Discharge Elimination System (NPDES) General Construction Permit. BMPs are individual or combined measures that can be implemented in a practical and effective manner on the Project site which, when applied, prevent or minimize the potential release of contaminants into surface waters and groundwater. As part of the General Construction Permit, the contractor would be required to prepare and implement a Storm Water Pollution Prevention

Plan (SWPPP). One of the key elements of a SWPPP is the use of BMPs employed to protect stormwater quality, including minimizing erosion and soil loss during construction activities. Construction activities would be required to employ the specific erosion control BMPs presented in the SWPPP, typical examples of which include use of silt fencing, sandbag barriers, and placement of straw bales secured by stakes. Since BMPs have been recognized as methods to effectively prevent or minimize the potential release of contaminants into surface waters and groundwater, the potential for erosion impacts or loss of top soil during proposed Project construction would be less than significant.

6c) ***Would the project be located on geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?***

The proposed Project area is predominantly underlain by compacted fill consisting of native unconsolidated deposits and bedrock. The fill material is somewhat well compacted sandy clay, with abundant rock fragments common throughout. The fill material ranges from 18 on up to 53 feet in topographically low areas, on top of 2 to 13 feet of natural stiff clay that rests on bedrock. In general, the fill is moderately to highly expansive, and is strong and only slightly to moderately compressible (Woodward-Clyde 1993). The proposed Project would include a design level geotechnical investigation that would include recommendations for foundation soils compaction and backfill compaction specifications to ensure geotechnically sound installation of the proposed Project components. The potential for seismic-related ground failure, including liquefaction for the proposed Project is discussed above under a.iii). The potential landslide hazard for the proposed Project is discussed above in a.iv). Mitigation Measure GEO-1, above, would reduce the potential hazard from unstable soils, including lateral spreading, subsidence, liquefaction, or collapse to a less-than-significant level.

6d) ***Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?***

In general, the effects of expansive soils can damage foundations, concrete slabs, and aboveground structures over long periods of time. Previous studies have determined that clay-rich expansive soils are present on the site (as discussed in c) above). Typically, expansive soils can be re-engineered or replaced with engineered fills during grading and prior to construction to reduce the potential for adverse effects. For the proposed Project, backfilling excavated areas with either imported fill or reuse of excavated material, if appropriate, and compacted as an engineered fill would eliminate the potential effects of expansive soils. Treatment of subsurface soils underneath the proposed facilities at the proposed Project site according to measures designed by a geotechnical engineer would also eliminate potential hazards of expansive soils. Mitigation Measure GEO-1, above, would reduce the potential impact from expansive soils to a less-than-significant level.

- 6e) ***Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?***

Implementation of the proposed Project would not involve the use of septic tanks or alternative wastewater treatment disposal systems to handle wastewater generation. Surface water run-off and wastewater produced by Refinery operations are currently treated at the Project site's wastewater treatment plant. Septic systems would not be an element of the Project and therefore, the ability of the soils on the proposed Project site to accommodate septic systems is not considered here. No impact is anticipated.

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7. Greenhouse Gas Emissions

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
8. GREENHOUSE GAS EMISSIONS — Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

- 8a) *Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?*

Based on the following analysis, construction and operation of the project would not generate greenhouse gas (GHG) emissions, either directly or indirectly, that would have a significant impact on the environment.

Construction

The majority of proposed Project-related GHG construction emissions would be generated on-site due to the use of heavy-duty off-road equipment that would include excavators, graders, front loaders, dump trucks, cranes, paving equipment, etc. The equipment operation hours per day and number of required work-days would vary depending on the specific type of equipment and on the construction activity; however, for the purposes of this analysis, it is assumed that construction activities at the site would occur during two shifts each day for an average of 10 hours per shift, 7 days a week, for 25 weeks. GHG emissions would also be generated by construction worker daily commutes and by heavy-duty diesel tractor trailer trucks that would be required to haul materials (e.g., concrete, asphalt, rails) and debris to/from the proposed Project site.

The Bay Area Air Quality Management District’s (BAAQMD) *Revised Draft Options and Justification Report* (BAAQMD, 2009) does not identify a construction-related threshold of significance for GHG emissions; however, it does identify a quantitative threshold for annual operational emissions of 1,100 metric tons carbon dioxide equivalent (CO₂e). For stationary source projects, the quantitative threshold is 10,000 metric tons CO₂e per year. Therefore, for a conservative study, this analysis applies the BAAQMD’s threshold of 1,100 metric tons CO₂e per year for non-stationary sources to the project-related construction emissions. A summary of the GHG construction emissions that would be associated with the project are presented in Table 8-1.

**TABLE 8-1
PROJECT CONSTRUCTION GREENHOUSE GAS EMISSIONS**

Sources	CO₂e Emissions (metric tons)
Equipment Exhaust	474
On-site Vehicle Exhaust	24
Off-site Vehicle Exhaust	103
Total Emissions	601
CEQA Threshold	1,100
Threshold Exceeded (Y/N)	No

SOURCE: ERM, 2013a

Details of the GHG construction emissions calculations and assumptions are available for review at the City of Benicia Community Development Department and online. As indicated in Table 8-1, project construction-related GHG emissions would be approximately 601 metric tons CO₂e per year, which is considerably lower than BAAQMD's quantitative threshold of 1,100 metric tons CO₂e per year for non-stationary sources. Therefore, GHG emissions that would be associated with construction of the proposed Project would represent a less than significant impact.

Operations

Project operations would result in a net reduction of GHG emissions over existing conditions (see Table 8-2) as the overall capacity of the Refinery would be unchanged, but there would be less crude oil deliveries by marine vessels that have higher emissions compared to deliveries of crude oil by rail transit. The proposed Project would reduce GHG emissions by up to approximately 3,543 metric tons of CO₂e per year compared to existing conditions. Therefore, implementation of the project would represent a beneficial impact.

**TABLE 8-2
PROJECT ANNUAL NET GREENHOUSE GAS EMISSIONS**

Sources	CO₂e Emissions, Net Change from Baseline (metric tons/year)
Trains	5074
Marine Vessels (Baseline)	(8,617)
Total Emissions	(3,543)
CEQA Threshold	1,100
Threshold Exceeded ?	No

SOURCE: ERM, 2013b

8b) ***Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?***

The City of Benicia Climate Action Plan (CAP) would apply to the proposed Project, specifically Policy IC-3.2, *Decrease Transportation Source Emissions*, and Objective IC-4, *Encourage the Refinery to Continue to Reduce Emissions* (City of Benicia, 2009). The proposed Project would not conflict with the CAP because it would support both of these initiatives as it would result in reduced net emissions in the BAAQMD from transportation sources. Therefore, there would be no impact related to the proposed Project conflicting with the CAP.

References

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8. Hazards and Hazardous Materials

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
8. HAZARDS AND HAZARDOUS MATERIALS — Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

8a) ***Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?***

While the proposed Project clearly involves the transportation of crude oil – a hazardous material – by rail, it also results in a reduction of the transportation of crude oil by marine vessel. As the quantities of crude delivered by rail and marine vessel offset each other, it is, at a minimum, expected that the relative risks offset each other and that rail transport would present no new significant hazard above the current Refinery baseline risk for marine transport of crude oil to the Refinery. Thus, the potential risk for the routine transport of crude oil by rail for the proposed Project is considered less than significant.

- 8b) ***Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?***

The crude oil tanker cars must meet the U.S. Department of Transportation (USDOT) requirements for hazardous materials as established in the Code of Federal Regulations (CFR) No. 49 Parts 173.31. Tanker car unloading is covered in 49 CFR 174.67. Accident data from the USDOT show that between 1975 and 2005 the risk of transport of hazardous materials by rail tanker car has declined significantly – primarily due to a focus on safety by the railroads and improved tank car design (USDOT, 2013). The risks of upset and accident from the proposed Project occur through the potential for a spill of crude oil during transport, unloading, or storage at the Refinery or through a fire as a result of an accident involving a spill of crude oil during transport, unloading, or storage activities. In all of these situations, when compared to the baseline conditions at the Refinery of crude transport and handling by marine vessel, the relative differences between facilities and the reduction of transport of an equivalent amount of crude oil by marine vessel would have a less than significant impact.

- 8c) ***Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?***

There are no schools within a 1/4 mile radius of the proposed Project and none are proposed within that radius. No impact would result.

- 8d) ***Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?***

The proposed Project area (the Valero Refinery) is listed on the State Water Resources Control Board List as having potentially contaminated ground water, however, all remedial actions are complete (SWRCB, 2013) and no further action has been identified. As the proposed Project involves the installation of underground equipment and other new construction that would involve soil disturbance, there is the potential to encounter contaminated soil or groundwater. If contamination is encountered, construction work would follow legally required procedures to protect worker and public health and safety. Excavated soils would be segregated and sampled relative to the profiling requirements of the accepting landfill, and disposed of in accordance with policies of the accepting landfill and applicable regulations. This impact is considered less than significant.

- 8e) ***For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?***

The proposed Project is not located within an airport use plan. No impact would occur.

- 8f) ***For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?***

There are no private airstrips in the vicinity of the proposed Project. Therefore, there are no impacts anticipated from a private airstrip. No impact would occur.

- 8g) ***Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?***

Valero personnel respond to emergencies at the Refinery while the City of Benicia has overall responsibility for emergency response and evacuation plans within the City. The main feature of the proposed Project which could impact on evacuation plans is the additional periods of time in which project-related rail traffic would block Park Road outside the Refinery's southern border. As discussed below in Section 14, *Public Services*, and Section 16, *Transportation/Traffic*, the proposed Project would not pose a potentially significant new impact on this road and thus, is considered to be a less than significant impact on emergency/evacuation response plans.

- 8h) ***Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?***

No aspect of the proposed Project would expose people or structures to significant risk of wildland fires as the proposed Project facilities are entirely within the Refinery and away from source areas for such fires. Additionally, Valero personnel respond to all emergencies at the Refinery and could address such risks as needed. Transportation of crude by rail could have some potential for such risk but when compared to the baseline risk of all rail traffic, the Project-related risk is less than significant.

References

State Water Resources Control Board List website: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL18238656, accessed May 2013.

US Department of Transportation website: <http://www.volpe.dot.gov/coi/pis/work/archive/tankcar.html>, accessed May 2013.

9. Hydrology and Water Quality

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
9. HYDROLOGY AND WATER QUALITY — Would the project:				
a) Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, in a manner that would result in substantial erosion or siltation on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f) Otherwise substantially degrade water quality?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
j) Expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

9a, f) ***Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality?***

The majority of the proposed Project site is developed and is an operating refinery; the proposed Project would not result in any increase in impervious area or storm runoff. The San Francisco Bay Regional Water Quality Control Board (RWQCB) regulates water

quality in the Project area. The Refinery operates under a National Pollutant Discharge Elimination System (NPDES) permit administered by the RWQCB. Wastewater produced on the Refinery site by Refinery operations is currently treated at the Refinery's wastewater treatment plant and discharged into the Carquinez Straits via a waste water effluent outfall regulated under the Refinery NPDES permit. Long-term storm runoff generated at the Project site would be similar to the existing runoff on-site. Stormwater runoff would continue to be discharged through the stormwater outfalls that service the Refinery property⁶. The stormwater outfalls are permitted under the Refinery NPDES permit, which sets stormwater outfall discharge limits and monitoring requirements. Stormwater discharges and water quality at the Refinery's 16 storm water outfalls are managed through application of an existing Storm Water Pollution Prevention Plan (SWPPP), which incorporates the NPDES discharge limits and monitoring requirements as well as incorporates procedures, pollution prevention strategies, and best management practices (BMPs) used to meet these discharge limits. The SWPPP was originally prepared to comply with San Francisco Regional Water Quality Control Board (SFRWQCB) Order Number 2002-0112 (NPDES Permit No. CA0005550) adopted in October, 2002 (URS, 2003). In 2011, the SWPPP was revised to comply with Order Number R2-2009-0079, issued by the SFRWQCB in 2009 to be effective from January 1 through December 31, 2014. The impact would be less than significant for long-term operations.

Construction activities associated with the proposed Project would require land disturbing activities such as grading, earthmoving, backfilling, and compaction. Additionally, proposed Project construction would involve use of chemicals and solvents such as fuel and lubricating grease for motorized heavy equipment. Such construction activities could cause dislodging of soil and erosion or inadvertent spills of construction related chemicals into waterways resulting in adverse water quality impacts. Sulphur Springs Creek is directly adjacent to the proposed Project and these impacts could be significant in the immediate vicinity of construction activities as well as further downstream. Construction or grading activities occurring on land parcels of one acre or more in size are subject to a General Construction Permit under the NPDES permit program under section 402(p) of the federal Clean Water Act. However, the SFRWQCB confirmed that stormwater runoff generated during Project construction activities would not require coverage under the General Permit for Construction Activities based on measures described in Valero's SWPPP (RWQCB, 2013). Implementation of a storm water management plan (SWMP) as described below in Mitigation Measure HYD-1 would ensure that the Project would not substantially degrade water quality. Implementation of standard construction procedures and precautions would also ensure that the water quality impacts related to the handling of chemicals from Project construction would be less than significant.

Based on geotechnical information developed for the proposed Project site (Valero, 2013), encountering groundwater during grading and excavation is not anticipated. The groundwater

⁶ Storm water outfalls in the vicinity of the proposed Project include EEF-003 through -004 and EEF-007 through -010.

table varies across the proposed Project area⁷ (Stantec, 2012), but in general is approximately 10 feet below existing grade at the proposed Project site. Additionally, the groundwater levels are likely to be lower than 10 feet below grade during summer months when the grading and excavation work are scheduled to occur (Valero, 2013). Therefore, it is anticipated that interception of the groundwater table during excavation and grading will be minimal. However, excavation during proposed Project construction could intercept the shallow groundwater table at some locations and could require dewatering. Where groundwater is intercepted during construction, it will be extracted and contained in holding tanks and subsequently processed at the facility's wastewater treatment plant and discharged into the Carquinez Straits via a waste water effluent outfall regulated under the Refinery NPDES permit. Impacts to water quality, water quality standards, or waste discharge requirements relating to construction dewatering of groundwater would be less than significant.

Mitigation Measure HYD-1: The Applicant and/or its contractor shall prepare and implement a storm water management plan (SWMP) for construction of the proposed Project. The proposed project is covered under the Applicant's National Pollutant Discharge Elimination System (NPDES) permit and storm water pollution prevention plan (SWPPP). A notice of intent (NOI) application and notice of termination (NOT) application are not required. Implementation of the SWMP shall start with the commencement of construction and continue through the completion of the proposed Project. The SWMP shall identify pollutant sources (such as sediment) that may affect the quality of stormwater discharge and implement best management practices (BMPs) consistent with the California Stormwater Quality Association's BMP Handbook for Construction to reduce pollutants in stormwater. The Applicant or the construction contractor shall install erosion and stormwater control measures on the construction site such as installation of a silt fence and other BMPs, particularly at locations close to storm drains and water bodies. The BMPs shall also include practices for proper handling of chemicals such as avoiding fueling at the construction site and overtopping during fueling and installing spill containment pans.

- 9b) *Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?*

The proposed Project would not require withdrawal of groundwater. The proposed Project would not result in a substantial increase in impervious surface area within the Refinery. The Refinery is not located in a water supply groundwater basin and, although groundwater in the region is used for agriculture and domestic use, the volume and extent of groundwater underlying the Refinery is minimized by a lack of thick alluvial deposits (URS 2001). Additionally, the potential use of groundwater underlying the Refinery site is

⁷ Depth to water at the Refinery ranges from 2 to 50 feet below ground surface (bgs) (URS 2001). Groundwater in the vicinity of the proposed Project site, adjacent to Sulphur Springs Creek, is monitored at a number of shallow groundwater monitoring wells and groundwater elevations have been recorded ranging from 3 to 8 feet above mean sea level (Stantec, 2012).

restricted due to existing groundwater contamination (Stantec, 2010). As discussed in a, f) above, excavation during Project construction could intercept the shallow groundwater table and could require dewatering, but such dewatering activities would be minimal and temporary in nature and as such, there would be no impacts to groundwater supplies or aquifers. The impact would be less than significant.

- 9c) ***Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?***

The proposed Project site is predominantly paved. The proposed Project elements would be built in an area that is currently graded and paved and would not substantially alter the existing drainage pattern of the site. Storm water runoff would continue to be collected by the existing storm drains and discharged through the Refinery site's NPDES-permitted outfalls. There would be no substantial change above the current baseline in runoff flow rates nor would the proposed Project increase erosion or siltation off-site. Proposed Project construction activities could cause soil erosion [see a, f) above]. However, construction would be short term and, as addressed above, would be conducted in accordance with a SWPPP. There would be no alteration of streams or the existing drainage patterns that could result in substantial erosion or siltation long-term. The impact would be less than significant.

- 9d) ***Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?***

There would be no substantial change in runoff flow rates nor would the proposed Project increase the potential for flooding [see a, f) and c) above]. As stated in c) above, there would be no alteration of streams or the existing drainage patterns. Within the Refinery property, addition of new Project components would not substantially increase the impervious surface areas or increase the storm runoff generated at the proposed Project site. Stormwater runoff would be collected by the existing on-site storm drains and discharged through the existing NPDES-permitted outfalls servicing the Refinery site. The runoff produced at the location of the proposed Project would be accommodated within the existing capacity of the storm water conveyance system. Therefore, there would be no increase in the rate or volume of surface runoff that could result in on- or off-site flooding. The impact would be less than significant.

- 9e) ***Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?***

As discussed in items 9a), f), c) and d) above, stormwater runoff would be collected by the existing storm conveyance system and discharged through the NPDES-permitted outfalls or treated at the Refinery WWTP and discharged into Carquinez Straits. The runoff would be

accommodated within the existing stormwater drainage system and would be similar in nature to the existing site runoff quantities. The impact would be less than significant.

- 9g) ***Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?***

The proposed Project does not include the construction of housing. No impact would result from the proposed Project.

- 9h) ***Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?***

Review of the Federal Emergency Management Agency (FEMA) Federal Insurance Rate Maps (FIRM) for the Project area, indicate that the proposed Project site along Sulphur Springs Creek is designated as “Zone AE”, a Special Flood Hazard Area (SFHA) that is within the 100-year flood zone (FEMA, 2013). Construction of aboveground facilities within a flood hazard zone could potentially impede or redirect flood flows. Aboveground facilities that are not designed to withstand inundation can be damaged during flood events. Due to the proposed Project being within a 100-year flood zone, proposed Project components would be required to include in the design criteria flood hazard mitigation measures in accordance with the City of Benicia Floodplain Management Policy (City of Benicia, 1999). The flood hazard mitigation measures incorporated into the design criteria for the proposed Project would comply with construction standards established by the California Building Code. Further, the proposed Project elements are not habitable structures for human occupancy. Thus, no flood damage to these facilities would be expected. Additionally, construction of new unloading facilities and industry rail track within the mapped 100-year flood hazard zone would be unlikely to displace floodwaters, raise flood elevations, create new flooding impacts (e.g., by causing flooding of existing facilities or structures that previously would not have been inundated), and/or exacerbate existing flooding problems (e.g., by increasing the severity or frequency of flooding relative to pre-Project conditions). Therefore, it is unlikely that the proposed Project would substantially displace or redirect flood flows. The impact would be less than significant.

- 9i) ***Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?***

The proposed Project area is within the mapped dam inundation zone for Lake Herman Dam (ABAG, 1995). Although unlikely, catastrophic failure of this dam would potentially expose people or structures to a significant risk of loss, injury, or death involving flooding. However, all dams are routinely inspected and evaluated for seismic integrity as overseen by the California Division of Safety of Dams (DSOD). When a dam is found to have a failure potential, the water level behind the dam is reduced to allow for partial collapse without loss of water as required by DSOD (ABAG, 2013). Thus, the probability of dam failure resulting in significant loss, injury, or death is low (ABAG, 2013). Given the low

risk of dam failure, and because the proposed facilities would be designed to withstand natural hazards, potential impacts related to dam failure are considered less than significant.

9j) ***Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?***

The proposed Project would be limited to modifications and additions to the Refinery that would allow a larger proportion of its crude oil to be delivered by railcar and would not expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow. The influence of an ocean-borne tsunami wave would dissipate prior to reaching the City of Benicia, because of the distance of the Project area from the Golden Gate in San Francisco Bay. The Refinery site is not located within a designated tsunami inundation area (CEMA, 2009). Additionally, the chances of a tsunami generated east of the Golden Gate are very low because the fault structures in the Bay Area displace laterally. Seiches form in enclosed bodies of water. The risk from seiche is considered minimal because there are no enclosed water bodies in the immediate vicinity of the proposed Project site. Lake Herman, the closest enclosed large water body is approximately 1.5 miles north of the proposed Project site. The possibility of mudflow is minimal because the proposed Project area is relatively flat with no steep slopes in the immediate vicinity. The proposed Project would not exacerbate nor be subject to the risks of tsunami, seiche, or mudflows.

References

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- ABAG 2013. Dam Failure Inundation. Earthquakes and Hazards Program. Accessed online February 28, 2013 at <http://quake.abag.ca.gov/dam-failure/>
- California Emergency Management Agency (CEMA), 2009. Tsunami Inundation Map for Emergency Planning. State of California ~ County of Solano. Benicia Quadrangle. California Emergency Management Agency, California Geological Survey, University of Southern California. July 15, 2009. Accessed online February 28, 2013 at: http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/Solano/Documents/Tsunami_Inundation_Benicia_Quad_Solano.pdf
- City of Benicia, 1999. Benicia General Plan, adopted June 15, 1999.
- Federal Emergency Management Agency (FEMA), 2013. Flood Insurance Rate Map. Solano County, California, and Incorporated Areas. Panel 634 of 730. Map number 06095C0634E.
- San Francisco Bay Regional Water Quality Control Board (SFRWQCB), 2013. Correspondence from John H. Madigan, P.E. to Don Cuffel, Valero Benicia Refinery, Construction Projects Stormwater Runoff Covered by NPDES Permit No. CA0005550, Valero Benicia Refinery, Contra Costa County, May 15, 2013.
- Stantec, 2010. Groundwater Monitoring Plan-Revised 2010, Valero Benicia Refinery. Stantec, May 24, 2010.

URS Corporation, 2001. Remedial Action Plan – Valero Benicia Refinery, July 2001.

URS Corporation, 2003. Valero Refining Company, California. Storm Water Pollution Prevention Plan. Prepared by URS Corporation, 2003. Revised, September 2007 and July 2011.

Valero, 2013. Crude by Rail Project. Response to ESA Data Request No. 3, March 27, 2013.

10. Land Use and Land Use Planning

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
10. LAND USE AND LAND USE PLANNING —				
Would the project:				
a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

10a) *Would the project physically divide an established community?*

Land uses in the vicinity of the proposed Project include general industrial uses in the Benicia Industrial Park directly across Sulphur Springs Creek to the east. This area consists largely of single-level warehouse and manufacturing buildings interspersed with parking areas and materials storage yards. The nearest residential area is located approximately 0.4-mile to the northwest of the terminus of the proposed unloading rack and rail spurs. This neighborhood is separated from the proposed Project site by undeveloped hills, including areas owned by Valero. The proposed Project is surrounded by other areas of the Refinery to the west and south. The proposed Project would be constructed within the existing footprint of already-developed portions of the Refinery, in physically discrete areas occupied by existing Refinery and tank storage operations. Development on the proposed Project site would be contained within the footprint of the existing Refinery and tank farm, and would not physically divide an existing community. The impact would be less than significant.

10b) *Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?*

The proposed Project site is designated General Industrial by the Benicia General Plan and General Industrial (IG) by the Benicia Zoning Ordinance. General Industrial uses are permitted by right under Benicia’s Zoning Ordinance, except that a use permit is required for all oil and gas refining. The entire Refinery is located in an area designated by the *San Francisco Bay Plan* for water-related industry. The proposed Project site is not located within the boundaries of the *Benicia Waterfront Special Area Plan* or the *Bay Area Seaport*

Plan (Benicia Port Plan). The proposed Project would not conflict with any applicable land use plan or policy.

10c) ***Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?***

The proposed Project is located outside the Marsh Protection Area identified in the Suisun Marsh Local Protection Program of the *Suisun Marsh Protection Plan*. Therefore, the Project would not conflict with this conservation plan; no impact would result.

References

City of Benicia, Land Use Diagram, revised November 2003.

City of Benicia, Zoning Map, revised April 2012.

San Francisco Bay Conservation and Development Commission (BCDC), *Benicia Waterfront Special Area Plan*, available online at http://www.bcdc.ca.gov/laws_plans/plans/benicia_waterfront.shtml.

BCDC, *San Francisco Bay Plan*, amended September 2006, reprinted March 2012.

BCDC and Metropolitan Transportation Commission, *San Francisco Bay Area Seaport Plan*, April 18, 1996, as amended through January 2012.

BCDC, *Suisun Marsh Protection Plan*, December 17, 1976, reprinted May 2012.

11. Mineral Resources

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
11. MINERAL RESOURCES — Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

11a) ***Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?***

No base metal, precious metal, or other economic mineral deposits have been reported from the region surrounding the Refinery property (URS, 2002). Clay shale within the Great Valley Sequence has previously been used for the manufacture of brick (URS, 2002). Crushed rock aggregate is produced from two quarries near Lake Herman, to the northwest of the Refinery. No mineral deposits of significant economic value occur within or in the immediate surroundings of the Refinery. Also, there are no oil, gas, or hydrothermal resources either beneath or adjacent to the Refinery property (URS, 2002).

11b) ***Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?***

The proposed Project will not result in any significant impacts to locally-important mineral resources at or near the Refinery.

References

URS, Inc., *MTBE PO Draft Environmental Impact Report*, April 2002.

12. Noise

<u>Issues (and Supporting Information Sources):</u>	<u>Potentially Significant Impact</u>	<u>Less Than Significant with Mitigation Incorporation</u>	<u>Less Than Significant Impact</u>	<u>No Impact</u>
12. NOISE — Would the project:				
a) Result in Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Result in Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Result in A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Result in A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

12a) ***Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?***

The Community Health and Safety Element of the *City of Benicia General Plan* contains noise performance standards, which are directly applicable to this project. These performance standards are used for determining the compatibility of proposed noise sensitive land uses with stationary noise sources. The standards also apply to new projects that include stationary noise sources, which may affect an existing noise sensitive development. The intent of these performance standards is both to prevent new noise sources from encroaching on existing noise sensitive developments and to prevent new noise sensitive development from encroaching on existing uses. The noise limits set by these performance standards are shown in Table 12-1. Noise sources evaluated relative to the performance standards in Table 12-1 should be considered with respect to their standard daily or weekly operating conditions. Noise sources may produce unusual noise levels due to temporary equipment malfunction, or unusual atmospheric conditions. Noise levels associated with these infrequent conditions are exempt from the performance standards contained in Table 12-1. In addition, the performance standards are not applicable to safety signals or warning devices.

**TABLE 12-1
NOISE LEVEL PERFORMANCE STANDARDS FOR NOISE-SENSITIVE LAND USES**

Noise Level Performance Standards, dBA Land Use	Exterior Hourly Leq		Interior Hourly Leq	
	Daytime 7 a.m. to 10 p.m.	Nighttime 10 p.m. to 7 a.m.	Daytime 7 a.m. to 10 p.m.	Nighttime 10 p.m. to 7 a.m.
Residential	55	50	40	35
Transient Lodging	55	50	40	35
Hospitals	--	--	40	35
Nursing Homes	55	50	40	35
Theaters, Auditoriums	--	--	35	35
Churches	55	50	40	40
Schools	55	50	45	45
Libraries	55	50	45	45

NOTES:

- Stationary noise sources include industrial operations, outdoor recreation facilities, HVAC units, loading docks, etc.
- The above standards may be adjusted upwards to allow for an increase in the existing ambient hourly Leq caused by a project. An increase of less than 3 dB is permitted, even if the standards in Table 12-1 are exceeded; an increase of 3 dB or greater constitutes a significant environmental impact, unless the increase does not cause the standards in Table 12-1 to be exceeded.
- The noise level standards contained above shall be applied to a typical hour of operation. When a peak hour of operation is expected to occur consistently during daily or weekly operations, the standards shall also be applied to those operations.
- Each of the noise standards specified above shall be lowered by five dB for tonal noises (humming, high pitched tones, speech music, or recurring impulsive noises). This lowering of the standard does not apply to residential units established in conjunction with industrial or commercial caretaker dwellings.
- The City may choose to apply the noise level performance standards at designated outdoor activity areas, in lieu of the property line.
- The above standards do not apply to safety signals or warning devices.
- For noise sources that occur on an infrequent basis and are considered to be safety equipment (such as flaring or pressure relief valves), a maximum noise level of 75 dB is acceptable, as measured from the receiver's property line. Noise levels that are projected to exceed this maximum are considered a significant environmental impact.
- Where outdoor activity areas do not exist and/or are not expected to be affected, the City may choose to only apply the interior noise level criteria.

SOURCE: City of Benicia General Plan, Community Health and Safety Element – Table 4-4. June 1999.

Title 8, Chapter 8.20 of the Benicia Municipal Code contains noise regulations that apply to the proposed Project. Section 8.20.140 addresses noise from the operation of machinery, equipment, fans, and air conditioning units. This section limits noise increases from such mechanical devices to a maximum of five dBA over ambient base noise levels at the property line of any property generating the noise. Section 8.20.150 prohibits construction activities within any residential zone, or within a radius of 500 feet from a residential zone between the nighttime hours of 10:00 p.m. of any one day and 7:00 a.m. of the following day in such a manner that a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance unless a permit has been obtained from the City Manager or his designee. This section would not apply to the proposed Project as construction activities associated with the proposed Project would take place more than 2,000 feet from the nearest residential zones. Therefore, there are no standards established in the local general plan or noise ordinance related to construction noise that would be applicable to the proposed Project.

Operations and Maintenance

Operational activities associated with the proposed Project that would generate noise would be related to the movement of rail cars and operation of the unloading rack pumps. A noise assessment was conducted for the Refinery by Wilson Ihrig & Associates to evaluate noise level increases at sensitive receptor locations in the vicinity of the Refinery due to the implementation of the proposed Project. The noise assessment found that under worst-case conditions, noise from the unloading rack pumps and the rail car movements would be up to 21 dBA and 58 dBA, respectively, at the nearest residence at Lansing Circle, approximately 2,700 feet northwest of the northern end of the Project site (Wilson, Ihrig & Associates, 2013).

Existing average hourly L_{eq} noise levels for day, evening, and nighttime hours at the nearest residences to the proposed Project site range between 52 dBA and 55 dBA. Overall, noise generated by the proposed Project would be similar to existing noise generated by the Refinery; and therefore, this impact would be less than significant.

- 12b) *Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?*

Construction

Some types of construction equipment can produce vibration levels that can cause architectural damage to structures and be annoying to nearby sensitive receptors. Vibration levels generated during construction of the proposed Project would vary during the construction period, depending upon the construction activity and the types of construction equipment used. Typical vibration levels for the construction equipment types that would generally result in the highest vibration levels (e.g., auger rig, large bulldozers) are presented in Table 12-2.

**TABLE 12-2
VIBRATION SOURCE LEVELS FROM CONSTRUCTION EQUIPMENT**

Distance (feet)	Peak Particle Velocity (in/sec)
	Large Bulldozer
15	0.191
25	0.089
50	0.031
75	0.017
100	0.011
150	0.006

SOURCE: FTA, 2006.

A numerical threshold to identify the point at which a vibration impact occurs has not been identified by City standards or municipal codes. Therefore, a peak particle velocity (PPV) threshold identified by Caltrans is used in this analysis to determine the significance of vibration impacts related to adverse human reaction and risk of architectural damage to

normal buildings. The PPV threshold is 0.20 in/sec (Caltrans, 2002). This PPV level has been found to be annoying to people in buildings and can pose a risk of architectural damage to buildings.

The nearest residences would be 2,700 feet from the Project site. At this distance, construction equipment PPV levels would be substantially less than the 0.20 in/sec significance threshold. Therefore, short-term construction-related vibration impacts would be less than significant.

Operations and Maintenance

As discussed above, operation and maintenance of the proposed Project would increase the daily number of trains accessing the Project site, which would produce groundborne vibration in the immediate area of the railroad. Project-related vibration associated with railroad movements would result in a less-than-significant impact at the nearest sensitive receptors that are over 2,000 feet away from the Project site.

12c) ***Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?***

As discussed above, noise generated by the proposed Project is similar to existing noise generated by the Refinery. The proposed Project would result in a change in the method of delivering crude oil to the Project site from marine vessel to railcar. Overall, long-term noise levels that would be associated with the proposed Project would be similar to baseline conditions. A noise assessment conducted for the Applicant determined that the expected maximum noise levels from the two pump motors and train movements would be up to approximately 21 dBA and 58 dBA, respectively (Wilson, Ihrig & Associates, 2013). These noise levels are comparable to existing noise in the area generated at the Refinery and therefore the proposed Project would not result in substantial permanent increases in ambient noise levels. This impact would be less than significant.

12d) ***Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?***

Construction

Noise associated with Project-related construction activities would result in temporary increases in noise levels in the study area. Construction activities that would be associated with the proposed Project would require the use of excavators, graders, front loaders, dump trucks, cranes, and paving equipment, etc. Maximum noise levels from such equipment would range between approximately 80 dBA and 88 dBA at 50 feet (FTA, 2006). Construction of the proposed Project would temporarily generate noise from various activities and equipment over the 25 week construction schedule. The nearest sensitive receptor is located 2,700 feet away from the area where Project construction activities occur. At this distance, noise generated by construction equipment would be attenuated to less than 40 dBA, which would be less than ambient noise levels. As a result, this impact would be less than significant.

Operation

Movement of the trains would present a periodic increase of ambient noise in the Project area; however, as discussed above, this increase in noise would be similar to noise levels generated by existing Refinery operations. Therefore, this impact would be less than significant.

- 12e) *For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*

The proposed Project is not located within 2 miles of a public airport. Therefore, there would be no impact associated with this criterion.

- 12f) *For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?*

The proposed Project is not located within the vicinity of a private airstrip. Therefore, there would be no impact associated with this criterion.

References

Caltrans, 2002, *Transportation Related Earthborne Vibrations (Caltrans Experiences)*. Technical Advisory, Vibration TAV-02-01-R9601. February 20, 2002.

City of Benicia General Plan, 1999. Community Health and Safety Element. June 1999.

Federal Transit Authority (FTA), 2006. *Transit Noise and Vibration Impact Assessment*, May 2006.

Wilson Ihrig & Associates. 2013. Noise Study for Valero Crude by Rail Project. March 8.

13. Population and Housing

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
13. POPULATION AND HOUSING — Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Displace substantial numbers of existing housing units, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

13a) *Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?*

The proposed Project would temporarily result in the presence of approximately 121 construction workers through the approximately 25-week construction period. The temporary addition of a construction work force would not be considered a significant impact, nor would the addition of approximately 30 full-time-equivalent permanent employees. The proposed Project would require access to an available construction labor pool. Adequate labor exists in the Bay Area to fill the number of jobs the Project would create, and the Project would not be required to import labor. The Project would not, directly or indirectly, induce population growth; the impact would be less than significant.

13b) *Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?*

The proposed Project site is an existing and developed Refinery, and there is currently no occupied housing at the site. Development and improvements proposed as part of the proposed Project would be constructed and implemented in already developed areas of the Refinery, in areas occupied by Refinery operations and equipment. The proposed Project would not displace existing housing. No impact would result.

13c) *Would the project displace substantial numbers of people necessitating the construction of replacement housing elsewhere?*

Development and improvements proposed as part of the proposed Project would be constructed and implemented in already developed areas of the Refinery, in areas occupied by Refinery operations and equipment. The proposed Project would not displace people necessitating the construction of replacement housing elsewhere. No impact would result.

References

ERM, Valero Crude by Rail, Project Description, March 2013.

14. Public Services

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
14. PUBLIC SERVICES — Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
i) Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ii) Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii) Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv) Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
v) Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

14a.i-v) *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection?*

The Refinery has its own security personnel and security procedures, which restrict access to the site and thereby reduce dependence on local law enforcement. The Refinery also has its own fire brigade for emergencies occurring within the Refinery, which is licensed by the State Fire Marshall, and utilizes the services of the Benicia Fire Department for response to emergencies occurring outside of the Refinery boundaries. Valero is also a participating member of the Bay Area Petrochemical Mutual Aid Organization, which is composed of more than half a dozen refineries and chemical plants whose operators have agreed to provide one another with emergency response resources in the event of a major emergency.

Given that the Refinery currently provides internal fire protection and security services and has adequate personnel, equipment and response times, the project would not increase the demand for fire protection or police protection services. Therefore, it is not expected that the project would affect service ratios or response times or increase the use of existing fire protection or police facilities such that substantial physical deterioration, alteration, or expansion of these facilities would occur.

The proposed Project does not include a residential component that would directly result in school-age children moving to the area, nor would it indirectly induce substantial population growth in the area. Any short-term increase in population due to construction activities or long-term increase during operation would be considered minimal, as the majority of the anticipated workforce most likely currently resides within commuting distance of the project site. Thus, the number of potential school-age children of these construction workers would similarly be minimal. No new school facilities would be necessary to serve the project, so no adverse environmental impacts from facility construction and operation would occur.

The proposed Project would not adversely affect nearby parks (see Section 15, *Recreation*). The project would not directly or indirectly induce population growth in the area, therefore, the construction or alteration of other new public facilities would not be required as a result of the project.

In conclusion, the proposed Project would not require the construction of new or altered governmental facilities to maintain adequate service levels, response times, or performance objectives; impacts would be less than significant.

References

ERM, Valero Crude by Rail, Project Description, March 2013.

15. Recreation

<i>Issues (and Supporting Information Sources):</i>	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
15. RECREATION — Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

15a) ***Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?***

There are six parks within about 1.5-mile of the proposed Project site: Waters End Park, Frank Skillman Park, Southampton Park, Francesca Terrace, Duncan Graham Park, and Overlook Park. As discussed in Section 4.13, *Population and Housing*, approximately 121 workers would be necessary during the 25-week construction period. Thirty full-time-equivalent workers are anticipated during project operation. Due to the relatively short construction period and the available experienced labor pool, it is anticipated that the construction workforce would likely already reside in the City of Benicia, Solano County, or in other nearby Bay Area communities. These workers would be expected to use recreational facilities nearest their places of residency. Therefore, the project’s anticipated construction workforce is not likely to use existing Benicia neighborhood and regional parks or recreational facilities proximate to the Refinery at levels greater than normal use. Major infrastructure improvements such as parks and recreational facilities are generally planned and constructed to serve hundreds or thousands of people. Even if all 30 anticipated permanent workers moved into the City of Benicia from elsewhere, the resulting population increase would be minor in relation to the overall population of the City. Thus, the actual increase in users at each park or recreational facility would be insignificant in relation to the design capacity. Therefore, any increases in usage associated with the project would not result in substantial or accelerated physical deterioration of parks; the impact would be less than significant.

- 15b) ***Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?***

The proposed Project does not include parks or recreational facilities. Additional parks and recreational facilities would not be necessary as a result of the proposed Project. As explained in a) above, the population increase associated with the project would not be large enough to require the construction of parks and recreational facilities. Thus, there would be no impact related to construction or expansion of recreation facilities.

References

ERM, Valero Crude by Rail, Project Description, March 2013.

16. Transportation and Traffic

<u>Issues (and Supporting Information Sources):</u>	<u>Potentially Significant Impact</u>	<u>Less Than Significant with Mitigation Incorporation</u>	<u>Less Than Significant Impact</u>	<u>No Impact</u>
16. TRANSPORTATION AND TRAFFIC —				
Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location, that results in substantial safety risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Result in inadequate emergency access?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

16a) ***Would the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system?***

Given that the Refinery and the adjacent Benicia Industrial Park are both industrial uses that are regularly served by, and rely on the operation of the railroad to transport both raw materials and finished products, use of the railroad spur tracks (i.e., Track 700) that serve the individual businesses in the area is an essential component of the overall transportation system in this part of Benicia. For that reason, the usual forms of traffic analysis, which ignore rail operations, are not appropriate to measure the impact of the proposed Project.

For purposes of this analysis, based on the characteristics of the proposed Project, the above-cited significance criterion has been focused to produce the following more-appropriate criterion / threshold of significance (explained below): *Would the project cause a substantial increase in the queue length caused by trains crossing Park Road, with the threshold of significance defined as a queue that substantially impedes other traffic (such*

as traffic on the I-680 mainline, or at an adjacent upstream intersection wherein traffic not destined over the Park Road crossing is unable to continue along the travel way)?

The *City of Benicia General Plan* provides a minimum standard of LOS D for intersection operations, meaning that impacts to intersection operations are considered significant if a project would cause intersection operations to degrade to worse than LOS D. This criterion is typically used to assess impacts of development projects that would generate increased vehicle trips on at area intersections, something that this project would not do (except for temporary and intermittent traffic generated during project construction). However, intersection level of service is not the only or most applicable metric that can be used to evaluate impacts of increased rail activity on the surrounding transportation network. Park Road, which provides one access to the Refinery and to the Benicia Industrial Park, crosses the active railroad siding that carries materials and products to and from the Refinery and businesses in the industrial park. Generally, people who drive through industrial areas served by at-grade railroad crossings have a higher tolerance of delay associated with daily at-grade rail activity that is not on a set schedule compared to delays that are not in the vicinity of an at-grade railroad crossing.

Vehicle queues that result from at-grade rail crossings have a major influence on roadway and intersection traffic operations within the vicinity of the at-grade crossing. Vehicle queues and delay are directly related -- the longer the vehicle queues are, the higher the delay becomes. However, during times of the day when traffic volumes are low, it is possible for an at-grade train crossing to result in vehicle queues that do not significantly impede other traffic (e.g., queues that do not impede traffic flow at upstream locations such as intersections and freeways). Even though delay experienced by drivers in a queue might be high during a long train crossing, it is not a foregone conclusion that the at-grade train crossing would adversely affect the surrounding transportation network. According to Union Pacific Railroad (UPRR), trains that regularly cross Park Road currently cause traffic delays of up to 10 minutes at a time (longer delays recently have been observed as described below). Those daily traffic delays at the Park Road / Bayshore Road intersection (i.e., with LOS worse than the City's LOS D standard) are part of the existing work environment that drivers expect and deal with as they choose.

Therefore LOS is not relevant to the more-important potential impacts – queues, delays and emergency access – of the proposed Project's rail car movements. Intersection LOS is inadequate to assess these potential impacts and is therefore not a suitable significance criterion for this analysis. Also, as described in the Project Description and below, there would be four 8.3-minute episodes of Project-caused delay, but no increase in delay due to the proposed Project at any other times.

Setting

Regional access to the proposed Project site is provided primarily from Interstate 680 (I-680), while local access is provided via Park Road, Bayshore Road and Industrial Way. The nearest I-680 interchanges are at Bayshore Road and Industrial Way. Park Road is a

two-lane road that connects the industrial port area along the southeastern edge of the City of Benicia to the industrial areas to the northeast. It intersects the existing UPRR track at an at-grade railroad crossing located just east of Bayshore Road. Bayshore Road is a two-lane road that connects the Refinery to the industrial port area along the southeastern edge of the City of Benicia, following the Suisun Bay shoreline; a partial interchange with I-680 provides access to and from the south. Industrial Way is a two-lane road that loops through the industrial area where the Refinery is situated, providing access to numerous industrial parcels either directly or via connections with local streets; a partial interchange with I-680 provides access to and from the north.

The study area lacks substantial pedestrian facilities (sidewalks are not provided along any of the roads), which is typical of industrial areas. No designated bicycle facilities are provided within the study area. Fairfield and Suisun Transit (FAST) operates an express intercity route—Route 40—that connects the City of Vacaville to the Bay Area Rapid Transit (BART) station in the City of Walnut Creek. Route 40 has one stop in each direction at the intersection of Park Road and Industrial Way. From here, the northbound route continues via I-680 to the City of Fairfield, and the southbound route continues via I-680 to the Pleasant Hill BART Station; both utilize the I-680 interchanges at Industrial Way and Bayshore Road.

Train Operations at Park Road Crossing

The City of Benicia serves as the terminus for what is commonly referred to as the Overland Route for UPRR. The Refinery is served by a spur off the Overland Route mainline that runs between the industrial port area along the southeastern edge of the City of Benicia and the Refinery itself, terminating north of Park Road. This spur features an at-grade crossing at Park Road, east of Bayshore Road. The spur also serves the industrial areas northeast of the Refinery. Switching activity between tracks typically occurs just south of the Park Road at-grade railroad crossing. The Park Road crossing is controlled by two gates and mast-mounted flashing lights.

Train crossing counts (using video cameras placed adjacent to the at-grade crossings) were collected at the Park Road at-grade crossing in addition to the at-grade crossing at the Iron Workers Union Driveway 700 feet southeast of Park Road, for the week of Monday, April 15 through Sunday, April 21, 2013. As shown in Table 16-1, the number of train crossings is higher at Park Road than at the Iron Workers Union driveway. The reason for the higher number of crossings at Park Road is because the majority of switching activity between tracks serving the Refinery and tracks serving other industrial areas northeast of the Refinery occur on the segment just south of Park Road and north of the Iron Workers Union Driveway. It is common for UPRR trains to access the Refinery, then exit the Refinery, cross Park Road, perform the track switching, and cross Park Road again to access the other industrial areas northeast of the Refinery, and vice versa.

**TABLE 16-1
EXISTING AT-GRADE RAIL OPERATIONS**

Attribute	Park Road At-Grade Crossing	Iron Workers Union Driveway At-Grade Crossing
Range of Crossings Per Day	4 - 18	4 - 6
Average Crossings Per Day – Weekdays	10	5
Average Crossing Duration – Weekdays	02:50	03:15
Average Number of Railcars Per Day – Weekdays	95	69
Average Number of Railcars Per Crossing - Weekdays	10	15
Range of Number of Railcars Per Crossing - Weekdays	2 - 35	2 - 43
Maximum Observed Crossing Duration – Weekdays	16:17	24:50
% of Crossings With Duration Under 5 Minutes – Weekdays	86%	87%
Average Crossings Per Day – Weekend	7	5
Average Crossing Duration – Weekend	01:42	00:18
Average Number of Railcars Per Day – Weekend	45	40
Average Number of Railcars Per Crossing - Weekend	7	8
Range of Number of Railcars Per Crossing - Weekend	2 - 18	2 - 18
Maximum Observed Crossing Duration – Weekend	05:56	03:21
% of Crossings With Duration Under 5 Minutes – Weekend	92%	100%

SOURCE: Fehr & Peers, 2013.

The back and forth seen with current daytime switching operations is required for UPRR to “cut” the train into the various segments needed within the Refinery and then over on the Industrial Way siding. UPRR pulls out onto Park Road to get the tail end of the train ahead of the switch needed to redirect the train to the Industrial way siding.⁸

The majority of train crossings at both at-grade intersections occurred between 9:00 AM and 7:30 PM on weekdays, and between 12:00 Noon and 6:30 PM on weekends. An average of 10 train crossings totaling 95 railcars during the weekdays were observed on Park Road, with the average crossing duration estimated at 2 minutes and 50 seconds. About 86 percent of all crossings on Park Road had a duration of less than 5 minutes. The majority of train crossings on Park Road had a duration of typically less than 2 minutes, though a maximum crossing duration was observed at 16 minutes and 17 seconds on Wednesday, April 17, 2013 around 2:00 PM.

Similarly, the majority of train crossings on the Iron Workers Union Driveway had a duration of less than 2 minutes, though a maximum crossing duration was observed at 24 minutes and 50 seconds on Wednesday, April 17, 2013 around 2:00 PM. The average number of train crossings and duration of each crossing is generally lower on weekends compared to weekdays.

⁸ *Note:* This switching operation will not occur for Project trains because the first half of 50 railcars would be led by a locomotive, and the last half would be pushed by one (called “buried power”). The train will be “cut” in the middle all within the Refinery as the two 25-car segments are aligned at the rack. No back and forth across Park Road is required for this operation.

Existing Plus Project Conditions

Below is a summary of the Project assumptions for Existing Plus Project conditions:

- Up to 100 railcars will be delivered daily, with single train deliveries of up to 50 railcars
- A minimum headway of one hour between Project train deliveries
- Typical railcar length is 60 feet
- Up to 200 feet of locomotive per train delivery
- Average travel speed across the Park Road at-grade railroad crossing is 5 mph
- All switching activity between tracks will occur within the Refinery site north of Park Road
- According to UPRR, their plan is to deliver a full 50-car train and pull out an empty 50-car train between the hours of 8:00 PM and 5:00 AM. The exact sequence is still being worked out by their logistics team due to other constraints such as their available sidings and other trains scheduled to use the main line from Roseburg to Benicia. In the future, the second 50-car train may also be delivered (and removed when emptied) during that evening non-peak window or during the non-peak daytime hours (avoiding 6:00 AM – 9:00 AM and 4:00 PM – 6:00 PM weekdays). UPRR has yet to confirm the window of availability for daytime Park Road crossings.

An automatic traffic count was conducted on Park Road for seven days (Monday through Sunday, January 7-13, 2013) near the at-grade crossing, to establish the temporal distribution of traffic volumes at the crossing. The peak hour for typical weekday conditions generally occurs between 7:15 and 8:15 AM, but because proposed Project trains would not cross Park Road during the morning and afternoon peak traffic periods (6:00 AM – 9:00 AM and 4:00 PM – 6:00 PM), the analysis of potential proposed Project impacts focused on traffic volumes during the off-peak hours of 9:00 to 10:00 AM (representative of 9:00 AM to 3:00 PM and 6:00 to 7:00 PM conditions), and 9:00 to 10:00 PM (representative of conditions from approximately 7:00 PM to 6:00 AM).

A train with 200 feet of locomotive and 50 railcars in length would take about 7.3 minutes to cross Park Road at a speed of 5 mph. The at-grade crossing traffic controls provide a 30-second buffer time before and after each train crossing on Park Road. Therefore, each 50-railcar train delivery would block traffic on Park Road for approximately 8.3 minutes. The estimated blockage time on Park Road due to the proposed Project is lower than other existing observed train crossings. The April 2013 maximum observed train crossing duration was 16 minutes and 17 seconds, which is nearly double the blockage time of the train crossings due to the proposed Project.

The off-peak hours of 9:00 – 10:00 AM and 9:00 – 10:00 PM were evaluated assuming a 50-railcar train crossing at Park Road. Vehicle queues associated with the 50-railcar crossing would extend back onto the northbound I-680 off-ramp, but not onto the I-680 mainline, and the great majority of drivers caught in the queue would be those heading toward Park Road and the at-grade crossing (i.e., few vehicles turn right from the off-ramp onto Bayshore

Road). Queues also would extend back to the Park Road / Refinery Driveway, but would not reach Industrial Way. These results for the AM off-peak hour are similar to what drivers under existing conditions already experience. Train crossings of durations greater than 8 minutes already occur about once a day between the 9:00 AM – 7:30 PM periods.

Traffic volumes in the evenings and late nights are much lower within the study area compared to the peak traffic periods. During the 9:00 – 10:00 PM hour, the resulting queues during a train crossing would be no longer than 4 vehicles. Although the proposed 50-railcar train crossing would block Park Road for over 8 minutes, the resulting queues would be contained within the provided intersection storage capacity at Park Road/Bayshore Road during the 9:00 – 10:00 PM hour.

Project train crossings occurring during the 9:00 AM – 7:00 PM period would generate queues on the west side of the tracks that could extend back onto Bayshore Road and affect the operations of the I-680 ramp-terminal intersections, but would not extend back onto the I-680 mainline. Queues on the east side of the tracks would generally be contained within the Park Road segment between the tracks and Industrial Way, affecting access to and from Refinery driveways. The segment of Park Road between the at-grade railroad crossing and Industrial Way provides a two-way left-turn lane which could be utilized as a queue storage lane by some drivers waiting on westbound Park Road for the train to clear.

If the proposed train crossings occur during the 7:00 PM – 6:00 AM period, resulting queues on the west side and east side of the tracks would not exceed the provided storage capacity, and would not extend back and affect the operations of other study intersections.

Cumulative Conditions

A 1.5 percent per year growth rate was applied to existing traffic volumes, which is similar to the annual rate of 1.6 percent used in the *Benicia Business Park EIR* for the period between 2006 and 2030. It is noted that according to 2006 and 2013 count data collected at the intersection of Park Road/Bayshore Road, traffic volumes have not increased during the seven-year period, potentially due to the recent economic downturn.

Under cumulative volume conditions, vehicle queues associated with the 50-railcar crossing again would extend back onto the northbound I-680 off-ramp, but not onto the I-680 mainline. Queues also would extend back to the Park Road / Refinery Driveway, but would not reach Industrial Way. Traffic volumes in the evenings and late nights are much lower within the study area compared to the peak traffic periods. During the 9:00 – 10:00 PM hour, the resulting queues during a train crossing would be no longer than 5 vehicles. Although the proposed 50-railcar train crossing would block Park Road for over 8 minutes, the resulting queues would be contained within the provided intersection storage capacity at Park Road/Bayshore Road during the 9:00 – 10:00 PM hour.

Project train crossings occurring during the 9:00 AM – 7:00 PM period would generate queues on the west side of the tracks that would extend back onto Bayshore Road and affect

the operations of the I-680 ramp-terminal intersections, but would not extend back onto the I-680 mainline. Queues on the east side of the tracks would generally be contained within the Park Road segment between the tracks and Industrial Way, affecting access to and from Refinery driveways. The segment of Park Road between the at-grade railroad crossing and Industrial Way provides a two-way left-turn lane, which could be utilized as a queue storage lane by some drivers stuck on westbound Park Road waiting for the train to clear.

If the proposed train crossings occur during the 7:00 PM – 6:00 AM period, resulting queues on the west side and east side of the tracks would not exceed the provided storage capacity, and would not extend back and affect the operations of other study intersections.

Project Impacts

The proposed Project would increase the frequency of 8-minute crossings that occur in the area, but the increased crossing frequency is within the current range of crossing variability. Although the proposed Project would increase the train frequency on Park Road by four train crossings per day (two trips into the Refinery and two trips out of the Refinery), the proposed crossing duration of each proposed Project train trip is lower than train crossing durations that already exist today without the proposed Project. Train crossings that currently occur between 12:00 PM and 1:00 PM tend to produce more vehicle stacking than at other times during which train crossings related to the Project would occur; the following measure would minimize potential Project impacts:

Mitigation Measure TRAN-1:

- Prohibit scheduling crude train crossings during the weekday lunch hour (12:00 – 1:00 PM).

The proposed Project impact would be less than significant with implementation of the above-described mitigation measure.

16b) ***Would the project conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures?***

As stated in 16a above, the proposed Project would not generate vehicle traffic on area roadways (except for temporary and intermittent traffic generated during Project construction). In addition, vehicle queues caused by train crossings on Park Road (current and future) would not affect any roads that are part of the Solano County Congestion Management Program (CMP) network. Lastly, level of service standards for roadways that are part of the Solano County CMP are intended to regulate long-term traffic increases from operation of new development, not temporary construction traffic. No impact would result.

16c) ***Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?***

The proposed Project would not involve aircraft, would not be near an airport, nor would the Project construct anything that would intrude into aircraft flight paths or air traffic spaces. Therefore, the proposed Project would have no impact on air traffic patterns.

16d) *Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment), or due to the proposed increased frequency/length of train crossings?*

The Federal Railroad Administration (FRA) provided collision history data for the Park Road at-grade crossing. According to the FRA, the last reported collision at the Park Road at-grade crossing was in April 1995 when a train collided with a truck.

Neither proposed Project construction nor Project operations would alter the physical configuration of the existing roadway network serving the area, and would not introduce unsafe design features. The proposed Project also would not introduce uses that are incompatible with existing uses already served by the road system that serves the Project area. Therefore, the proposed Project would have a less-than-significant traffic hazard impact.

16e) *Would the project result in inadequate emergency access?*

The Benicia Fire Department has a response time goal of 7 minutes for all emergency calls, 90 percent of the time, and they routinely achieve that goal (i.e., have a response time no more than 7 minutes more than 90 percent of the time). According to the 2012 data, the average response time within the entire City was about 5.2 minutes (2,099 total incidents), and the average response time to the Park Road/Bayshore Road area was about 6.6 minutes (27 total incidents). The City of Benicia Fire Department also has a contract with the Solano County Emergency Medical Service Authority to provide an advance life support staffed engine to all emergency medical calls within 7 minutes from the time the station is alerted.

Although the proposed Project would increase the train frequency within the study area by four train crossings per day (two trips into the Refinery and two trips out of the Refinery), the proposed crossing duration of each proposed Project train trip would be lower than train crossing durations that already exist today without the proposed Project. The proposed increased crossing frequency is within the current range of crossing variability. According to the 2012 emergency response data provided by the fire department, an average of about two emergency incidents a month occurred along the industrial areas of Park Road and Bayshore Road. The probability of an emergency incident occurring at the same time as a proposed Project train crossing is low. It is unlikely that the Project would cause the average emergency vehicle response time to increase to over 7 minutes for the Park Road and Bayshore Road industrial areas. However, the following measures would minimize potential Project impacts in regards to emergency vehicle access:

Mitigation Measure TRAN-2:

- Coordinate with the City of Benicia Fire Department to prepare an action plan in the event that an emergency occurs during a Project train crossing. The action plan would provide methods of adequately informing the Fire Department of the expected train crossing schedule and alternate routes to

access the Park Road and Bayshore Road industrial areas during the event that a train crosses Park Road.

- Utilize the Refinery's existing onsite emergency response team to assist with responding to off-site emergencies within the Park Road and Bayshore Road industrial areas as requested by the City of Benicia Fire Department under the existing mutual aid agreement, if an emergency occurs during the event of a train crossing on Park Road.

The proposed Project impacts would be less than significant with implementation of the above-described mitigation measures.

16f) ***Would the project conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?***

Implementation of the proposed Project would neither directly nor indirectly eliminate existing or planned alternative transportation corridors or facilities, include changes in policies or programs that support alternative transportation, nor construct facilities in locations in which future alternative transportation facilities are planned. The proposed Project would not conflict with adopted policies, plans and programs supporting alternative transportation.

As described above, FAST operates one weekday transit route (Route 40) on Park Road within the study area; the nearest bus stops are located at the intersection of Park Road/Industrial Way. Route 40 provides four buses in each direction during the AM commute period between 5:30 and 9:00 AM, and five buses in each direction during the PM commute period between 3:30 and 8:00 PM. Proposed Project train crossings would not occur during the AM or PM peak traffic period. It is anticipated that proposed Project train crossings could occur during the 6:00 to 8:00 PM period, and on average, about one bus travels along Park Road in each direction during that period. The chances of buses attempting to cross Park Road in the event of a proposed Project train crossing are small, but possible. Although the proposed Project would increase the train frequency on Park Road by four train crossings a day, the proposed crossing duration of each proposed Project train trip is lower than train crossing durations that already exist today without the proposed Project. The potential increase in transit delay incurred by the Project is within the delay variability already experienced by Route 40 during the PM peak commute period.

The Project impacts would be less than significant.

References

Fehr and Peers Transportation Consultants, *Draft Transportation Impact Analysis Report for the Valero Benicia Refinery Crude by Rail Project*, May 2013.

17. Utilities and Service Systems

<u>Issues (and Supporting Information Sources):</u>	<u>Potentially Significant Impact</u>	<u>Less Than Significant with Mitigation Incorporation</u>	<u>Less Than Significant Impact</u>	<u>No Impact</u>
17. UTILITIES AND SERVICE SYSTEMS —				
Would the project:				
a) Conflict with wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Require or result in the construction of new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in a determination by the wastewater treatment provider that would serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g) Comply with federal, state, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Discussion

17a) *Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?*

Wastewater produced on the proposed Project site by Refinery operations is currently treated at the Refinery's wastewater treatment plant and discharged into the Carquinez Straits via a waste water effluent outfall. The Refinery operates under a National Pollutant Discharge Elimination System (NPDES) permit administered by the San Francisco Bay Regional Water Quality Control Board RWQCB. As discussed in Section 9, *Hydrology and Water Quality*, long-term storm runoff generated at the proposed Project site would be similar to the existing runoff on-site. Stormwater runoff would continue to be discharged through 16 stormwater outfalls permitted under the Refinery NPDES permit, which sets discharge limits and monitoring requirements. Stormwater discharges and water quality at the storm water outfalls are managed through application of an existing Storm Water Pollution Prevention Plan (SWPPP), which incorporates the NPDES discharge limits and monitoring requirements as well as incorporates procedures, pollution prevention strategies, and best management practices (BMPs) used to meet these discharge limits.

Construction activities would require land disturbing activities as well as involve the use of chemicals and solvents. These construction activities could result in soil erosion or inadvertent spills of chemicals into the adjacent Sulphur Springs Creek. Implementation of the erosion and stormwater runoff control measures, as well as proper handling of chemicals in compliance with the General Construction Permit described in Section 9, *Hydrology and Water Quality*, would ensure that the Project would not exceed wastewater treatment requirements; the impact would be less than significant.

- 17b) ***Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?***

The proposed Project would be constructed and its operations conducted entirely within those areas of the Refinery that are already served by the existing water and wastewater collection and treatment systems. No additional wastewater would be generated by Refinery operations under the Project. Therefore, the Refinery's wastewater treatment plant would not require expansion or modification under the proposed Project. Approximately 121 construction workers and 30 permanent full-time employees are anticipated. Wastewater generated from temporary and permanent employees would not require the expansion or modification to the City's wastewater treatment plant, where domestic wastewater from the Refinery is treated. No impact would result.

- 17c) ***Would the project require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?***

The proposed Project elements would be built in an area that is currently graded and paved and would not substantially alter the existing drainage pattern of the site. Storm water runoff would continue to be collected by the existing storm drains and discharged through the Refinery site's NPDES-permitted outfalls. There would be no substantial change above the current baseline in runoff flow rates nor would the proposed Project increase erosion or siltation off-site. There would be no alteration of streams or the existing drainage patterns and runoff would be accommodated within the existing capacity of the storm water conveyance system. The proposed Project would not require construction of new storm water drainage facilities; therefore, no impact would result.

- 17d) ***Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?***

The proposed Project is not anticipated to require additional water supplies above that supplied via the existing contract with the City. New or expanded entitlements would not be required to serve the Project. No impact would result.

- 17e) ***Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?***

No additional wastewater would be generated by Refinery operations under the proposed Project. Therefore, the Refinery's wastewater treatment plant would have adequate capacity. Wastewater generated by temporary and permanent employees under the proposed Project would be treated by the City's wastewater treatment plant. The anticipated 30 permanent employees and 121 construction workers would not require expansion of the City's treatment plant. The impact would be less than significant.

- 17f) ***Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?***

Grading and demolition of existing paved areas would be required as a part of construction of the proposed Project. Excess soil, asphalt, and concrete generated from site preparation and demolition activities would be disposed of on-site. Existing piping removed during construction associated with relocated equipment also would be deposited at the Refinery's reclamation yard. Other materials, such as construction packaging materials, would be transported off-site for recycling or disposal at appropriately permitted disposal sites. Non-hazardous waste and recyclable waste generated by the proposed Project would be transported to the Keller Canyon Landfill in Pittsburg by a contracted hauler. The Keller Canyon Landfill is a Class II landfill with a maximum permitted throughput of 3,500 tons per day. The remaining capacity of the landfill was estimated at 71,900,000 cubic yards as of September 2008, and the estimated closure date is 2050 (CalRecycle, 2013). Solid waste produced during construction would represent the largest component of the waste produced by the proposed Project. This one-time contribution to the landfill would be well within the capacity of the landfill and would result in a less-than-significant impact. During operation, solid wastes would be generated during routine maintenance activities. The additional waste quantities generated during proposed Project operation would be an insubstantial increase in comparison to the existing solid waste generated by normal operations at the Refinery. The additional waste quantities generated by operation of the proposed Project would result in a less-than-significant impact.

- 17g) ***Would the project comply with federal, state, and local statutes and regulations related to solid waste?***

The Refinery is currently complying with federal, State, and County requirements related to management of solid waste. In addition, the Refinery has an ongoing recycling program that would be employed during the construction and operation of the proposed facilities. There are no aspects of, or actions proposed under the proposed Project that would not comply with these existing solid waste statutes and regulations. As a result there is no reason to expect that the Refinery would not continue to comply with solid waste regulations. There would be no impact.

References

California Department of Resources Recycling and Recovery (CalRecycle), Keller Canyon Landfill, Solid Waste Facility Permit, December 14, 2009, available online at www.calrecycle.ca.gov/SWFacilities/Directory/07-AA-0032/Detail/, accessed May 15, 2013.

18. Mandatory Findings of Significance

<u>Issues (and Supporting Information Sources):</u>	<u>Potentially Significant Impact</u>	<u>Less Than Significant with Mitigation Incorporation</u>	<u>Less Than Significant Impact</u>	<u>No Impact</u>
18. MANDATORY FINDINGS OF SIGNIFICANCE — Would the project:				
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Discussion

- 18a) *Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?*

As discussed in Sections 4) and 5) above, all potential impacts for biological and cultural resources are either reduced to less than significant with mitigation or less than significant. Implementation of proposed mitigation measures BIO-1 and CUL-1 would similarly reduce this potential impact to less-than-significant impact.

- 18b) *Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?*

There are no currently known projects within the Refinery area or near the Refinery potentially affected by the proposed Project which could be considered cumulatively considerable. Allowing for uncertainty of this conclusion, this impact is considered less than significant.

18c) ***Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?***

While the potential for the proposed Project to have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly, cannot be fully determined, it is clear that the primary project-related risk would be a spill of crude oil during transportation. In this case, the relative risk of an area potentially affected by a spill of crude oil from the proposed Project over the baseline case where crude is shipped by marine vessel is very likely much smaller and much less environmentally impacting. Consequently, when compared to the baseline, this potential impact is considered less than significant.

CHAPTER III

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Natasha Dvorak	Biological Resources
Heidi Koenig	Cultural Resources
Kristina Tierney	Air Quality; Greenhouse Gas Emissions; Noise

APPENDIX A1

Air Permit Application

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Crude by Rail Air Permit Application

Valero Benicia Refinery
Benicia, California

Public Document

February 2013

www.erm.com

Valero Refining Co. - California

Crude by Rail

Air Permit Application

Valero Benicia Refinery
Benicia, California
BAAQMD Plant No. B2626

February 2013

Project No. 0186851

Environmental Resources Management

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LIST OF ACRONYMS

ATC	Authority to Construct
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
bbbl	barrel
BWON	Benzene Waste Operations NESHAP
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO ₂ e	carbon dioxide equivalent
District	Bay Area Air Quality Management District
EFR	external floating roof
GHG	greenhouse gas
HAP	hazardous air pollutant
HRSA	Health Risk Screening Assessment
LDAR	Leak Detection and Repair
MACT	Maximum Achievable Control Technology
MMbbbl	million barrels
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO _x	oxides of nitrogen
NPOC	non-precursor organic compound
PM	particulate matter
POC	precursor organic compound
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
psia	pounds per square inch absolute
PTE	Potential to Emit
RVP	Reid Vapor Pressure
SO ₂	sulfur dioxide
TAC	toxic air contaminant
TBACT	Best Available Control Technology for Toxics
UP	Union Pacific Railroad Company
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

Valero Refining Co. - California (Valero) owns and operates a petroleum refinery located in Benicia, California. Valero is proposing the Crude by Rail project ("CBR" or "project"), which would allow the refinery to receive crude oil by train. The project would require a Bay Area Air Quality Management District (BAAQMD or "District") Authority to Construct (ATC) permit. The purpose of this document and its appendices is to provide information to the District in support of the project and issuance of an ATC.

The project would also require a land-use permit from the City of Benicia. Approval of the land-use permit would require compliance with the California Environmental Quality Act (CEQA), including preparation of an Initial Study. An application for a land-use permit was submitted to the City of Benicia in December 2012. The City is acting as lead agency.

1.1 Facility Contact Information

Name/ Address: Valero Refining Co. - California
3400 East Second Street
Benicia, CA 94510-1097

District Facility No.: B2626

Facility Contact: Susan Gustofson, P.E.
Staff Environmental Engineer
(707) 745-7011
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1.2 Overview

Valero currently receives crude oil by pipeline and by ship. The project would install two rail car unloading racks, re-purpose an existing tank to include crude oil service, and construct associated infrastructure, including rail lines, to allow Valero to receive crude oil by train. The project would permit Valero to receive crude oil in quantities up to 70,000 barrels (bbl) per day (100 rail cars per day), but it would not increase the volume of crude oil delivered to the refinery because crude oil quantities delivered by train would replace crude oil quantities received by ship. The refinery's crude oil processing rate, which is limited by District permit to an annual average of 165,000 bbl per day (daily maximum of 180,000 bbl per day), would remain unchanged. No modifications would be made to refinery process equipment.

1.3 Schedule

Valero plans to begin construction in 2013 and to commence operating the crude by rail unloading facility in late 2013 or early 2014. Construction is expected to take approximately 6 months.

1.4

Application Summary

This application package, including the attached appendices, provides necessary information for the District to evaluate the project. The remainder of this document is organized as follows:

- Section 2.0 (Facility and Project Description) provides an overview of the facility and presents the various elements of the project, including descriptions of project components;
- Section 3.0 (Emissions Estimates) provides a summary of project emissions for storage tank, fugitive components associated with the rail car unloading facilities, and cargo carrier emissions;
- Section 4.0 (Applicable Regulations) addresses compliance with applicable District and federal regulatory requirements;
- Section 5.0 (Estimated Permit Fees) provides an estimate of District New Source Review fees;
- Section 6.0 (References);
- Appendix A - Project Drawings and Specifications;
- Appendix B - Emission Calculations;
- Appendix C - District Permit Application Forms.

2.0 FACILITY AND PROJECT DESCRIPTION

2.1 Facility Description

The refinery occupies approximately 330 acres of the 880-acre Valero property, which is located at 3400 East Second Street in the eastern portion of the city of Benicia, along the northern edge of Suisun Bay. Figure 2-1 shows an aerial photograph of the refinery, property boundaries, and surrounding area.

The refinery converts crude oil into many finished products, including California Air Resources Board (CARB) cleaner-burning gasoline and diesel fuels, liquefied petroleum gas, jet fuel, fuel oil, and asphalt. Major equipment used for processing crude oil into finished products includes distillation columns, storage tanks, reactors, vessels, heaters, boilers, and other ancillary equipment. Valero also operates its own wastewater treatment plant and a marine terminal, which services crude oil, refinery product, and feedstock deliveries and exports via ships and barges. The marine terminal is located approximately 1 mile south of the refinery, near the northern landing of the Benicia Bridge. The refinery also uses rail to transport refinery feedstocks and products. All rail traffic enters and exits along the southeastern boundary of the refinery near the intersection of Park Road and Bayshore Road.

The refinery site and project location are zoned General Industrial. Present land use at the project location is petroleum refining and storage. The elements of the project will be compatible with the existing land use, and will not result in substantial alterations of the planned land use in the area. Construction and operation of facilities associated with this project will be within the Valero property boundaries.

Figure 2-1 Valero Benicia Refinery Location Map



Imagery date: 9/1/2012, Google Earth Pro 6.2.2.6613.

2.2

Project Description

Valero currently receives crude oil by pipeline and by ship. The proposed project would allow Valero to receive crude oil by train and consist of the following primary components:

- Unloading racks. Two unloading racks would be installed to allow crude oil to be transferred from rail cars (up to 100 rail cars per day, 70,000 bbl per day) to existing external floating roof tank 1776 (District Source S-97). The racks would be installed in the northeastern portion of the main refinery property, between the eastern side of the lower tank farm and the fence adjacent to Sulphur Springs Creek.
- Tank 1776 (District Source S-97). Existing external floating roof tank 1776 would be used to store all crude oil transferred from the rail car unloading racks. Tank 1776 is currently permitted to store jet fuel and other refinery products. It would be changed to crude oil service as part of this project, but it would retain the capability to store jet fuel and other refinery products in the future if required. There would be no physical modifications to tank 1776 that would impact emissions. The bottom interior surface of the tank would be coated as required for crude water draw service.
- Pipeline and associated components. Approximately 4,000 feet of primarily 16-inch-diameter piping and associated components (pumps, valves, flanges, and connectors) would be installed between the rail car unloading racks and tank 1776 and from tank 1776 to the existing crude supply piping.
- Rail tracks. Two rail spurs and a parallel rail car storage track would be constructed on refinery property to allow receipt of rail cars at the unloading racks. The rail spurs and parallel rail car storage track would be located between the eastern side of the lower tank farm and the western side of the fence along Sulphur Springs Creek.
- Other infrastructure modifications. Approximately 1,800 feet of tank farm dike walls and an existing firewater pipeline and compressor station would be relocated to accommodate the new rail tracks.

Figure 2-2 shows the location of the rail car unloading racks and tank 1776. Detailed project drawings showing rail track locations, pipeline routes, and other project details, are provided in Appendix A.

Figure 2-2 Location Map



Imagery date: 9/1/2012, Google Earth Pro 6.2.2.6613.

2.2.1

Unloading Racks

The project would install two parallel rail car unloading racks. Each rail car unloading rack would accommodate up to 25 rail cars at a time (two, 50-rail car “switches” per day would be transported to the racks by train). Each rack would have 25 unloading stations, which would bottom-unload “closed dome” rail cars using a 4-inch-diameter hose, with dry disconnect couplings, connected to a common header routed between the two racks (a check valve, connected to the top of each rail car via 2-inch-diameter hose, would open to allow ambient air to enter during unloading and immediately close when unloading was finished). Two new pumps, operating in parallel, would pump the crude oil from the unloading rack header via a new 16-inch-pipeline to tank 1776 (see Section 2.2.2 for tank details). Once emptied, the 50 rail cars would be disconnected from the racks, moved off site (or to an interim storage location on site), and then replaced by another 50-rail car switch (see Section 2.2.3 for a description of train and rail car movements, including duration).

The unloading racks would be used only for unloading crude oil, up to 70,000 bbl per day (25.55 million barrels [MMbbl] per year); there would be no loading of crude oil or other materials at the racks. As a result, the only emissions associated with the unloading racks would be fugitive emissions from flanges, connectors, valves, and pumps (at the unloading rack, between the unloading rack and tank 1776, and from tank 1776 to the existing crude supply piping). The estimated number of new fugitive components associated with the project is presented in Table 2-1.

Table 2-1 Fugitive Component Counts

Component Type	Estimated Count*
Pumps	3
Valves	518
Flanges	1036
Connectors	259
Atmospheric Pressure Relief Devices	0

All components in light liquid service.

Estimated counts include contingency factor of 15% for valves. Flanges estimated using 2.0:1 flange/valve ratio. Connectors estimated using 0.5:1 connector/valve ratio. A third pump is a proposed installed spare for the two primary pumps.

Final component counts would be determined upon completion of construction. A process flow diagram and project drawings are provided in Appendix A.

2.2.2

Tank 1776 (District Source S-97)

Tank 1776 is an existing external floating roof (EFR) tank that would be used to store all crude oil transferred from the rail car unloading racks, up to 70,000 bbl per day (25.55 MMbbl per year). Tank 1776 is a grandfathered source currently permitted to store various refinery products such as jet fuel, diesel, and gasoline. It shares a 62.8 MMbbl per year combined throughput limit with seven other storage tanks (S-63, S-73, S-74, S-75, S-76, S-78, and S-163). As part of this project, no physical modification would be made to tank 1776 that would increase breathing emissions, but the tank would be re-purposed for crude oil storage. To that end, the tank will be outfitted with additional nozzles for crude service and for potential future connections as found on typical crude storage tanks. Table 2-2 provides the dimensions and capacity of tank 1776.

Table 2-2 Tank 1776 Capacity and Dimensions

Valero Tank ID (District ID)	Type	Diameter (feet)	Height (feet)	Capacity [1] (bbl)
TK-1776 (S-97)	External Floating Roof	128	48	110,000

[1] Working (useable) capacity is 101,400 bbl.

Tank 1776 has a welded steel shell and its EFR is equipped with primary and tight-fitting secondary seals to minimize emissions. The roof fittings comply with the current District Rule 8-5 requirements for floating roof tanks.

Crude oil stored in tank 1776 would be transferred to an existing header where it would be blended with crude oil from other storage tanks before being piped to refinery process units.

2.2.3 Train Activity

Up to 100 rail cars per day would be unloaded at the refinery. Typically, two 50-rail-car switches per day would occur between the unloading racks and the Union Pacific Railroad Company (UP) tracks southeast of the refinery and highway 680. A UP locomotive would transport up to 50 rail cars at a time to the unloading rack. All locomotives would enter and exit along the southern refinery boundary, near the intersection of Park Road and Bayshore Road (see Figure 2-2 for location of the locomotive entrance/exit).

After the 50 rail cars are emptied at the unloading rack, they would be moved to the adjacent storage track. A UP locomotive would then retrieve the empty rail cars parked on the storage track and transport them off site. This unloading cycle would then be repeated for the remaining 50 loaded rail cars.

The duration of this unloading process, from entry of 50 loaded rail cars to refinery property, unloading of the 50 rail cars, to exit of 50 empty rail cars from refinery property, would take approximately 8 to 10 hours (16 to 20 hours for 100 rail cars).

Track layouts are provided in Appendix A.

3.0 EMISSION ESTIMATES

Estimated annual emissions have been calculated for the project to determine District permitting and emission offset requirements. Annual mass emissions are calculated based on 24-hour-per-day and 365-day-per-year operation. Net emissions are presented as the increase associated with the project based on post-project emissions minus baseline emissions. Consistent with District Rule 2-2-605, a baseline of the last 3 years (December 2009 through November 2012) best represents recent emissions at the refinery.

A summary of project net emissions is presented in Table 3-1. Emissions estimates for tank 1776 represent the net increase in potential emissions at maximum annual crude throughput (25.55 MMbbl per year). Fugitive emissions from components reflect the increased number of components associated with the unloading rack and related components, including pumps, valves, flanges, and connectors. Train emissions reflect the potential emissions increase at maximum annual crude throughput of 25.55 MMbbl per year, while marine vessel emissions reflect the potential emissions decrease associated with a 25.55 MMbbl reduction in crude oil delivered by marine vessels.

Net emissions of precursor organic compounds (POCs) from tank 1776 and fugitive component emissions (unloading rack, pumps, etc.) are the only pollutant increases associated with the project subject to District permitting requirements.

Table 3-1 Emissions Summary

Source	Project Emissions, Net Change from Baseline (ton/yr)						
	POC	NOx	CO	PM ₁₀	PM _{2.5}	SO ₂	GHG
Tank 1776 (S-97)	4.33	-	-	-	-	-	-
Unloading Rack and Pipeline Fugitive Components	1.71	-	-	-	-	-	-
Trains	1.70	33.04	5.60	0.83	0.81	0.02	5,593
Marine Vessels	(5.18)	(91.84)	(10.69)	(3.58)	(3.40)	(26.79)	(9,498)
Total	2.56	(58.80)	(5.09)	(2.75)	(2.59)	(26.77)	(3,905)

Project emissions estimates @ 25.55 MMbbl per year crude oil by rail. “()” indicates decrease.

POC = precursor organic compounds

NOx = oxides of nitrogen

CO = carbon monoxide

PM₁₀ = particulate matter (10 microns or less)

PM_{2.5} = particulate matter (2.5 microns or less)

SO₂ = sulfur dioxide

GHG = greenhouse gases, calculated as CO₂ equivalent (CO₂e)

3.1 Tank Emissions

The change in tank 1776 service to include crude oil storage would result in a net increase in POC and toxic air contaminant (TAC) emissions at the source. To minimize emissions, tank 1776’s external floating roof is equipped double seals with zero-gap secondary seals, consistent with District Rule 8-5, Best Available Control Technology (BACT) performance requirements, and Title 40 of the Code of Federal Regulations (CFR) 60 Subpart Kb.

3.1.1 POC Emissions

POC emissions are calculated using the United States Environmental Protection Agency (USEPA) TANKS 4.09d software. Crude oil storage tank emissions for the project are presented in Table 3-2, including baseline, post-project, and net emissions. Pre-project (baseline) emissions are based on actual emissions from product storage at tank 1776 for the 3-year baseline period from December 2009 through November 2012.

Table 3-2 Tank 1776 POC Emissions

Valero Tank ID (District ID)	POC Emissions (lb/day)			POC Emissions (ton/yr)		
	Baseline	Post-Project	Net	Baseline	Post-Project	Net
TK-1776 (S-97)	15.6	39.3	23.7	2.85	7.18	4.33

Post-project emissions assume annual crude oil throughput of 25.55 MMbbl/yr (70,000 bbl/day x 365 day/yr) and the following crude oil properties: Reid Vapor Pressure (RVP) = 9.4 pounds per square inch absolute (psia), density = 6.74 lb/gal (43.5 API).

Appendix B provides documentation of the emission estimation methodology including tank characteristics, material properties, USEPA TANKS 4.09d software input assumptions and output results, and actual tank throughput data for the 3-year baseline period.

Tank 1776 is currently permitted for jet fuel (JP4) as a grandfathered source under Valero's Title V permit, and shares a combined throughput limit of 62.8 MMbbl per year with the following tanks: S-63, S-73, S-74, S-75, S-76, S-78, and S-163 (S-74 is operated under NuStar Logistics' Title V permit, Facility B5574, while the other tanks are operated under the refinery's Title V permit. NuStar is a contiguous facility that is operated pursuant to a service agreement between NuStar Logistics and Valero Refining Company--California). Valero requests that S-97 receive a new throughput limit of 25.55 MMbbl per year applicable to storage of crude oil only, but that S-97 should also remain subject to the shared 62.8 MMbbl per year throughput limit for S-63, S-73, S-74, S-75, S-76, S-78, S-97, and S-163 to the extent S-97 is used for storage of products other than crude.

While the post-project PTE calculated for S-97 would be greater than baseline emissions, crude oil throughput at S-97 would be offset by a corresponding decrease in crude oil throughput at the facility's other crude oil storage tanks that are currently served by ship and by pipeline (S-57 through S-62, S-1047, and S-1048 [S-57 through S-62 are operated under NuStar Logistics' Title V permit]). As a result, post-project combined crude oil throughput at tanks S-57 through S-62, S-97, S-1047, and S-1048 would not exceed 62.6 MMbbl per year, which is the current combined throughput limit specified by Condition 20820 for tanks S-57 through S-62, S-1047, and S-1048.

3.1.2 TAC Emissions

POC emissions from crude oil storage include compounds classified as TACs. For the TAC emissions estimates, post-project POC emissions were speciated into TAC constituents based on the default speciation data obtained from USEPA TANKS 4.09d software for crude oil at the conditions assumed for each tank. Pre-project (baseline) emissions are based on actual emissions from product storage at tank 1776 for the 3-year

baseline period from December 2009 through November 2012. TAC emissions are summarized in Table 3-3.

Table 3-3 Tank 1776 TAC Emissions

TAC	Hourly Emissions (lb/hr)			Annual Emissions (lb/yr)		
	Baseline	Post-Project	Net	Baseline	Post-Project	Net
Benzene	5.3E-03	8.6E-03	3.2E-03	46.6	74.9	28.3
Ethylbenzene	6.1E-04	3.7E-03	3.1E-03	5.4	32.3	26.9
Hexane (n-)	4.7E-03	7.1E-03	2.4E-03	41.3	62.3	21.0
Toluene	6.8E-03	1.0E-02	3.5E-03	59.5	90.0	30.5
Xylenes (m-)	2.8E-03	1.3E-02	1.0E-02	24.7	111.9	87.2

Hourly TAC emissions are average hourly emissions based on annual emissions estimates. TAC emissions estimates based on TANKS4.09d default speciation profiles (except for benzene in crude oil: 0.6%wt benzene assumed for crude oil, which is higher than default benzene content in TANKS4.09d).

See Appendix B for detailed assumptions and TANKS 4.09d input parameters.

3.2 Fugitive Component Emissions

3.2.1 POC Emissions

Project fugitive POC emissions are based on the total count of new components associated with the Crude by Rail project. POC emission increases are based on emission factors developed using the Correlation Equation Method (California Air Pollution Control Officers Association [CAPCOA]/CARB, 1999), with the District Rule 8-18 component emission definitions as the screening values. Total fugitive emissions are estimated by multiplying the emission factor for each component type by the estimated count of each component type. For the proposed project, total POC emissions from fugitive components are estimated to be 1.71 tons per year as presented in Table 3-4.

Table 3-4 Fugitive Component POC Emissions

Component Type	POC Emissions (ton/yr)
Pumps	0.07
Valves	0.35
Flanges	1.17
Connectors	0.11
Atmospheric Pressure Relief Devices	0.00
Total	1.71

All components in light liquid (crude oil) service.
POC emissions estimates represent net post-project potential emissions.

Detailed fugitive emission calculations including the correlation equations, screening values, and resulting emission factors are presented in Appendix B.

3.2.2 TAC Emissions

Fugitive POC emissions contain compounds that are classified as TACs. Using the same liquid fraction for the same crude oil speciation as for the storage tanks, TAC emissions were calculated from project component fugitive POC emissions and are presented in Table 3-5.

Table 3-5 Fugitive Component TAC Emissions

TAC	CAS #	Wt. Percent in Crude Oil	TAC Emissions (net)	
			lb/hr	lb/yr
Benzene	00071-43-2	0.06	2.3E-04	2.0
Ethylbenzene	00100-41-4	0.4	1.6E-03	13.7
Hexane (n-)	00110-54-3	0.4	1.6E-03	13.7
Toluene	00108-88-3	1.0	3.9E-03	34.2
Xylenes (m-)	01330-20-7	1.4	5.5E-03	47.8

Consistent with District Rule 2-5-601, fugitive components are considered new sources. Hourly and annual TAC emissions are based on the post-project emissions (i.e., the potential to emit). Detailed fugitive TAC emission calculations are documented in Appendix B.

3.3 Cargo Carrier Emissions

3.3.1 Criteria Pollutant Emissions

Cargo carrier emissions would decrease because emission rates per bbl of crude delivered would be lower for trains than for ships, and increases in crude volume delivered by train would result in decreases in crude volume delivered by ship. Emissions from cargo carriers include all emissions while operating in the District. A summary of cargo carrier emissions is presented in Table 3-6.

Table 3-6 Cargo Carrier Criteria Pollutant Emissions

Source	Post-Project Emissions, Net Change from Baseline (ton/yr)						
	POC	NOx	CO	PM ₁₀	PM _{2.5}	SO ₂	GHG
Trains	1.70	33.04	5.60	0.83	0.81	0.02	5,593
Marine Vessels	(5.18)	(91.84)	(10.69)	(3.58)	(3.40)	(26.79)	(9,498)
Total	(3.48)	(58.80)	(5.09)	(2.75)	(2.59)	(26.77)	(3,905)

Train emissions are post-project potential emissions @ 25.55 MMbbl per year; marine vessel emissions (negative) are post-project emissions @ -25.55 MMbbl per year (reduced crude oil deliveries).

Detailed calculations are presented in Appendix B. The baseline period is defined as the 3-year period ending November 30, 2012.

Cargo carrier emissions, specifically ship and barge emissions, associated with the import of crude and gas oil at Valero's marine terminal are currently subject to annual calendar year limits, as specified in Part 23 of Condition 20820. No changes are proposed to these limits; post-project cargo carrier emissions would remain within these limits.

4.0 APPLICABLE REGULATIONS

Prior to issuance of an ATC, the District must determine that the proposed project will comply with applicable air quality rules and regulations, including both District and federal requirements. This section presents a discussion of each applicable air quality requirement and documentation that the project complies with all requirements.

4.1 District Rules and Regulations

4.1.1 Regulation 1 – General Provisions and Definitions

Section 1-301 of Regulation 1 prohibits discharge from any source such quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public; or that endangers the comfort, repose, health or safety of any such person or the public; or that causes or has a natural tendency to cause injury or damage to business or property.

The project will be operated in accordance with all federal and District rules and regulations, and is not expected to cause a public nuisance.

4.1.2 Regulation 2 – Permits

4.1.2.1 Rule 2-1 – General Requirements

Section 2-1-301 – Authority to Construct

Unless otherwise exempted, an ATC must be obtained from the District prior to building, modifying, or replacing any emissions unit or control device. The project would emit regulated air contaminants. Therefore, the project is subject to the requirements of Section 2-1-301 to obtain an ATC from the District prior to project implementation. District ATC permit application forms are presented in Appendix B, Attachment B-1, in accordance with Section 2-1-402.

Per Section 2-1-114.2.4, cargo carrier emissions must be included in the facility's emissions. As discussed in Section 3.3, post-project, facility-wide cargo carrier emissions would remain unchanged or decrease because emissions rates per barrel of crude delivered would be lower for trains than for ships, and increases in crude volume delivered by train would replace crude volume delivered by ships.

Criteria pollutant emissions from cargo carriers would not exceed the existing "Cargo Carrier and Dock" emission limits contained Parts 23 and 24 of Condition 20820. Cargo carrier TAC emissions would not be emitted in a quantity greater than that previously emitted (Section 2-1-234.4). While cargo carrier emissions would remain unchanged or decrease, the distribution of cargo carrier emissions would shift from the marine terminal south of the refinery to the rail lines east and south of the refinery.

Section 2-1-302 – Permit to Operate

In accordance with Section 2-1-302, a Permit to Operate must be obtained from the District prior to using or operating any article, machine, equipment, or other contrivance, the use of which may cause, reduce or control emissions of air contaminants. After construction of any equipment associated with the proposed project is complete in accordance with the ATC, Valero would notify the District when ready to commence

operation. Operation of the new project would only commence once Valero receives a Permit to Operate or a temporary authorization to operate in accordance with the ATC.

Section 2-1-412 – Public Notice, Schools

Section 2-1-412 requires public notice if the new or modified source is located within 1,000 feet of any K-12 school. The project will not be located within 1,000 feet of the boundary of any school.

4.1.2.2 Rule 2-2 – New Source Review

District Rule 2-2, New Source Review, applies to all new and modified sources that are subject to ATC requirements. The proposed project is potentially subject to several sections of Rule 2-2.

Section 2-2-301 – Best Available Control Technology

Section 2-2-301 requires BACT to control emissions from any new source with the potential to emit 10 pounds per day or more of non-precursor organic compounds (NPOCs), POCs, NO_x, SO₂, PM₁₀, or CO. Tank 1776 would be subject to BACT because post-project POC emissions would exceed 10 pounds per day (see Table 3-2 for emissions estimates). Fugitive components (pumps, valves, flanges, connectors) would not be subject to BACT because post-project POC emissions would be below 10 pounds per day. Cargo carriers (trains) are not subject to BACT per Section 2-2-206.

District BACT guidelines for POC emissions from EFR tanks are summarized in Table 4-1.

Table 4-1 BACT for EFR Tanks

Pollutant	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice	Typical Technology
POC	1. Vapor recovery system w/ an overall system efficiency >98% [a],[T] 2. BAAQMD Approved roof w/ liquid mounted primary seal and zero gap secondary seal, all meeting design criteria of Reg. 8, Rule 5. Also, no ungasketed roof penetrations, no slotted pipe guide pole unless equipped with float and wiper seals, and no adjustable roof legs unless fitted w/ vapor seal boots or equivalent. [a],[T] Additionally, a dome is required for tanks that meet all of the following: 1) capacity greater than or equal to 19,815 gallons 2) located at a facility with greater than 20 tons per year volatile organic compound (VOC) emissions since the year 2000 and 3) storing a material with a vapor pressure equal to or greater than 3 psia (except for crude oil tanks that are permitted to contain more than 97% by volume crude oil).[b]	1. Thermal Incinerator; or Carbon Adsorber; or Refrigerated Condenser; or BAAQMD approved equivalent. [a],[T] 2. BAAQMD Approved Roof and Seal Design. [a],[T]

References:

District BACT Guideline Document 167.1.2, Source: Storage tank – External Floating Roof, Organic Liquids, Class: All, Revision 2, Date: 9/19/2011. Only POC BACT information is shown because BACT is only triggered for POC emissions.

[a] BAAQMD

[T] TBACT (Best Available Control Technology for Toxics)

[b] BAAQMD Application 22722, SCAQMD Regulation 1178 (1/1/04)

BACT1 for EFR tanks specifies a vapor recovery system with an overall efficiency greater than 98 percent. While technologically feasible, a vapor recovery system is not typically used in practice on large EFR tanks because it would be cost-prohibitive, well above the District’s cost-effectiveness threshold of \$17,500 per ton of POC reduced.

BACT2 for EFR tanks is a liquid-mounted primary seal, zero-gap secondary seal, and gasketed fittings, all meeting the design criteria of Rule 8-5. Tank 1776 would satisfy these BACT2 requirements (it would not be subject to the BACT2 dome requirement because it would be permitted to store more than 97 percent by volume crude oil).

Section 2-2-302 and 2-2-303 – Project Emission Offsets

In accordance with Section 2-2-302, emission offsets must be provided for a new or modified source at a facility that emits or will be permitted to emit 35 tons per year or more of POC or NOx (minus any contemporaneous emission reduction credits) at a 1.15 to 1.0 ratio. The refinery is permitted to emit POC and NOx in excess of 35 tons per year. For new and modified sources, emission increases must be calculated in accordance with Sections 2-2-604 and 2-2-605. As presented in Table 4-2, the project results in an increase in POC emissions from tank 1776 and from fugitive component emissions. Valero plans to provide emission reduction credits at the prescribed ratio of 1.15 to 1.0 to offset the net project emission increase.

Table 4-2 Emission Offsets

Emission Source	POC Emissions (ton/yr)	NOx Emissions (ton/yr)	PM ₁₀ Emissions (ton/yr)	SO ₂ Emissions (ton/yr)
Project Emissions				
Tank 1776	4.33	0	0	0
Fugitive Components	1.71	0	0	0
Cargo Carriers (Trains, Marine Vessels)	*	*	*	*
<i>Subtotal</i>	<i>6.04</i>	<i>0</i>	<i>0</i>	<i>0</i>
Contemporaneous Emission Reductions				
None	0	0	0	0
<i>Subtotal</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Net Project Emission Increase	6.04	0	0	0
Emission Offset Requirement	6.95	-	-	-

Emissions are post-project net emissions (post-project potential emissions minus baseline emissions). Emission offset ratio is 1.15:1. Only POC, NOx, PM₁₀, and SO₂ are subject to emission offset requirements. * There would be no increase in cargo carrier emissions (trains, marine vessels). See Table 3-6 for the estimated net change in emissions from cargo carriers. Cargo carrier emissions would continue to comply with the existing cargo carrier emission limits in Condition 20820, Parts 23-25.

See Appendix B for detailed calculations and assumptions.

Valero would surrender emission reduction credits for the required emission offsets upon confirmation by the District.

Section 2-2-304 through 2-2-306 – PSD Requirement

The tanks and fugitive components would only emit POC, which is not a regulated Prevention of Significant Deterioration (PSD) pollutant. Cargo carrier emissions are not considered as part of the facility emissions when determining PSD applicability per Section 2-2-215.2.

Section 2-2-317 – Maximum Achievable Control Technology Requirement

In accordance with Section 2-2-317, the District shall not issue an ATC for a new or modified source at a Major Facility of hazardous air pollutants (HAPs) unless the source will meet Best Available Control Technology for Toxics (TBACT), except as provided in Section 2-2-114. Section 2-2-114 allows an exemption from Section 2-2-317 when the combined increase in Potential to Emit (PTE) from all related sources in a proposed construction or modification is less than 10 tons per year of any HAP and less than 25 tons per year of any combination of HAPs. The increase in HAP emissions from tank 1776 and associated project fugitive components would be less than 10 tons per year of any HAP and less than 25 tons per year of all HAPs combined. Therefore, TBACT is not required for tank 1776 or the associated project fugitive components pursuant to Section 2-2-317.

4.1.2.3 Rule 2-5 – New Source Review of Toxic Air Contaminants

In accordance with District Regulation 2-5-100, if the project's emissions of any TAC, which are identified in Table 2-5-1 of Regulation 2, Rule 5, exceed the indicated trigger level, then a risk analysis is required. "Project emissions" include emissions from new sources and increased emissions from modified sources. The rule requires that emissions of all TACs associated with a project be included in the risk analysis if any single TAC exceeds its hourly or annual trigger level.

According to Section 2-5-216, project emissions must include all approved projects within the 2-year period preceding an application, unless the emissions are demonstrated to be unrelated to those in the application. There are no approved projects within the 2-year period prior to this application that are related to this application. Therefore, no adjustment to project emissions is necessary.

Project TAC emissions are summarized in Table 4-3. Hourly TAC emissions are below acute trigger levels. Annual TAC emissions are below the chronic trigger level for all pollutants except benzene. Because benzene exceeds the District's chronic trigger level, Valero has included a completed District Health Risk Screening Assessment (HRSA) form in Appendix C.

Table 4-3 TAC Emissions and District Trigger Levels

Pollutant	CAS Number	Emissions, Net Change from Baseline		Trigger Levels (District Table 2-5-1)		Exceed Acute Trigger Level?	Exceed Chronic Trigger Level?
		lb/hr	lb/yr	lb/hr (acute)	lb/yr (chronic)		
Tank 1776							
Benzene	71-43-2	3.2E-03	28.3	2.9	6.4	No	Yes
Ethylbenzene	100-41-4	3.1E-03	26.9	NA	77,000	No	No
Hexane (n-)	110-54-3	2.4E-03	21.0	NA	270,000	No	No
Toluene	108-88-3	3.5E-03	30.5	82.0	12,000	No	No
Xylenes (m-)	1330-20-7	1.0E-02	87.2	49.0	27,000	No	No
Fugitive Components							
Benzene	71-43-2	2.3E-04	2.0	2.9	6.4	No	No
Ethylbenzene	100-41-4	1.6E-03	13.7	NA	77,000	No	No
Hexane (n-)	110-54-3	1.6E-03	13.7	NA	270,000	No	No
Toluene	108-88-3	3.9E-03	34.2	82.0	12,000	No	No
Xylenes (m-)	1330-20-7	5.5E-03	47.8	49.0	27,000	No	No

Net TAC emissions from Tables 3-3 and 3-5.

4.1.2.4 Rule 2-6 – Major Facility Review

The refinery is a major facility and currently holds a Major Facility Review Permit, also referred to as a Title V operating permit. The project will require a Minor Permit Revision of the Title V permit in accordance with Regulation 2-6-215 because it is not an administrative or significant permit revision. The proposed revisions are not considered to be administrative or significant because there are no proposed revisions that meet the definition for administrative revisions under 2-6-201 or that meet the definition for significant revisions under Section 2-6-226.

Valero will submit a Title V permit modification application following receipt of the ATC for this project.

4.1.3 Regulation 3 – Fees

District Regulation 3 specifies the fee structure for projects subject to District permitting review. Estimated fees for the project are presented in Section 5.0.

4.1.4 Regulation 6 – Odorous Substances

Regulation 6, Rule 1 limits particulate matter and visible emissions. Tank 1776, the offloading racks, and fugitive components would not be sources of PM or visible emissions. The locomotives used to transport rail cars would emit PM, but Rule 6-1 does not apply to cargo carriers.

4.1.5 Regulation 7 – Odorous Substances

District Regulation 7 places general limitations on odorous substances and specific emission limitations on certain odorous compounds. This rule only becomes applicable if the District receives odor complaints from 10 or more complainants within a 90-day period. Because the District has not received 10 or more complaints with a 90-day period concerning refinery emissions, the Valero refinery is not subject to this rule.

4.1.6 Regulation 8 – Organic Compounds

4.1.6.1 Rule 8-5 – Storage of Organic Liquids

Rule 8-5 limits emissions of organic compounds from storage tanks. S-97 would continue to be subject to this rule. The tank would continue to comply with Rule 8-5; the project would not change the applicability of Rule 8-5 to tank 1776.

4.1.6.2 Rule 8-18 – Equipment Leaks

Rule 8-18, specific to equipment leaks, limits POC emissions from equipment components such as valves, flanges, connectors, and pumps. The limits on these fugitive POC emissions are specific to each component type. The new fugitive components installed as part of this project would be added to the Valero's existing Leak Detection and Repair (LDAR) program to ensure compliance with Rule 8-18.

4.1.6.3 Rule 8-28 – Episodic Releases from Pressure Relief Valves at Petroleum Refineries and Chemical Plants

Section 8-28-302 requires that any person installing a new refinery source or modifying an existing refinery source that is equipped with at least one pressure relief device in organic compound service must meet all applicable requirements of Rule 2-2, including BACT. Any pressure relief devices installed as part this project would meet BACT.

4.1.7 Regulation 10 – Standards of Performance for New Stationary Sources

Regulation 10 adopts the provisions of 40 CFR 60 by reference. The applicable subparts of 40 CFR 60 are identified in Section 4.3 of this application.

4.1.8 Rule 11-12 – National Emission Standard for Benzene Emissions

Rule 11-12 adopts the provisions of 40 CFR 61 Subpart BB and Subpart FF by reference. The applicability of and compliance with 40 CFR 61 is reviewed in Section 4.3 of this application.

4.2 California Environmental Quality Act

CEQA requires a review of potential significant environmental impacts from proposed projects. This project has been determined to be subject to CEQA review by the City of Benicia and will require a Land Use Permit. An application for a Land Use Permit was submitted to the City of Benicia in December 2012. The City of Benicia will serve as Lead Agency.

4.3 Federal Rules and Regulations

4.3.1 40 CFR 52.21 – Prevention of Significant Deterioration of Air Quality

District has been delegated authority by USEPA for implementation and enforcement of the federal PSD requirements as referenced in District Regulation 2-2-304. As previously discussed in Sections 1.5 and 4.1.2.2, the project is not subject to PSD review because project emissions increases are not considered to be a “modification” that would exceed “major modification” applicability thresholds for any pollutant listed in District Rules 2-2-304 through 2-2-306.

Cargo carriers are not subject to PSD applicability review per District Rule 2-2-215.

4.3.2 40 CFR 60 Subpart A – General Provisions

Any source subject to an applicable standard under 40 CFR 60 is also subject to the general provisions of Subpart A. Because the replacement, new, and refurbished storage tanks are subject to 40 CFR 60 Subpart Kb, the requirements of Subpart A apply. Subpart A contains requirements for notification of construction or modification and startup, monitoring, recordkeeping and reporting, and performance testing. Valero will provide notification to the USEPA administrator at least 60 days prior to construction of equipment subject to Subpart Kb and notification of startup, as required. Valero currently complies with the monitoring, recordkeeping, and reporting requirements of Subpart A and will continue to do so following implementation of the proposed project.

4.3.3 40 CFR 60 Subpart Kb – Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

This subpart applies to each storage vessel with a capacity greater than or equal to 75 cubic meters that is used to store volatile organic liquids for which construction, reconstruction, or modification is commenced after July 23, 1984. Subpart Kb requires tanks storing organic liquids to be equipped with an appropriate vapor loss control device (internal floating roof with seals, EFR with seals, or fixed roof tank with vapor recovery and control device).

Tank 1776 would be subject to Subpart Kb because the proposed operational change is considered a modification under Section 60.14 (an operational change that would result in an increase in the emission rate of a pollutant to which a standard applies). Tank 1776 would comply with the requirements of Subpart Kb.

4.3.4 40 CFR 60 Subpart GGGa – Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006

The project’s group of equipment (valves, pumps, connectors, and flanges in POC service) is not within a process unit, as defined in §60.590a, and is therefore not an affected facility and not subject to 40 CFR 60 Subpart GGGa.

4.3.5 40 CFR 61 Subpart A – General Provisions

Any source subject to an applicable standard under 40 CFR 61 is also subject to the general provisions of Subpart A. Because the proposed project will be subject to Subpart FF, the requirements of Subpart A apply. Valero currently complies with the monitoring, recordkeeping, and reporting requirements of Subpart A and would continue to do so following implementation of the proposed project.

4.3.6 40 CFR 61 Subpart FF – Benzene Waste Operations NESHAP

Commonly referred to as BWON, or the Benzene Waste Operations national emission standards for hazardous air pollutants (NESHAP), 40 CFR 61 Subpart FF applies to chemical manufacturing plants, coke by-product recovery plants, and petroleum refineries. The proposed project would generate benzene-containing wastes. Valero has in place a BWON program that would ensure continued compliance with this rule.

4.3.7 40 CFR 63 Subpart A – General Provisions

Any source subject to an applicable standard under 40 CFR 63 is also subject to the general provisions of Subpart A. Because the proposed project will be subject to Subpart CC, the requirements of Subpart A apply. Valero currently complies with the monitoring, recordkeeping, and reporting requirements of Subpart A and would continue to do so following implementation of the proposed project.

4.3.8 40 CFR 63 Subpart CC – National Emission Standards for Petroleum Refineries

Commonly referred to as “Refinery MACT,” Subpart CC applies to petroleum refining process units and related emission sources that emit or have equipment containing or contacting one or more HAPs listed in Subpart CC, and are located in a petroleum refinery that is a major source of HAPs. Subpart CC establishes standards for miscellaneous process vents, storage vessels, wastewater streams and treatment operations, equipment leaks, gasoline loading racks, and marine vessel loading operations. Tank 1776 and the project’s fugitive component equipment leaks would be subject to this rule.

Storage tanks subject to Subpart CC are classified as either Group 1 or Group 2 storage vessels. “Group 1 storage vessel” means a storage vessel at an existing source that has a design capacity greater than or equal to 177 cubic meters (46,758 gallons) and stored-liquid maximum true vapor pressure greater than or equal to 10.4 kilopascals (1.5 pounds per square inch [psi]) and stored-liquid annual average true vapor pressure greater than or equal to 8.3 kilopascals (1.2 psi) and annual average HAP liquid concentration greater than 4 percent by weight total organic HAP. “Group 2 storage vessel” means a storage vessel that does not meet the definition of a Group 1 storage vessel.

Tank 1776 is a Group 1 storage vessel. A Group 1 storage vessel that is also subject to 40 CFR 60 Subpart Kb is subject to the overlap in Subpart CC at 63.640(n)(1) that specifies that such tanks are subject only to the requirements of 40 CFR 60 Subpart Kb with exceptions in Subpart CC at 63.640(n)(8). This will be the case for tank 1776.

5.0 ESTIMATED PERMIT FEES

Estimated permit fees for this ATC application are \$16,818. Table 5-1 presents a breakdown of the estimated fees based on tank 1776's capacity. Valero requests District confirmation of these permit fee estimates.

Table 5-1 *Estimated Permit Fees*

Fee Type	Fee (\$)
Filing Fee	\$416
Initial Fee	\$7,993
Risk Screening Fee	\$8,409
Permit to Operate Fee [1]	-
Toxic Surcharge Fee [1]	-
Total	\$16,818

Fee estimate based on District Regulation 3 (June 6, 2012) and Schedule C (Stationary Containers for the Storage of Organic Liquids).

Initial fee = 0.173 cents per gallon

Risk Screening Fee (RSF) = \$416 plus 0.173 cent per gallon (first TAC source in application)

[1] This is a permit modification application for an existing source and there is no incremental increase in Permit to Operate or Toxic Surcharge fees because the tank's capacity will remain unchanged.

Fee estimate assumes a container volume of 4,620,000 gallons (110,000 bbl), as listed in Table II A of Valero's Title V permit. Note that the actual working (useable) volume of the tank is 4,258,000 gallons (101,400 bbl).

REFERENCES

- Bay Area Air Quality Management District (District). 2013. *Best Available Control Technology (BACT) Guideline*.
<http://hank.baaqmd.gov/pmt/bactworkbook/default.htm>.
- Bay Area Air Quality Management District (District). 2010. Final Major Facility Review Permit, Valero Refining Co. – California, Facility #B2626. December 20, 2010.
- Bay Area Air Quality Management District (District). 1994. Application 12467. S-97 External Floating Roof Tank: TK-1776, storing JP-4 and mogas, 110 thousand barrel capacity. January 21, 1994.
- California Air Pollution Control Officers Association (CAPCOA)/California Air Resources Board (CARB). 1999. *California Implementation Guidelines for Estimating Mass Emissions from Fugitive Hydrocarbon Leaks at Petroleum Facilities*.
<http://www.arb.ca.gov/fugitive/fugitive.htm>.

Appendix A
Drawings and Specifications
Attachment A-1 – Process Flow Diagram
Attachment A-2 – Plot Plan

Appendix A contains confidential business information

Appendix B

Emission Calculations

Attachment B-1 - Tank 1776 Baseline Throughput and Emissions

Attachment B-2 - Tank 1776 Post-Project Emissions

Attachment B-3 - Fugitive Component Emissions

Attachment B-4 - Cargo Carrier Emissions

Appendix B, Attachments B-1, B-2, and portions of B-4 contains
confidential business information

Attachment B-3
Fugitive Component Emissions

Crude By Rail Project
Fugitive Component Emissions Estimates
2/27/2013

Emission Factors

Component Type	Screening Value (SV)	Correlation Equation	Hourly Emissions	Daily Emissions
	max ppm	kg/hr/comp	lb/hr/comp	lb/day/comp
Pumps	500	$5.07E-05(SV)^{0.622}$	5.33E-03	0.12803
Valves	100	$2.27E-06(SV)^{0.747}$	1.56E-04	0.00375
Flanges	100	$4.53E-06(SV)^{0.706}$	2.58E-04	0.00619
Connectors	100	$1.53E-06(SV)^{0.736}$	1.00E-04	0.00240
PSVs/Other	500	$8.69E-06(SV)^{0.642}$	1.04E-03	0.02485

Correlation Equation from Table IV-3a (CAPCOA-Revised 1995 EPA Correlation Equations and Factors for Refineries and Marketing Terminals), California Implementation Guidelines for Estimating Mass Emissions from Fugitive Hydrocarbon Leaks at Petroleum Facilities, February 1999.

Screening Value (SV) from BAAQMD Regulation 8, Rule 18 component emission limits

Component Count Estimates

Component Type	Component Count Estimate		
	Total	% Contin	Total (w/Contin)
Pumps	3	0	3
Valves	450	15%	518
Flanges	2 * valves	2 * valves	1,036
Connectors	0.5 * valves	0.5 * valves	259
PSVs	0	0%	0
Total			1,816

Equipment counts per Valero, Feb 2013. Flange count assumes 2.0:1 flange to valve ratio, and 0.5:1 connector to valve ratio. Total component counts for valves includes 15% contingency.

POC and TAC Emissions

Component Type	Total Count	POC Emission Factor (lb/day/comp)	POC Emissions		TAC Emissions				
			Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Benzene	Ethylbenzene	Hexane (-n)	Toluene	Xylenes (-m)
					0.06%	0.4%	0.4%	1.00%	1.4%
Pumps	3	0.12803	0.38	140.2	0.08	0.56	0.56	1.40	1.96
Valves	518	0.00375	1.94	708.3	0.42	2.83	2.83	7.08	9.92
Flanges	1,036	0.00619	6.41	2340.4	1.40	9.36	9.36	23.40	32.77
Connectors	259	0.00240	0.62	226.9	0.14	0.91	0.91	2.27	3.18
PSVs	0	0.02485	0.00	0.0	0.00	0.00	0.00	0.00	0.00
Total	1,816	-	9.36	3415.7	2.05	13.66	13.66	34.16	47.82

TAC speciation percentages for crude oil based on EPA TANKS 4.09d default values (same as used for tank emissions).

Emissions Summary (ton/yr)

Component Type	POC	Benzene	Ethylbenzene	Hexane (-n)	Toluene	Xylenes (-m)
Pumps	0.07	0.00	0.00	0.00	0.00	0.00
Valves	0.35	0.00	0.00	0.00	0.00	0.00
Flanges	1.17	0.00	0.00	0.00	0.01	0.02
Connectors	0.11	0.00	0.00	0.00	0.00	0.00
PSVs	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.71	0.00	0.01	0.01	0.02	0.02

Attachment B-4
Cargo Carrier Emissions

Train Criteria Pollutant and GHG Emissions

Marine Vessel Criteria Pollutant and GHG Baseline
Emissions

*Train
Criteria Pollutant and GHG
Emissions*

Crude by Rail Project

Locomotive Criteria Pollutant and GHG Emissions

2/22/2013

Summary

Incremental Locomotive Annual Emissions (100 Rail Cars per Day, 25.55 MMbbl Crude Oil per Year)

Type	Annual Emissions (tons/year)						
	CO	ROG	NOx	SOx	PM10	PM2.5	CO ₂ e
Small Line Haul	0.336	0.178	3.490	0.001	0.081	0.078	149
Large Line Haul	4.224	1.019	21.416	0.015	0.571	0.554	5,058
Switching	1.043	0.501	8.134	0.004	0.180	0.175	387
Total Emissions	5.602	1.698	33.04	0.020	0.832	0.807	5,593

Locomotive Emission Factors (100 Rail Cars per Day)

Locomotive Emission Factor	Emission Factor (lb/kbbl)						
	CO	ROG	NOx	SOx	PM10	PM2.5	CO ₂ e
	0.4385	0.1329	2.5863	0.0016	0.0651	0.0632	437.8

lb/kbbl = pounds per thousand barrels of crude oil delivered

Crude by Rail Project
Locomotive Criteria Pollutant and GHG Emissions
 2/22/2013
Input Data

Maximum Daily and Annual Tank Rail Cars and Crude Oil

Project Scenario	Maximum Daily Tank Rail Cars (cars/day)	Maximum Annual Tank Rail Cars (cars/yr)	Maximum Daily Crude (bbl/day)	Maximum Annual Crude (bbl/yr)	Reference
100 railcars per day	100	36,500	70,000	25,550,000	Project Description

Fuel Consumption Index* Calculation (for year 2011)

Railroads Operating in CA	Fuel Consumption (gallons)	Gross-Ton Miles w/ Locomotive (1000 ton-miles)	Gross-Ton Miles w/o Locomotive (1000 ton-miles)	Fuel Consumption Index (gross ton-miles/gal)
BNSF	1,291,164,605	1,200,654,478	101,512,077	851
UP	980,687,454	1,072,705,764	86,678,504	1005
Average	-	-	-	928
Data Source	Form R-1 schedule 750 Line 1	Form R-1 schedule 755 Line 104	Form R-1 schedule 755 Line 98	-

* Based on methodology described in *Procedures for Emission Inventory Preparation Volume IV: Mobile Sources*, EPA420-R-92-009, December 1992

Track Length/Trip Distance Calculation (Miles)

Track Segment	Haul Type	Total Distance (miles)	Distance within BAAQMD (miles)	Reference
Track Length from Roseville Yard to UPRR Mainline Track near Valero Refinery	Large Line Haul	68	22	Google Earth - Roseville Yard to Benecia Refinery
Track Length of Siding Track in Valero Refinery	Small Line Haul	2	2	Google Maps - Tracks 700, 732, 710
R-A-R/Industry Track	Switching	NA	NA	

Crude by Rail Project
Locomotive Criteria Pollutant and GHG Emissions
2/22/2013
Daily Emissions

Year 2014 Daily Locomotive Criteria Pollutant Emissions - 100 Railcars per Day

Parameter	Value	Units	Reference
Maximum Additional Daily Tank Car due to Project	100	Cars/day	Based on Project Description
Maximum Freight Weight	106	short tons/car	TRN Spec Sheet-1
Daily Freight Transported due to Project	10,580	short tons/day	Based on Project Description
Weight of Empty Tank Car	37	short tons/car	TRN Spec Sheet-1
Maximum Total Daily Weight of Empty Tank Cars	3,720	short tons/day	
Maximum Daily Gross Weight Hauled	14,300	short tons/day	Freight Weight + Empty Railcar Weight
Assuming the Facility is Serviced Once daily	1	train/day	
Therefore Daily Number of Railcars per Train	100	Cars/train	
Total Siding Track Length within Valero Facility	2	miles	Google Earth and diagram provided by Valero
Total Mainline Track Length in California	68	miles	Google Earth - UPRR tack from Roseville Yard to Benecia Refinery
Total Mainline Track Length in BAAQMD	22	miles	Google Earth - Portion of UPRR tack from Roseville Yard to Benecia Refinery within BAAQMD
Conversion Factors			
UPRR Fuel Consumption Index (Gross Weight - Locomotive Weight)	1,005	Gross ton-miles/gal	Calculated based on methodology described in Procedures for Emission Inventory Preparation Volume IV: Mobile Sources, EPA420-R-92-009, December 1992
Sulfur Content of Fuel	15	ppmw	California Diesel Fuel Standard
Density of Diesel	3,200	g/gal	Emission Factors for Locomotives, EPA-420-F-09-025, April 2009
Number of Locomotives required for Switching	1	per train	Assumption
Switching Time	2	hr/train	Assumption
Average Train Size	25	cars/train	Project Description
Fuel Consumed during Yard Operation	9.4	gal/hr/locomotive	Revised Inventory Guidance for Locomotive Emissions, Sierra Research, pg 14, footnote 2, June 2004, http://www.metro4-sesarm.org/pubs/railroad/FinalGuidance.pdf
Average Locomotive Power over typical Switch Duty Cycle	177	bhp	Locomotive Emission Standards, Regulatory Support Document, Appendix B, EPA-420-R-98-101, April 1998
Power to Fuel Consumption Conversion Factor	15.2	bhp-hr/gal	Table 3, Emission Factors for Locomotives, EPA-420-F-09-025, April 2009

Crude by Rail Project
Locomotive Criteria Pollutant and GHG Emissions
 2/22/2013
Daily Emissions

Year 2014 Locomotive Emission Factors

Operation Type	Emission Factor (g/gal fuel) ¹						
	CO	POC	NOx	SOx	PM10	PM2.5	CO ₂ e ^{1,2}
Large Line Haul	26.62	6.42	135	0.096	3.6	3.5	10,314
Switch	27.82	13.37	217	0.096	4.8	4.7	10,314
Small Line Haul	23.30	12.32	242	0.096	5.6	5.4	10,314

1. Emission Factors for Locomotives, EPA-420-F-09-025, April 2009

2. N₂O and CH₄ factors for locomotive from 2012 Climate Registry Default Emission Factors, Released: January 6, 2012. <http://www.theclimaterestry.org/downloads/2012/01/2012-Climat-Registry-Default-Emissions-Factors.pdf>

Year 2014 Daily Line Haul Emissions (Within BAAQMD)

Segment	Operation Type	Emissions (lb/day)					
		CO	ROG	NOx	SOx	PM10	PM2.5
Within Valero Refinery	Small Line Haul	1.84	0.97	19.12	0.01	0.44	0.43
BAAQMD Border to Valero Refinery	Large Line Haul	23.14	5.58	117.35	0.08	3.13	3.04
Total Line Haul Emissions		24.98	6.56	136.47	0.09	3.57	3.46

Year 2014 Daily Switching Emissions

Segment	Operation Type	Emissions (lb/day)					
		CO	ROG	NOx	SOx	PM10	PM2.5
From Unloading Rack to Empty Railcar Parking Location (Using Fuel Usage Method)	Switch	4.62	2.22	36.04	0.02	0.80	0.77
From Unloading Rack to Empty Railcar Parking Location (Using Average Power Method)	Switch	5.71	2.75	44.57	0.02	0.99	0.96
Total Switch Emissions		5.71	2.75	44.57	0.02	0.99	0.96

Crude by Rail Project
Locomotive Criteria Pollutant and GHG Emissions
2/22/2013
Annual Emissions

Year 2014 Annual Locomotive Criteria Pollutant Emissions - 100 Railcars per Day

Parameter	Value	Unit	Reference
Additional Annual Tank Car due to Project	36,500	Cars/year	Based on Project Description
Maximum Freight Weight	106	short tons/car	TRN Spec Sheet-1
Annual Freight Transported due to Project	3,861,700	short tons/year	Based on Project Description
Weight of Empty Tank Car	37	short tons/car	TRN Spec Sheet-1
Total Annual Weight of Empty Tank Cars	1,357,800	short tons/year	
Annual Gross Weight Hauled	5,219,500	short tons/year	Freight Weight + Empty Railcar Weight
Assuming the Facility is Serviced Once daily	1	train/day	
Therefore daily Number of Railcars per Train	100	Cars/train	
Total Siding Track Length within Valero Facility	2	miles	Google Earth and diagram provided by Valero
Total Mainline Track Length in California	68	miles	Google Earth - UPRR tack from Roseville Yard to Benecia Refinery
Total Mainline Track Length in BAAQMD	22	miles	Google Earth - Portion of UPRR tack from Roseville Yard to Benecia Refinery within BAAQMD
Conversion Factors			
UPRR Fuel Consumption Index (Gross Weight - Locomotive Weight)	1,005	Gross ton-miles/gal	Calculated based on methodology described in Procedures for Emission Inventory Preparation Volume IV: Mobile Sources, EPA420-R-92-009, December 1992
Sulfur Content of Fuel	15	ppmw	California Diesel Fuel Standard
Density of Diesel	3,200	g/gal	Emission Factors for Locomotives, EPA-420-F-09-025, April 2009
Number of Locomotives required for Switching	1	per train	Assumption
Switching Time	2	hr/train	Assumption
Average Train Size	25	cars/train	Project Description
Fuel Consumed during Yard Operation	9.4	gal/hr/ locomotive	Revised Inventory Guidance for Locomotive Emissions, Sierra Research, pg 14, footnote 2, June 2004, http://www.metro4-sesarm.org/pubs/railroad/FinalGuidance.pdf
Average Locomotive Power over typical Switch Duty Cycle	177	bhp	Locomotive Emission Standards, Regulatory Support Document, Appendix B, EPA-420-R-98-101, April 1998
Power to Fuel Consumption Conversion Factor	15.2	bhp-hr/gal	Table 3, Emission Factors for Locomotives, EPA-420-F-09-025, April 2009

Crude by Rail Project
Locomotive Criteria Pollutant and GHG Emissions
 2/22/2013
Annual Emissions

Year 2014 Locomotive Emission Factors

Operation Type	Emission Factor (g/gal fuel) ¹						
	CO	POC	NOx	SOx	PM10	PM2.5	CO ₂ e ^{1,2}
Large Line Haul	26.624	6.4233	135	0.096	3.6	3.5	10314
Switch	27.816	13.3731	217	0.096	4.8	4.7	10314
Small Line Haul	23.296	12.3201	242	0.096	5.6	5.4	10314

1. Emission Factors for Locomotives, EPA-420-F-09-025, April 2009

2. N₂O and CH₄ factors for locomotive from 2012 Climate Registry Default Emission Factors, Released: January 6, 2012. <http://www.theclimateresistry.org/downloads/2012/01/2012-Climate-Registry-Default-Emissions-Factors.pdf>

Year 2014 Annual Line Haul Emissions (Within BAAQMD for Criteria Pollutants and Within California for CO₂e)

Segment	Operation Type	Emissions (tons/year)							Fuel Usage (gal/day)
		CO	ROG	NOx	SOx	PM10	PM2.5	CO ₂ e	
Within Valero Refinery	Small Line Haul	0.34	0.18	3.49	0.001	0.081	0.078	149	13,083
BAAQMD Border to Valero Refinery	Large Line Haul	4.22	1.02	21.42	0.015	0.571	0.554	5058	444,834
Total Line Haul Emissions		4.56	1.20	24.91	0.017	0.652	0.632	5,206	457,918

Year 2014 Annual Switching Emissions

Segment	Operation Type	Emissions (tons/year)							Fuel Usage (gal/day)
		CO	ROG	NOx	SOx	PM10	PM2.5	CO ₂ e	
From Unloading Rack to Empty Railcar Parking Location (Using Fuel Usage Method)	Switch	0.843	0.405	6.577	0.003	0.145	0.141	313	75
From Unloading Rack to Empty Railcar Parking Location (Using Average Power Method)	Switch	1.043	0.501	8.134	0.004	0.180	0.175	387	93
Total Switch Emissions		1.043	0.501	8.134	0.004	0.180	0.175	387	93

*Marine Vessel
Criteria Pollutant and GHG
Baseline Emissions*

Crude by Rail Project
 Marine Vessel Criteria Pollutant and GHG Baseline Emissions
 2/22/2013

Total Emissions Over 3-Year Baseline Period

Sources	Total Emissions Over Baseline Period (lb)									
	NO _x	CO	ROG	PM ₁₀	PM _{2.5}	SO ₂	CH ₄	CO ₂	N ₂ O	CO ₂ e
OGV - Main Engine	218,239	18,710	14,480	5,221	4,809	29,772	1,299	9,213,764	469	9,386,595
OGV - Auxiliary Engine	292,408	26,445	12,501	9,136	8,414	50,486	2,164	16,588,373	697	16,849,940
OGV - Auxiliary Boiler	74,692	7,568	4,162	7,568	7,378	115,501	1,135	36,702,931	2,845	37,608,850
Tugboats	85,823	25,437	6,739	4,248	4,248	62	112	5,485,412	247	5,564,409
Total	671,162	78,161	37,882	26,172	24,849	195,822	4,710	67,990,480	4,259	69,409,794
Emission Factor (lb/kbbl)	7.19	0.84	0.41	0.28	0.27	2.10	0.05	728	0.05	743

Total crude delivered by marine vessel during 3-year baseline period: 93,361,985 barrels

Annual Average Emissions Over Baseline Period

Sources	Annual Average Emissions Over Baseline Period (tons/year)									
	NO _x	CO	ROG	PM ₁₀	PM _{2.5}	SO ₂	CH ₄	CO ₂	N ₂ O	CO ₂ e
OGV - Main Engine	36	3	2	1	1	5	0	1,536	0	1,564
OGV - Auxiliary Engine	49	4	2	2	1	8	0	2,765	0	2,808
OGV - Auxiliary Boiler	12	1	1	1	1	19	0	6,117	0	6,268
Tugboats	14	4	1	1	1	0	0	914	0	927
Total	112	13	6	4	4	33	1	11,332	1	11,568

Average Emissions per Visit Over Baseline Period

Sources	Average Emissions Over Baseline Period (lb/visit)									
	NO _x	CO	ROG	PM ₁₀	PM _{2.5}	SO ₂	CH ₄	CO ₂	N ₂ O	CO ₂ e
OGV - Main Engine	827	71	55	20	18	113	5	34,901	2	35,555
OGV - Auxiliary Engine	1,108	100	47	35	32	191	8	62,835	3	63,826
OGV - Auxiliary Boiler	283	29	16	29	28	438	4	139,026	11	142,458
Tugboats	325	96	26	16	16	0.2	0	20,778	1	21,077
OGV - Total	2,217	200	118	83	78	742	17	236,762	15	241,839

Projected Emissions Offset by Proposed Crude By Rail Project

Emissions Offset by 25.55 MMbbls/year of Crude by Rail										
	NO _x	CO	ROG	PM ₁₀	PM _{2.5}	SO ₂	CH ₄	CO ₂	N ₂ O	CO ₂ e
Emissions (tpy)	91.8	10.7	5.2	3.6	3.4	26.8	0.6	9,303	0.6	9,498

Note: - Greenhouse gases (GHGs) are calculated as carbon dioxide equivalent (CO₂e) = CO₂ + 21*CH₄ + 310*N₂O

21 is the Global Warming Potential of CH₄

310 is the Global Warming Potential of N₂O

Default or Average Tanker Ship Specifications

Ship/Tanker Type	Crude Capacity (barrels)	DWT	Average Aux Engine Rating of ships visiting the Valero Wharf (kW)	Average Max Speed of ships visiting the Valero Wharf (kW)
Handymax		0 to 49,999	2328	14.5
Panamax	500,000	50,000 to 79,999	2616	14.9
Aframax	750,000	80,000 to 119,999	2492	15.0
Suezmax	1,000,000	120,000 to 199,999	3277	15.6
VLCC	2,000,000	200,000 to 299,999	4,502	15.3
ULCC	4,000,000	300,000+	4,502	15.6

VLCC - VERY LARGE CRUDE CARRIER
 ULCC - ULTRA LARGE CRUDE CARRIER

Crude Tanker Specific Cargo Capacity Estimate

Description	DWT ¹	Cargo tank capacity (m ³) ¹	Cargo capacity per DWT (m ³ /DWT)	Specific Cargo Capacity (bbl/DWT)
Suezmax Oil Tanker	166,300	185,447	1.1151	7.01
Oil Tanker	108,000	126,211	1.1686	7.35
Oil Tanker	114,000	126,210	1.1071	6.96
Oil Tanker	70,700	80,400	1.1372	7.15
Oil Tanker	52,600	58,691	1.1158	7.02
Oil Tanker	45,999	53,100	1.1544	7.26
Chemicals and Oil Products Tanker	46,764	52,969	1.1327	7.12
Oil and Chemical Tanker	47,400	53,100	1.1203	7.05
Alaskan class tankers	193,048	210,902	1.0925	6.87
Average				7.09

Crude by Rail Project
Marine Vessel Criteria Pollutant and GHG Baseline Emissions
 2/22/2013

conversion factor:	264.172	gal/m3
conversion factor:	42	gal/bbl

Notes:

1. DWT and cargo tank capacity for oil tankers were obtained from the following websites~
<http://www.hb.hr/LinkClick.aspx?fileticket=RetQFnntemc%3D&tabid=74>
<http://www.nassco.com/products-and-services/comm-dc/bp-tanker-f>
<http://www.marinetraffic.com/ais/shipdetails.aspx?MMSI=303656000>
2. Emissions from slow cruise and maneuvering mode are apportioned by the ratio of crude delivered for Valero to the total cargo capacity of the oil tanker. It was assumed that the oil
3. Maximum cargo capacity = Average specific cargo capacity x DWT

Default Discharge Rate

DWT	Average Discharge Rate (bbl/hr)
0 -109,999	22707
110,000 - 169,999	22707
170,000 -	22707

POLB Air Emissions Inventory for 2011 -Tanker Specifications

Size	Average Model Year	Avg Age (2011 - Model year)	AVG DWT	Max Speed (knots)	Main Eng Rating (kW)	Aux Eng Rating (kW)
Handysize	2004	7	46,314	14.6	8,257	2,328
Panamax	2004	7	70,912	14.8	11,060	2,627
Aframax	2005	6	109,227	15.1	13,319	2,432
Suezmax	2005	6	178,271	15.3	18,587	5,056
VLCC	2003	8	298,571	15.3	25,288	4,502
ULCC	2004	7	311,294	15.6	28,625	4,502

Main Engine Emission Factors

Fuel Switching Regulation

Phase	Effective Date	% Sulfur Content for OGV		Comment
		MGO	MDO	
1	7/1/2009	1.5%	0.5%	No HFO to be used
	8/1/2012	1.0%	0.5%	
2	1/1/2014	0.1%	0.1%	

All main engines on oil tankers are slow speed, category 3 engines with displacement > 30 dm3 and power rating b/w 2,500 kw and 70,000 kW

Main Engine Emission Standards

Tier	For US Flagged Vessels (USEPA Standard for Category 3 Engines)			
	Effective Date	Speed (rpm)		
		Slow (n < 130)	Medium (130 ≤ n < 2000)	High (n ≥ 2000)
0				
1	2004	17	$45 \cdot n^{-0.2}$	9.8
2	2011	14.4	$44 \cdot n^{-0.23}$	7.7
3	2016	3.4	$9 \cdot n^{-0.2}$	1.96

Tier	For Foreign Flagged Vessels (MARPOL Annex VI - not based on category)			
	Effective Date	Speed (rpm)		
		Slow (n < 130)	Medium (130 ≤ n < 2000)	High (n ≥ 2000)
0				
I	2000	17	$45 \cdot n^{-0.2}$	9.8
II	2011	14.4	$44 \cdot n^{-0.23}$	7.7
III	2016	3.4	$9 \cdot n^{-0.2}$	1.96

Tier	For All Flagged Vessels (Combination of USEPA and MARPOL)			
	Effective Date	Speed (rpm)		
		Slow (n < 130)	Medium (130 ≤ n < 2000)	High (n ≥ 2000)
0	≤1999			
1	2000 - 2010	17	$45 \cdot n^{-0.2}$	9.8
2	2011 - 2015	14.4	$44 \cdot n^{-0.23}$	7.7
3	2016 -	3.4	$9 \cdot n^{-0.2}$	1.96

Main Engine Emission Factors

Main Engine Emission Factor (g/kW-hr)															
Engine Speed	RPM	Tier	Ship Built Year From	Ship Built Year To	Fuel	NO _x	CO	ROG	PM ₁₀	PM _{2.5}	SO ₂	CH ₄	CO ₂	N ₂ O	CO _{2e}
Slow	<130	0	0	1999	0.5% S MDO	18.1	1.1	0.78	0.38	0.35	1.9	0.07	588	0.029	598
Slow	<130	I	2000	2010	0.5% S MDO	17	1.1	0.78	0.38	0.35	1.9	0.07	588	0.029	598
Slow	<130	II	2011	2015	0.5% S MDO	14.4	1.1	0.78	0.38	0.35	1.9	0.07	588	0.029	598
Slow	<130	0	0	1999	0.1% S MDO	18.1	1.1	0.78	0.25	0.23	0.36	0.07	588	0.029	598
Slow	<130	I	2000	2010	0.1% S MDO	17	1.1	0.78	0.25	0.23	0.36	0.07	588	0.029	598
Slow	<130	II	2011	2015	0.1% S MDO	14.4	1.1	0.78	0.25	0.23	0.36	0.07	588	0.029	598
Slow	<130	III	2016	9999	0.1% S MDO	3.4	1.1	0.78	0.25	0.23	0.36	0.07	588	0.029	598

All emission factors, except Tier-based NO_x and N₂O from California ARB, May 2011, Appendix D, Emissions Estimation Methodology for Ocean-Going Vessels, Tables II-6 and II-7

Tier-based NO_x emission factors are from on MARPOL Annex IV regulations

N₂O emission factor at 0.5% S or 0.1 % S = N₂O emission factor at 2.7% S in HFO (from POLB 2011 Emissions Inventory, Section 2, Table 2.6) x Fuel Correction Factor (POLB 2011 Emissions Inventory, Section 2, Tables 2.17)

Low Load Adjustment Multipliers (Used when Load factor < 20%)

Load Factor (%)	NO _x	CO	ROG	PM ₁₀	PM _{2.5}	SO ₂	CH ₄	CO ₂	N ₂ O
2	4.63	9.7	21.18	7.29	7.29	1	21.18	1	4.63
3	2.92	6.49	11.68	4.33	4.33	1	11.68	1	2.92
4	2.21	4.86	7.71	3.09	3.09	1	7.71	1	2.21
5	1.83	3.9	5.61	2.44	2.44	1	5.61	1	1.83
6	1.6	3.26	4.35	2.04	2.04	1	4.35	1	1.6
7	1.45	2.8	3.52	1.79	1.79	1	3.52	1	1.45
8	1.35	2.45	2.95	1.61	1.61	1	2.95	1	1.35
9	1.27	2.18	2.52	1.48	1.48	1	2.52	1	1.27
10	1.22	1.97	2.18	1.38	1.38	1	2.18	1	1.22
11	1.17	1.79	1.96	1.3	1.3	1	1.96	1	1.17
12	1.14	1.64	1.76	1.24	1.24	1	1.76	1	1.14
13	1.11	1.52	1.6	1.19	1.19	1	1.6	1	1.11
14	1.08	1.41	1.47	1.15	1.15	1	1.47	1	1.08
15	1.06	1.32	1.36	1.11	1.11	1	1.36	1	1.06
16	1.05	1.24	1.26	1.08	1.08	1	1.26	1	1.05
17	1.03	1.17	1.18	1.06	1.06	1	1.18	1	1.03
18	1.02	1.11	1.11	1.04	1.04	1	1.11	1	1.02
19	1.01	1.05	1.05	1.02	1.02	1	1.05	1	1.01
20	1	1	1	1	1	1	1	1	1

POLB 2011 Emissions Inventory, Section 2, Table 2.9

Auxiliary Engine Emission Factors

Fuel Switching Regulation

Phase	Effective Date	% Sulfur Content for OGV		Comment
		MGO	MDO	
1	7/1/2009	1.5%	0.5%	No HFO to be used
	8/1/2012	1.0%	0.5%	
2	1/1/2014	0.1%	0.1%	

All auxiliary engines are assumed to be medium speed engines
 According to USEPA's "Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, Final Report, April 2009", Table 2-2 - Auxiliary engines in OGVs are Category 2 engines

Auxiliary Engine Emission Standards

Tier	For Foreign Flagged Vessels (MARPOL Annex VI - not based on category)			
	Effective Date	Speed (rpm)		
		Slow (n < 130)	Medium (130 ≤ n < 2000)	High (n ≥ 2000)
0				
I	2000	17	$45 \cdot n^{-0.2}$	9.8
II	2011	14.4	$44 \cdot n^{-0.23}$	7.7
III	2016	3.4	$9 \cdot n^{-0.2}$	1.96

Auxiliary Engine Emission Factors
USEPA Category 2 engine Standards

Tier	Effective Date	Displacement (L/cylinder)	Power (kW)	Speed (rpm)	Nox (g/kW-hr)	HC + Nox (g/kW-hr)	PM (g/kW-hr)
1	2004	≥ 2.5	≥ 37	rpm < 130	17	-	-
				130 ≤ rpm < 2,000	$45 \cdot n^{-0.2}$	-	-
				rpm ≥ 2,000	9.8	-	-
2	2007	5.0 ≤ Disp < 15	all	-	-	7.8	0.27
		15.0 ≤ Disp < 20	< 3,300	-	-	8.7	0.50
		15.0 ≤ Disp < 20	≥ 3,300	-	-	9.8	0.50
		20.0 ≤ Disp < 25	all	-	-	9.8	0.50
		25.0 ≤ Disp < 30	all	-	-	11.0	0.50
3	2013+	7.0 ≤ Disp < 15	< 2,000	-	-	6.2	0.14
			2,000 ≤ kW < 3,700	-	-	7.8	0.14
	2014+	15.0 ≤ Disp < 20	< 2,000	-	-	7	0.34
		20.0 ≤ Disp < 25	< 2,000	-	-	9.8	0.27
		25.0 ≤ Disp < 30	< 2,000	-	-	11.0	0.27
4	2017+	All	600 ≤ kW < 1,400	-	1.8	0.19 HC only	0.04
	2016+	All	1400 ≤ kW < 2,000	-	1.8	0.19 HC only	0.04
	2014+	All	2,000 ≤ kW < 3,700	-	1.8	0.19 HC only	0.04
	2014-2015	< 15.0	≥ 3,700	-	1.8	0.19 HC only	0.12
	2014-2015	15.0 ≤ Disp < 30		-	1.8	0.19 HC only	0.25
	2016+	All		-	1.8	0.19 HC only	0.06

Auxiliary Engine Emission Factors

Auxiliary Engine Emission Factors for Foreign Flagged Ships (g/kW-hr)															
Engine Speed	RPM	Tier	Ship Built Year From	Ship Built Year To	Fuel	NO _x	CO	ROG	PM ₁₀	PM _{2.5}	SO ₂	CH ₄	CO ₂	N ₂ O	CO _{2e}
Medium	130 - 2000	0	0	1999	0.5%S MDO	13.9	1.1	0.52	0.38	0.35	2.1	0.09	690	0.029	701
Medium	130 - 2000	I	2000	2010	0.5%S MDO	12.2	1.1	0.52	0.38	0.35	2.1	0.09	690	0.029	701
Medium	130 - 2000	II	2011	2015	0.5%S MDO	9.9	1.1	0.52	0.38	0.35	2.1	0.09	690	0.029	701
Medium	130 - 2000	0	0	1999	0.1%S MDO	13.9	1.1	0.52	0.25	0.23	0.4	0.09	690	0.029	701
Medium	130 - 2000	I	2000	2010	0.1%S MDO	12.2	1.1	0.52	0.25	0.23	0.4	0.09	690	0.029	701
Medium	130 - 2000	II	2011	2015	0.1%S MDO	9.9	1.1	0.52	0.25	0.23	0.4	0.09	690	0.029	701
Medium	130 - 2000	III	2016	9999	0.1%S MDO	2.6	1.1	0.52	0.25	0.23	0.4	0.09	690	0.029	701

Engine Category 2
 speed (rpm) 500

All emission factors, except Tier-based NO_x and N₂O from California ARB, May 2011, Appendix D, Emissions Estimation Methodology for Ocean-Going Vessels, Table II-8
 Tier-based NO_x emission factors are from MARPOL Annex IV regulations. Tier 0, I, and II factors are multiplied by fuel correction factor. Tier III emission factors were not multiplied by fuel correction factors as HFO will not be available and used in 2016 and thereafter.

N₂O emission factor at 0.5% S or 0.1 % S = N₂O emission factor at 2.7% S in HFO (from POLB 2011 Emissions Inventory, Section 2, Table 2.11) x Fuel Correction Factor (POLB 2011 Emissions Inventory, Section 2, Tables 2.17)

Auxiliary Engine Emission Factors for US Flagged Ships (g/kW-hr)															
Engine Speed	RPM	Tier	Ship Built Year From	Ship Built Year To	Fuel	NO _x	CO	ROG	PM ₁₀	PM _{2.5}	SO ₂	CH ₄	CO ₂	N ₂ O	CO _{2e}
Medium	130 - 2000	0	0	1999	0.5%S MDO	13.9	1.1	0.52	0.38	0.35	2.1	0.09	690	0.029	701
Medium	130 - 2000	I	2000	2006	0.5%S MDO	12.2	1.1	0.52	0.38	0.35	2.1	0.09	690	0.029	701
Medium	130 - 2000	II	2007	2013	0.5%S MDO	8.4	1.1	0.47	0.11	0.11	2.1	0.09	690	0.029	701
Medium	130 - 2000	0	0	1999	0.1%S MDO	13.9	1.1	0.52	0.25	0.23	0.4	0.09	690	0.029	701
Medium	130 - 2000	I	2000	2006	0.1%S MDO	12.2	1.1	0.52	0.25	0.23	0.4	0.09	690	0.029	701
Medium	130 - 2000	II	2007	2013	0.1%S MDO	8.4	1.1	0.47	0.08	0.08	0.4	0.09	690	0.029	701

Engine Category 2
 Displacement (dm³/cyl) 5 ≤ Disp < 30
 speed (rpm) 500

All emission factors, except Tier-based NO_x and N₂O and Tier II ROG and PM, are from California ARB, May 2011, Appendix D, Emissions Estimation Methodology for Ocean-Going Vessels, Table II-8
 Tier-based NO_x and Tier II ROG and PM emission factors are from USEPA commercial marine engine regulations for Category 2 engines. The USEPA Tier II emission standards are based on engine displacement and as the engine displacement is not available, the emission factors are assumed to be an average of emission standards for all displacement categories under Category 2 engines. Tier II NO_x and ROG emission factors assumed a 95% to 5% split for the combined NO_x+HC standard. Tier 0, I and II NO_x factors and Tier II ROG and PM factors are multiplied by fuel correction factor.

Tier II PM 2.5 emissions factors assumed equal to Tier II PM₁₀ factors

N₂O emission factor at 0.5% S or 0.1 % S = N₂O emission factor at 2.7% S in HFO (from POLB 2011 Emissions Inventory, Section 2, Tables 2.5 and 2.6) x Fuel Correction Factor (POLB 2011 Emissions Inventory, Section 2, Tables 2.17)

Fuel Correction factor

Actual fuel	S Content	PM	NO _x	SO _x	CO	HC	CO ₂	N ₂ O	CH ₄
HFO	1.50%	0.82	1	0.555	1	1	1	1	1
MDO	1.50%	0.47	0.94	0.555	1	1	1	0.94	1
MGO	0.50%	0.25	0.94	0.185	1	1	1	0.94	1
MGO	0.30%	0.21	0.94	0.111	1	1	1	0.94	1
MGO	0.20%	0.19	0.94	0.074	1	1	1	0.94	1
MGO	0.10%	0.17	0.94	0.037	1	1	1	0.94	1

POLB 2011 Emissions Inventory, Section 2, Tables 2.17

Auxiliary Boiler Emissions Factors

Auxiliary Boiler Emission Factors (g/kW-hr)										
Fuel	NO _x	CO	ROG	PM ₁₀	PM _{2.5}	SO ₂	CH ₄	CO ₂	N ₂ O	CO ₂ e
2.7% S HFO	2.1	0.2	0.11	0.8	0.78	16.5	0.03	970	0.08	995
0.5% S MDO	1.97	0.20	0.11	0.20	0.195	3.05	0.03	970.00	0.08	993.9
0.1% S MDO	1.97	0.20	0.11	0.136	0.1326	0.61	0.03	970.00	0.08	993.9

All emission factors, except N₂O from California ARB, May 2011, Appendix D, Emissions Estimation Methodology for Ocean-Going Vessels, Table II-9

N₂O emission factor at 0.5% S or 0.1 % S = N₂O emission factor at 2.7% S in HFO (from POLB 2011 Emissions Inventory, Section 2, Table 2.15) x Fuel Correction Factor (POLB 2011 Emissions Inventory, Section 2, Tables 2.17)

Auxiliary Boiler Emission Factors (kg/tonne)										
Fuel	NO _x	CO	ROG	PM ₁₀	PM _{2.5}	SO ₂	CH ₄	CO ₂	N ₂ O	CO ₂ e
2.7% S HFO	6.89	0.66	0.36	2.62	2.56	54.10	0.10	3180	0.26	3264
0.5% S MDO	6.47	0.66	0.36	0.66	0.64	10.0	0.10	3180	0.25	3259
0.1% S MDO	6.47	0.66	0.36	0.45	0.43	2.00	0.10	3180	0.25	3259

Fuel Correction factor

Actual fuel	S Content	NOx	CO	HC	PM10	PM2.5	SOx	CH4	CO2	N2O
HFO	1.50%	1	1	1	0.82	0.82	0.555	1	1	1
MDO	1.50%	0.94	1	1	0.47	0.47	0.555	1	1	0.94
MGO	0.50%	0.94	1	1	0.25	0.25	0.185	1	1	0.94
MGO	0.30%	0.94	1	1	0.21	0.21	0.111	1	1	0.94
MGO	0.20%	0.94	1	1	0.19	0.19	0.074	1	1	0.94
MGO	0.10%	0.94	1	1	0.17	0.17	0.037	1	1	0.94

POLB 2011 Emissions Inventory, Section 2, Tables 2.17

Auxiliary Boiler Emissions Factors

Fuel Consumption Rates (ARB OGV 2011 Appendix D, Table II-10)

Engine	Engine Speed	Mode	Fuel	Fuel Use Rate (g of fuel/kW-hr)
Auxiliary Engine	All	All	Marine Distillate	217
	All	All	HFO	227
Boiler	NA	All	HFO	305
Main	Slow	Transit	Marine Distillate	185
	Slow	Transit	HFO	195
	Medium	Transit	Marine Distillate	203
	Medium	Transit	HFO	213
	High	Transit	HFO	213
	Slow	Maneuvering	Marine Distillate	185
	Slow	Maneuvering	HFO	195
	Medium	Maneuvering	Marine Distillate	203
	Medium	Maneuvering	HFO	213
	High	Maneuvering	HFO	213

**OGV and Tugboat Operation in SF Bay Area and Port of Benicia
 Speed Requirements per SF Bar Pilot - Steve Teague**

Segment	Speed	Distance	Time	Tug assist	
	knots	nm	hrs	Loaded (incoming)	Ballasted (outgoing)
Sea buoy - Mile rock (1 mi west of GG Bridge)	12	10	0.83		
Mile rock (1 mi west of GG Bridge) - SPB Light #5	10	19	1.90	Tug 1	
SPB light #5 - SPB light #15	10	7	0.70		
SPB light #15 - Buoy 25	8	4.5	0.56		
Buoy 25 - Berth	5	2.5	0.50	Additional Tugs	Tugs
Berth - Sea Buoy (out)	12	43	3.58		
Total Round Trip		86	8.08		

Tug Operations and Typical Specs per Capt. Shawn Bennett at Bay Delta Maritime

Segment	Tug Requirement	Incoming - Loaded	Outgoing - Ballasted
Mile rock (1 mi west of GG Bridge) - Near Berth (assumed Buoy 25)	1 Tug	3.2	0.5
Near Berth (assumed Buoy 25) - Berth	Tug 1 and Additional Tugs as required per ship DWT	0.5	0.5

Tug Fleet Main Engine Operating in Bay Area 5000 HP
 Tug Fleet Aux Engine Operating in Bay Area 150 HP
 Tug Fleet Avg Age 10 years
 Conclusion - typical tugboats are Class A

Bay Delta Maritime tugs are docked at SF Pier 17 and Valero dock in Port of Benicia

Ocean Going Vessels Activity Data

	Mode of Operation					
	Slow Cruise -1	Slow Cruise - 2	Slow Cruise/ Maneuvering	Maneuvering/Moo ring/Unmooring	Hotelling w/o Discharge	Hotelling /w Discharge
Segment Name	Pilot Sea Buoy ¹ - GG Bridge and Berth - Pilot Sea Buoy	GG Bridge - San Pablo Bay Light #15	San Pablo Bay Light #15 - Sea Buoy 25	Sea Buoy 25 - Berth	At Berth	At Berth
Speed (knots)	12	10	8	5	---	---
Round-trip distance (nm)	53.0	26.0	4.5	2.5	---	---
Round-Trip Time (hrs)	4.42	2.60	0.56	0.50	6	Crude delivered/ Discharge Rate
Main Engine Load Factor	(12/Max Speed) ³	(10/Max Speed) ³	(8/Max Speed) ³	2%	0%	0%
Auxiliary Engine Load Factor	24%	24%	33%	33%	26%	26%
Auxiliary Boiler Load Factor	0%	0%	12%	12%	100%	100%
Reference	Port of Richmond, 2005 Seaport Air Emissions Inventory, Table, 2-6		Distance measured using Google Earth from Valero Wharf	POLB, CARB, Port of Richmond Emissions Inventory	Assumed 3 hours before and after unloading the crude	

1. Per Alison Kirk of BAAQMD, emissions must be estimated from the point the pilot boards the ship at Sea Buoy

Ocean Going Vessels Activity Data

Operating Modes of Emission Sources			
Source	Operating Mode		
	Transit	Maneuvering	Hotelling
Main Engine	x	x	Not Used
Auxiliary Engine	x	x	x
Auxiliary Boiler	Operate if main Engine LF < 20%	x	x

Emission reduction technology control efficiency (Only for main engine)

2004 and newer main engines assumed to be equipped with fuel slide valves

Control Efficiency	NO _x	CO	ROG	PM ₁₀	PM _{2.5}	SO ₂	CH ₄	CO ₂	N ₂ O	CO _{2e}
	30%	0%	0%	25%	25%	0%	0%	0%	0%	0%

POLB 2011 Emissions Inventory

Crude by Rail Project

Marine Vessel Criteria Pollutant and GHG Baseline Emissions

2/22/2013

Baseline Ocean Going Vessels Emissions

1. IMO # obtained by searching ship name on www.marinetraffic.com
2. DWT obtained by searching IMO # in POLB Air Emissions Inventory OGV Appendices or in www.marinetraffic.com
3. MY obtained by searching IMO # in POLB Air Emissions Inventories' OGV Appendices or in www.marinetraffic.com
4. Ship Category based on IMO classification by DWT
5. Assumed number of main engines by ship category

Ship Category	Number of Main Engines
Handymax	1
Panamax	1
Aframax	1
Suezmax	2
VLCCS	2
ULCCS	2

6. Main engines power obtained by searching IMO # in POLB Air Emissions Inventories' OGV Appendices for various years and if not available then estimated using the regression analysis equation provided in EPA "Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data" (EPA420-R-00-002, February 2000), Table 4-5.

$$\text{Horsepower} = 9070 + 0.101 * \text{DWT}$$

$$\text{kW} = 0.746 * (9070 + 0.101 * \text{DWT})$$

7. Average number of Auxiliary engines on tankers = 2.7, per California ARB 2005 Oceangoing Ship Survey Summary Of Results, Appendix C, Table 9
8. Auxiliary engine rating for ships for which data was not available is equal to the average of auxiliary engine rating for similar category (DWT) of ships that visited the Valero Wharf during the baseline period or the average auxiliary engine rating for similar category of ships provided in POLB 2011 Emissions Inventory, Appendix A, Table A.3
9. Auxiliary Boiler rating for ships for which data was not available was assumed equal to the average of auxiliary boiler rating for similar category (DWT) of ships provided in POLB 2011 Emissions Inventory, Section 2, Table 2.16

Tugboat Specifications and Assumptions

Tug requirements - Sec C.3, Benicia Port Information and Terminal Regulations Manual

Vessel Size	SIZE	MOORING*	MOORING*	UNMOORING*	UNMOORING*
	DWT	Class A	Class B	Class A	Class B
0	30,000	0	2	0	2
30,000	65,000	1	1	1	1
65,000	130,000	2	1	2	0
130,000	195,000	4	0	3	0
195,000	999,999	4	0	3	1

[http://portal.harleymarine.com/vessels/sms/Shared%20Documents/SF%20Bay%20Area%20Terminal%20Guidlines/Valero%20Benicia,%20Ca/Valero%20Benicia%20Terminal%20Manual%20\(Final%20July%2027%202012\)%2](http://portal.harleymarine.com/vessels/sms/Shared%20Documents/SF%20Bay%20Area%20Terminal%20Guidlines/Valero%20Benicia,%20Ca/Valero%20Benicia%20Terminal%20Manual%20(Final%20July%2027%202012)%2)

Main Engine Assumptions

Tug Class	Average Power per Engine ¹	Number of Main Engines	Assumed Model Year	Useful Life ²	Emission Factor x FCF (g/HP-hr)									Assumed Date of MY
					NOx	CO	HC	PM10	PM2.5	SO2 at 15 ppm	CH4	CO2	N2O	
A	2172	2	2001	21	6.93	1.97	0.49	0.29	0.29	0.01	0.01	486.39	0.02	7/1/2001
B	1563	2	2001	21	6.93	1.97	0.49	0.29	0.29	0.01	0.01	486.39	0.02	7/1/2001
C	1388	2	2001	21	6.93	1.97	0.49	0.29	0.29	0.01	0.01	486.39	0.02	7/1/2001
D	754	2	2001	21	6.93	1.97	0.49	0.29	0.29	0.01	0.01	486.39	0.02	7/1/2001

1 - Revised PORT OF OAKLAND 2005 SEAPORT AIR EMISSIONS INVENTORY, Table 3-6

2 - Port of Richmond 2005 Emissions Inventory, Appendix A, Table 4

Aux Engine Assumptions

Tug Class	Average Power per Engine ¹	Number of Aux Engines	Assumed Model Year	Useful Life ²	Emission Factor x FCF (g/HP-hr)									Assumed Date of MY
					NOx	CO	HC	PM10	PM2.5	SO2 at 15 ppm	CH4	CO2	N2O	
A	128	2	2001	23	6.93	2.78	0.58	0.26	0.26	0.01	0.01	486.39	0.02	7/1/2001
B	110	2	2001	23	6.93	3.59	0.85	0.46	0.46	0.01	0.02	486.39	0.02	7/1/2001
C	92	2	2001	23	6.93	3.59	0.85	0.46	0.46	0.01	0.02	486.39	0.02	7/1/2001
D	110	2	2001	23	6.93	3.59	0.85	0.46	0.46	0.01	0.02	486.39	0.02	7/1/2001

1 - Revised PORT OF OAKLAND 2005 SEAPORT AIR EMISSIONS INVENTORY, Table 3-6

2 - Port of Richmond 2005 Emissions Inventory, Appendix A, Table 4

Crude by Rail Project
Marine Vessel Criteria Pollutant and GHG Baseline Emissions
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Fuel Correction factor for ULSD

Engine Power (HP)		MY		NOx	CO	HC	PM10	PM2.5	SO2 at 15 ppm	CH4	CO2	N2O
0	24	0	1994	0.93	1	0.72	0.72	0.72	1	0.72	1	0.93
25	50	0	1998	0.93	1	0.72	0.72	0.72	1	0.72	1	0.93
51	100	0	1997	0.93	1	0.72	0.72	0.72	1	0.72	1	0.93
101	175	0	1996	0.93	1	0.72	0.72	0.72	1	0.72	1	0.93
176	5000	0	1995	0.93	1	0.72	0.72	0.72	1	0.72	1	0.93
0	24	1995	2010	0.948	1	0.72	0.8	0.8	1	0.72	1	0.948
25	50	1999	2010	0.948	1	0.72	0.8	0.8	1	0.72	1	0.948
51	100	1998	2010	0.948	1	0.72	0.8	0.8	1	0.72	1	0.948
101	175	1997	2010	0.948	1	0.72	0.8	0.8	1	0.72	1	0.948
176	5000	1996	2010	0.948	1	0.72	0.8	0.8	1	0.72	1	0.948
0	5000	2011	9999	0.948	1	0.72	0.852	0.852	1	0.72	1	0.948

Ref - CARB 2007, Appendix B Emissions Estimation Methodology for Commercial Harbor Craft Operating in California and POLB 2011 Air Emissions Inventory

Deterioration Factor

HP Range		NOx	CO	HC	PM10	PM2.5	SO2 at 15 ppm	CH4	CO2	N2O
25	50	0.06	0.41	0.51	0.31	0.31	0	0	0	0
51	250	0.14	0.16	0.28	0.44	0.44	0	0	0	0
251	5000	0.21	0.25	0.44	0.67	0.67	0	0	0	0

Ref - CARB 2007, Appendix B Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

Operation Mode	Tug in-Transit	Tug Assist/Mooring/Unmooring
Load Factor	Tug Base - Vessel	Vessel - Vessel Berth
Main	0.5	0.31
Auxiliary	0.43	0.43

Ref - Port of Richmond 2005 Emissions Inventory, Appendix A, Table 2

Tug Mooring/Unmooring Activity rate	Tug in-Transit ¹	Tug Mooring/Unmooring ²
(hrs/one-way trip)	Tug Base - Vessel (in/out)	Vessel - Vessel Berth
Main	0.5	0.5
Auxiliary	0.5	0.5

1. Assumption

2. Assumed equal to time for maneuvering mode

Tug Assisting Activity rate	Tug in-Transit ¹	Tug Assist ²
(hrs/one-way trip)	Tug Base - Vessel	Vessel - Vessel Berth
Main	2	3.2
Auxiliary	2	3.2

Crude by Rail Project

Marine Vessel Criteria Pollutant and GHG Baseline Emissions

2/22/2013

1. Assumption
2. Based on conversation with SF Bar Pilot

Crude by Rail Project
 Marine Vessel Criteria Pollutant and GHG Baseline Emissions
 2/22/2013

Tugboat Zero Hour Emissions Factors

Engine Type	Year		Engine Power (HP)		Zero Hour Emission Factor (g/HP-hr)								
	Min	Max	Min	Max	NOx	CO	HC	PM10	PM2.5	SO2 at 15 ppm	CH4	CO2	N2O
Main	0	1997	25	50	8.14	3.65	1.84	0.72	0.72	0.006	0.0368	486	0.023
Main	1998	1999	25	50	8.14	3.65	1.8	0.72	0.72	0.006	0.036	486	0.023
Main	2000	2004	25	50	7.31	3.65	1.8	0.72	0.72	0.006	0.036	486	0.023
Main	2005	2008	25	50	5.32	3.73	1.8	0.3	0.3	0.006	0.036	486	0.023
Main	2009	2020	25	50	5.32	3.73	1.8	0.22	0.22	0.006	0.036	486	0.023
Main	0	1996	51	120	15.34	3.5	1.44	0.8	0.8	0.006	0.0288	486	0.023
Main	1997	1999	51	120	10.33	2.55	0.99	0.66	0.66	0.006	0.0198	486	0.023
Main	2000	2004	51	120	7.31	2.55	0.99	0.66	0.66	0.006	0.0198	486	0.023
Main	2005	2008	51	120	5.32	3.73	0.99	0.3	0.3	0.006	0.0198	486	0.023
Main	2009	2020	51	120	5.32	3.73	0.99	0.22	0.22	0.006	0.0198	486	0.023
Main	0	1970	121	175	16.52	3.21	1.32	0.73	0.73	0.006	0.0264	486	0.023
Main	1971	1978	121	175	15.34	3.21	1.1	0.63	0.63	0.006	0.022	486	0.023
Main	1979	1983	121	175	14.16	3.21	1	0.52	0.52	0.006	0.02	486	0.023
Main	1984	1986	121	175	12.98	3.14	0.94	0.52	0.52	0.006	0.0188	486	0.023
Main	1987	1995	121	175	12.98	3.07	0.88	0.52	0.52	0.006	0.0176	486	0.023
Main	1996	1999	121	175	9.64	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2000	2003	121	175	7.31	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2004	2012	121	175	5.1	3.73	0.68	0.22	0.22	0.006	0.0136	486	0.023
Main	2013	2020	121	175	3.8	3.73	0.68	0.09	0.09	0.006	0.0136	486	0.023
Main	0	1970	176	250	16.52	3.21	1.32	0.73	0.73	0.006	0.0264	486	0.023
Main	1971	1978	176	250	15.34	3.21	1.1	0.63	0.63	0.006	0.022	486	0.023
Main	1979	1983	176	250	14.16	3.21	1	0.52	0.52	0.006	0.02	486	0.023
Main	1984	1986	176	250	12.98	3.14	0.94	0.52	0.52	0.006	0.0188	486	0.023
Main	1987	1994	176	250	12.98	3.07	0.88	0.52	0.52	0.006	0.0176	486	0.023
Main	1995	1999	176	250	9.64	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2000	2003	176	250	7.31	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2004	2013	176	250	5.1	3.73	0.68	0.15	0.15	0.006	0.0136	486	0.023
Main	2014	2020	176	250	3.99	3.73	0.68	0.08	0.08	0.006	0.0136	486	0.023
Main	0	1970	251	500	16.52	3.07	1.26	0.7	0.7	0.006	0.0252	486	0.023
Main	1971	1978	251	500	15.34	3.07	1.05	0.6	0.6	0.006	0.021	486	0.023
Main	1979	1983	251	500	14.16	3.07	0.95	0.5	0.5	0.006	0.019	486	0.023
Main	1984	1986	251	500	12.98	3.07	0.9	0.5	0.5	0.006	0.018	486	0.023
Main	1987	1994	251	500	12.98	2.99	0.84	0.5	0.5	0.006	0.0168	486	0.023
Main	1995	1999	251	500	9.64	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2000	2003	251	500	7.31	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2004	2013	251	500	5.1	3.73	0.68	0.15	0.15	0.006	0.0136	486	0.023
Main	2014	2020	251	500	3.99	3.73	0.68	0.08	0.08	0.006	0.0136	486	0.023
Main	0	1970	501	750	16.52	3.07	1.26	0.7	0.7	0.006	0.0252	486	0.023
Main	1971	1978	501	750	15.34	3.07	1.05	0.6	0.6	0.006	0.021	486	0.023
Main	1979	1983	501	750	14.16	3.07	0.95	0.5	0.5	0.006	0.019	486	0.023
Main	1984	1986	501	750	12.98	3.07	0.9	0.5	0.5	0.006	0.018	486	0.023
Main	1987	1994	501	750	12.98	2.99	0.84	0.5	0.5	0.006	0.0168	486	0.023
Main	1995	1999	501	750	9.64	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2000	2006	501	750	7.31	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2007	2012	501	750	5.1	3.73	0.68	0.15	0.15	0.006	0.0136	486	0.023
Main	2013	2020	501	750	3.99	3.73	0.68	0.08	0.08	0.006	0.0136	486	0.023
Main	0	1970	751	1900	16.52	3.07	1.26	0.7	0.7	0.006	0.0252	486	0.023

Crude by Rail Project
 Marine Vessel Criteria Pollutant and GHG Baseline Emissions
 2/22/2013

Tugboat Zero Hour Emissions Factors

Engine Type	Year		Engine Power (HP)		Zero Hour Emission Factor (g/HP-hr)								
	Min	Max	Min	Max	NOx	CO	HC	PM10	PM2.5	SO2 at 15 ppm	CH4	CO2	N2O
Main	1971	1978	751	1900	15.34	3.07	1.05	0.6	0.6	0.006	0.021	486	0.023
Main	1979	1983	751	1900	14.16	3.07	0.95	0.5	0.5	0.006	0.019	486	0.023
Main	1984	1986	751	1900	12.98	3.07	0.9	0.5	0.5	0.006	0.018	486	0.023
Main	1987	1998	751	1900	12.98	2.99	0.84	0.5	0.5	0.006	0.0168	486	0.023
Main	1999	1999	751	1900	9.64	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2000	2006	751	1900	7.31	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2007	2011	751	1900	5.53	3.73	0.68	0.2	0.2	0.006	0.0136	486	0.023
Main	2012	2016	751	1900	4.09	3.73	0.68	0.08	0.08	0.006	0.0136	486	0.023
Main	2017	2020	751	1900	1.3	3.73	0.18	0.03	0.03	0.006	0.0036	486	0.023
Main	0	1970	1901	3300	16.52	3.07	1.26	0.7	0.7	0.006	0.0252	486	0.023
Main	1971	1978	1901	3300	15.34	3.07	1.05	0.6	0.6	0.006	0.021	486	0.023
Main	1979	1983	1901	3300	14.16	3.07	0.95	0.5	0.5	0.006	0.019	486	0.023
Main	1984	1986	1901	3300	12.98	3.07	0.9	0.5	0.5	0.006	0.018	486	0.023
Main	1987	1998	1901	3300	12.98	2.99	0.84	0.5	0.5	0.006	0.0168	486	0.023
Main	1999	1999	1901	3300	9.64	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2000	2006	1901	3300	7.31	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2007	2012	1901	3300	5.53	3.73	0.68	0.2	0.2	0.006	0.0136	486	0.023
Main	2013	2015	1901	3300	4.37	3.73	0.68	0.1	0.1	0.006	0.0136	486	0.023
Main	2016	2020	1901	3300	1.3	3.73	0.18	0.03	0.03	0.006	0.0036	486	0.023
Main	0	1970	3301	5000	16.52	3.07	1.26	0.7	0.7	0.006	0.0252	486	0.023
Main	1971	1978	3301	5000	15.34	3.07	1.05	0.6	0.6	0.006	0.021	486	0.023
Main	1979	1983	3301	5000	14.16	3.07	0.95	0.5	0.5	0.006	0.019	486	0.023
Main	1984	1986	3301	5000	12.98	3.07	0.9	0.5	0.5	0.006	0.018	486	0.023
Main	1987	1998	3301	5000	12.98	2.99	0.84	0.5	0.5	0.006	0.0168	486	0.023
Main	1999	1999	3301	5000	9.64	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2000	2006	3301	5000	7.31	1.97	0.68	0.36	0.36	0.006	0.0136	486	0.023
Main	2007	2013	3301	5000	5.53	3.73	0.68	0.2	0.2	0.006	0.0136	486	0.023
Main	2014	2015	3301	5000	4.94	3.73	0.68	0.25	0.25	0.006	0.0136	486	0.023
Main	2016	2020	3301	5000	1.3	3.73	0.18	0.03	0.03	0.006	0.0036	486	0.023

Crude by Rail Project
 Marine Vessel Criteria Pollutant and GHG Baseline Emissions
 2/22/2013

Tugboat Zero Hour Emissions Factors

Engine Type	Year		Engine Power (HP)		Zero Hour Emission Factor (g/HP-hr)								
	Min	Max	Min	Max	NOx	CO	HC	PM10	PM2.5	SO2 at 15 ppm	CH4	CO2	N2O
Auxiliary	0	1997	25	50	6.9	5.15	2.19	0.64	0.64	0.006	0.0438	486	0.023
Auxiliary	1998	1999	25	50	6.9	5.15	2.14	0.64	0.64	0.006	0.0428	486	0.023
Auxiliary	2000	2004	25	50	6.9	5.15	2.14	0.64	0.64	0.006	0.0428	486	0.023
Auxiliary	2005	2008	25	50	5.32	3.73	2.14	0.3	0.3	0.006	0.0428	486	0.023
Auxiliary	2009	2020	25	50	5.32	3.73	2.14	0.22	0.22	0.006	0.0428	486	0.023
Auxiliary	0	1996	51	120	13	4.94	1.71	0.71	0.71	0.006	0.0342	486	0.023
Auxiliary	1997	1999	51	120	8.75	3.59	1.18	0.58	0.58	0.006	0.0236	486	0.023
Auxiliary	2000	2004	51	120	7.31	3.59	1.18	0.58	0.58	0.006	0.0236	486	0.023
Auxiliary	2005	2008	51	120	5.32	3.73	1.18	0.3	0.3	0.006	0.0236	486	0.023
Auxiliary	2009	2020	51	120	5.32	3.73	1.18	0.22	0.22	0.006	0.0236	486	0.023
Auxiliary	0	1970	121	175	14	4.53	1.57	0.65	0.65	0.006	0.0314	486	0.023
Auxiliary	1971	1978	121	175	13	4.53	1.31	0.55	0.55	0.006	0.0262	486	0.023
Auxiliary	1979	1983	121	175	12	4.53	1.19	0.46	0.46	0.006	0.0238	486	0.023
Auxiliary	1984	1986	121	175	11	4.43	1.12	0.46	0.46	0.006	0.0224	486	0.023
Auxiliary	1987	1995	121	175	11	4.33	1.05	0.46	0.46	0.006	0.021	486	0.023
Auxiliary	1996	1999	121	175	8.17	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2000	2003	121	175	7.31	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2004	2012	121	175	5.1	3.73	0.81	0.22	0.22	0.006	0.0162	486	0.023
Auxiliary	2013	2020	121	175	3.8	3.73	0.81	0.09	0.09	0.006	0.0162	486	0.023
Auxiliary	0	1970	176	250	14	4.53	1.57	0.65	0.65	0.006	0.0314	486	0.023
Auxiliary	1971	1978	176	250	13	4.53	1.31	0.55	0.55	0.006	0.0262	486	0.023
Auxiliary	1979	1983	176	250	12	4.53	1.19	0.46	0.46	0.006	0.0238	486	0.023
Auxiliary	1984	1986	176	250	11	4.43	1.12	0.46	0.46	0.006	0.0224	486	0.023
Auxiliary	1987	1994	176	250	11	4.33	1.05	0.46	0.46	0.006	0.021	486	0.023
Auxiliary	1995	1999	176	250	8.17	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2000	2003	176	250	7.31	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2004	2013	176	250	5.1	3.73	0.81	0.15	0.15	0.006	0.0162	486	0.023
Auxiliary	2014	2020	176	250	3.99	3.73	0.81	0.08	0.08	0.006	0.0162	486	0.023
Auxiliary	0	1970	251	500	14	4.33	1.5	0.62	0.62	0.006	0.03	486	0.023
Auxiliary	1971	1978	251	500	13	4.33	1.25	0.53	0.53	0.006	0.025	486	0.023
Auxiliary	1979	1983	251	500	12	4.33	1.13	0.45	0.45	0.006	0.0226	486	0.023
Auxiliary	1984	1986	251	500	11	4.33	1.07	0.45	0.45	0.006	0.0214	486	0.023
Auxiliary	1987	1994	251	500	11	4.22	1	0.45	0.45	0.006	0.02	486	0.023
Auxiliary	1995	1999	251	500	8.17	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2000	2003	251	500	7.31	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2004	2013	251	500	5.1	3.73	0.81	0.15	0.15	0.006	0.0162	486	0.023
Auxiliary	2014	2020	251	500	3.99	3.73	0.81	0.08	0.08	0.006	0.0162	486	0.023
Auxiliary	0	1970	501	750	14	4.33	1.5	0.62	0.62	0.006	0.03	486	0.023
Auxiliary	1971	1978	501	750	13	4.33	1.25	0.53	0.53	0.006	0.025	486	0.023
Auxiliary	1979	1983	501	750	12	4.33	1.13	0.45	0.45	0.006	0.0226	486	0.023
Auxiliary	1984	1986	501	750	11	4.33	1.07	0.45	0.45	0.006	0.0214	486	0.023
Auxiliary	1987	1994	501	750	11	4.22	1	0.45	0.45	0.006	0.02	486	0.023
Auxiliary	1995	1999	501	750	8.17	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2000	2006	501	750	7.31	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2007	2012	501	750	5.1	3.73	0.81	0.15	0.15	0.006	0.0162	486	0.023
Auxiliary	2013	2020	501	750	3.99	3.73	0.81	0.08	0.08	0.006	0.0162	486	0.023

Crude by Rail Project
 Marine Vessel Criteria Pollutant and GHG Baseline Emissions
 2/22/2013

Tugboat Zero Hour Emissions Factors

Engine Type	Year		Engine Power (HP)		Zero Hour Emission Factor (g/HP-hr)								
	Min	Max	Min	Max	NOx	CO	HC	PM10	PM2.5	SO2 at 15 ppm	CH4	CO2	N2O
Auxiliary	0	1970	751	1900	14	4.33	1.5	0.62	0.62	0.006	0.03	486	0.023
Auxiliary	1971	1978	751	1900	13	4.33	1.25	0.53	0.53	0.006	0.025	486	0.023
Auxiliary	1979	1983	751	1900	12	4.33	1.13	0.45	0.45	0.006	0.0226	486	0.023
Auxiliary	1984	1986	751	1900	11	4.33	1.07	0.45	0.45	0.006	0.0214	486	0.023
Auxiliary	1987	1998	751	1900	11	4.22	1	0.45	0.45	0.006	0.02	486	0.023
Auxiliary	1999	1999	751	1900	8.17	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2000	2006	751	1900	7.31	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2007	2011	751	1900	5.53	3.73	0.81	0.2	0.2	0.006	0.0162	486	0.023
Auxiliary	2012	2016	751	1900	4.09	3.73	0.81	0.08	0.08	0.006	0.0162	486	0.023
Auxiliary	2017	2020	751	1900	1.3	3.73	0.18	0.03	0.03	0.006	0.0036	486	0.023
Auxiliary	0	1970	1901	3300	14	4.33	1.5	0.62	0.62	0.006	0.03	486	0.023
Auxiliary	1971	1978	1901	3300	13	4.33	1.25	0.53	0.53	0.006	0.025	486	0.023
Auxiliary	1979	1983	1901	3300	12	4.33	1.13	0.45	0.45	0.006	0.0226	486	0.023
Auxiliary	1984	1986	1901	3300	11	4.33	1.07	0.45	0.45	0.006	0.0214	486	0.023
Auxiliary	1987	1998	1901	3300	11	4.22	1	0.45	0.45	0.006	0.02	486	0.023
Auxiliary	1999	1999	1901	3300	8.17	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2000	2006	1901	3300	7.31	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2007	2012	1901	3300	5.53	3.73	0.81	0.2	0.2	0.006	0.0162	486	0.023
Auxiliary	2013	2015	1901	3300	4.37	3.73	0.81	0.1	0.1	0.006	0.0162	486	0.023
Auxiliary	2016	2020	1901	3300	1.3	3.73	0.18	0.03	0.03	0.006	0.0036	486	0.023
Auxiliary	0	1970	3301	5000	14	4.33	1.5	0.62	0.62	0.006	0.03	486	0.023
Auxiliary	1971	1978	3301	5000	13	4.33	1.25	0.53	0.53	0.006	0.025	486	0.023
Auxiliary	1979	1983	3301	5000	12	4.33	1.13	0.45	0.45	0.006	0.0226	486	0.023
Auxiliary	1984	1986	3301	5000	11	4.33	1.07	0.45	0.45	0.006	0.0214	486	0.023
Auxiliary	1987	1998	3301	5000	11	4.22	1	0.45	0.45	0.006	0.02	486	0.023
Auxiliary	1999	1999	3301	5000	8.17	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2000	2006	3301	5000	7.31	2.78	0.81	0.32	0.32	0.006	0.0162	486	0.023
Auxiliary	2007	2013	3301	5000	5.53	3.73	0.81	0.2	0.2	0.006	0.0162	486	0.023
Auxiliary	2014	2015	3301	5000	4.94	3.75	0.81	0.25	0.25	0.006	0.0162	486	0.023
Auxiliary	2016	2020	3301	5000	1.3	3.75	0.18	0.03	0.03	0.006	0.0036	486	0.023

Ref - CARB 2007, Appendix B Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

Appendix C
District ATC Application Forms

Form P-101B

Form T

Form HRSA



BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street, San Francisco, CA 94109
Engineering Division (415) 749-4990
www.baaqmd.gov fax (415) 749-5030

Form P-101B

Authority to Construct/
Permit to Operate

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1. Application Information

BAAQMD Plant No. B2626 Company Name Valero Refining Co. - California
Equipment/Project Description Crude By Rail Project

2. Plant Information *If you have not previously been assigned a Plant Number by the District or if you want to update any plant data that you have previously supplied to the District, please complete this section.*

Equipment Location 3400 East Second Street
City Benicia Zip Code 94510
Mail Address 3400 East Second Street
City Benicia State CA Zip Code 94510
Plant Contact Donald Cuffel Title Manager - Environmental Engineering
Telephone (707) 745 - 7545 Fax () Email don.cuffel@valero.com
NAICS (North American Industry Classification System) see www.census.gov/epcd/naics02/naico602.htm 324110

3. Proximity to a School (K-12)

The sources in this permit application (check one) Are Are not within 1,000 ft of the outer boundary of the nearest school.

4. Application Contact Information *All correspondence from the District regarding this application will be sent to the plant contact unless you wish to designate a different contact for this application.*

Application Contact Susan Gustofson Title Staff Environmental Engineer
Mail Address 3400 East Second Street
City Benicia State CA Zip Code XXXX
Telephone (707) 745 - 7011 Fax () Email susan.gustofson@valero.com

5. Additional Information *The following additional information is required for all permit applications and should be included with your submittal. Failure to provide this information may delay the review of your application. Please indicate that each item has been addressed by checking the box. Contact the Engineering Division if you need assistance.*

- If a new Plant, a local street map showing the location of your business
- A facility map, drawn roughly to scale, that locates the equipment and its emission points
- Completed data form(s) and a pollutant flow diagram for each piece of equipment. (See www.baaqmd.gov/Forms/Engineering.aspx)
- Project/equipment description, manufacturer's data
- Discussion and/or calculations of the emissions of air pollutants from the equipment

6. Trade Secrets *Under the California Public Records Act, all information in your permit application will be considered a matter of public record and may be disclosed to a third party. If you wish to keep certain items separate as specified in Regulation 2, Rule 1, Section 202.7, please complete the following steps.*

- Each page containing trade secret information must be labeled "trade secret" with the trade secret information clearly marked.
- A second copy, with trade secret information blanked out, marked "public copy" must be provided.
- For each item asserted to be trade secret, you must provide a statement which provides the basis for your claim.



BAY AREA AIR QUALITY MANAGEMENT DISTRICT

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Form P-101B
Authority to Construct/
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BAY AREA AIR QUALITY MANAGEMENT DISTRICT

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Form P-101B

Authority to Construct/
Permit to Operate

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7. Small Business Certification *You are entitled to a reduced permit fee if you qualify as a small business as defined in Regulation 3. In order to qualify, you must certify that your business meets all of the following criteria:*

- The business does not employ more than 10 persons and its gross annual income does not exceed \$750,000.
- And the business is not an affiliate of a non-small business. (Note: a non-small business employs more than 10 persons and/or its gross income exceeds \$750,000.)

8. Green Business Certification *You are entitled to a reduced permit fee if you qualify as a green business as defined in Regulation 3. In order to qualify, you must certify that your business meets all of the following criteria:*

- The business has been certified under the Bay Area Green Business Program coordinated by the Association of Bay Area Governments and implemented by participating counties.
- A copy of the certification is included.

9. Accelerated Permitting *The Accelerated Permitting Program entitles you to install and operate qualifying sources of air pollution and abatement equipment **without waiting for the District to issue a Permit to Operate**. To participate in this program you must certify that your project will meet all of the following criteria. Please acknowledge each item by checking each box.*

- Uncontrolled emissions of any single pollutant are each less than 10 lb/highest day, or the equipment has been precertified by the BAAQMD.
- Emissions of toxic compounds do not exceed the trigger levels identified in Table 2-5-1 (see Regulation 2, Rule 5).
- The source is not a diesel engine.
- The project is not subject to public notice requirements (the source is either more than 1000 ft. from the nearest school, or the source does not emit any toxic compound in Table 2-5-1).
- For replacement of abatement equipment, the new equipment must have an equal or greater overall abatement efficiency for all pollutants than the equipment being replaced.
- For alterations of existing sources, for all pollutants the alteration does not result in an increase in emissions.
- Payment of applicable fees (the minimum permit fee to install and operate each source). See Regulation 3 or contact the Engineering Division for help in determining your fees.

10. CEQA *Please answer the following questions pertaining to CEQA (California Environmental Quality Act).*

- A. Has another public agency prepared, required preparation of, or issued a notice regarding preparation of a California Environmental Quality Act (CEQA) document (initial study, negative declaration, environmental impact report, or other CEQA document) that analyzes impacts of this project or another project of which it is a part or to which it is related? YES NO If no, go to section 10B.

Describe the document or notice, preparer, and date of document or expected date of completion:

_____ A Land Use Permit application for this project was submitted to the City of Benicia in December 2012.
_____ The City of Benicia will serve as Lead Agency.

- B. List and describe any other permits or agency approvals required for this project by city, regional, state or federal agencies:

_____ None.

- C. List and describe all other prior or current projects for which either of the following statements is true: (1) the project that is the subject of this application could not be undertaken without the project listed below, (2) the project listed below could not be undertaken without the project that is the subject of this application:

_____ None.



BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street, San Francisco, CA 94109
Engineering Division (415) 749-4990
www.baaqmd.gov fax (415) 749-5030

Form P-101B

Authority to Construct/
Permit to Operate

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11. Certification *I hereby certify that all information contained herein is true and correct. (Please sign and date this form)*

Donald Cuffel

Manager -
Environmental Engineering

Susan Kristof

2/28/2013

Name of person certifying (print)

Title of person certifying

Signature of person certifying

Don Cuffel

Date

Send all application materials to the **BAAQMD Engineering Division, 939 Ellis Street, San Francisco, CA 94109.**

DATA FORM T
Organic Liquid Evaporation
(tankage, loading and handling)

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street .. San Francisco, CA 94109. (415) 749-4990 FAX (415)-749-5030

1. Business Name: Valero Refining Co. - California Plant No: B2626
(if unknown, leave blank)
2. SIC No: 2911 Date of Initial Operation ~2014 (planned) Source No S- 97
3. Name or Description TK-1776 (External Floating Roof) – Change to Include Crude Oil Service
4. Code materials* in order of highest throughputs: 1) 89 (crude oil) 2) _____ 3) _____ 4) _____
5. Total throughput (all materials), last 12 months: _____ thousand gal **or** 0 (crude) thousand bbl
6. Typical % of total annual throughput: Dec-Feb 25% Mar-May 25% Jun-Aug 25% Sep-Nov 25%
 Check box if loading/handling facility; complete lines 7-11 and omit the remainder of this form. (Also complete one Form T for each storage tank)
7. ● Usage type: Bulk plant (truck/rail car) Bulk plant (marine) Vehicle service station
 Aircraft/marine servicing Other: _____
8. ● How many nozzles/loading arms? _____ How many pumps? _____
9. ● Make and model of nozzles/loading arms: _____
10. ● Nozzle/arm loads tank by: splash fill submerged fill part splash, part submerged
11. ● Upon loading, vapor space in tank(s) is: Vented directly to atmosphere
 Collected by nozzle/arm and sent to Abatement Device(s): A _____ A _____
12. Annual Average: Storage vapor pressure __ psia **or** tank temperature ambient°F and RVP 9.4 psia
13. Highest v.p. of all materials stored: __ psia **or** high tank temperature ambient°F and high RVP 9.4 psia
14. Highest °API of all material stored: ~43.5 Lowest initial B.P. of all materials stored: 80-100 °F
15. Tank Type: underground fixed roof internal floating roof floating roof
 pressure other: _____
16. Tank volume: _____ thousand gallons **or** 110 thousand barrels
17. Tank Diameter: 128 ft height or length: ~48 ft Check if applicable: heated insulated

Fixed Roof Tanks Only

18. Maximum fill rate: _____ gal/hr **or** _____ bbl/hr
19. Average height of vapor space: _____ ft Highest head space reactivity _____%
 Check box if emissions from this tank are controlled; complete lines 20 and 21.
20. ● Emissions vent to what source(s) and/or abatement device(s)? S _____ S _____ A _____ A _____
21. ● Do all gauging/sampling devices have gas tight covers? yes no
22. Paint color: Aluminum White Light grey Medium grey Other _____
23. Paint Condition: good poor

Floating Roof Tanks Only

24. Shell Type: gunited riveted welded other: _____
25. Seal Type: single double other: _____ Condition: tight loose
26. Maximum withdrawn rate: _____ gal/hr **or** ~3,000 bbl/hr
27. Do all gauging/sampling devices enter below liquid level and have gas-tight covers? yes no
28. Roof type: pan pontoon other: _____ Is emergency roof drain at least 90% covered? yes no

Person completing this form S. Gustofson Date 2/28/2013

*See Material Code Reference List.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street . . . San Francisco, CA 94109. . . (415) 749-4990 . . . FAX (415) 749-5030 OR 4949
WEBSITE: WWW.BAAQMD.GOV

Health Risk Screening Analysis

IMPORTANT: For any permit application that requires a Health Risk Screening Analysis, fill out one form for each source that emits a Toxic Air Contaminant(s) [or for a group of sources that exhaust through a common stack]. Emissions can be from a discrete point source (with stack) or a source with fugitive emissions (area or volume source). You must provide a plot plan (drawn to scale, if possible) and a local map (aerial photos are recommended), which clearly demonstrate the location of your site, the source(s), property lines, and any surrounding buildings [see attached example]. Label streets, schools, residences, and other businesses. List major dimensions of all buildings surrounding the source in Section C.

Plant Name: Valero Refining Co. - California Plant No.: B2626
Source Description: Tank 1776 (external floating roof tank)
Source No.: S-97 Emission Point No.: P-
(if known) (if known)

SECTION A (Point Source)

- 1. Does the source exhaust at clearly defined emission point; i.e., a stack or exhaust pipe? YES OR NO
2. Does the stack (or exhaust pipe) stand alone or is it located on the roof of a building? alone OR on roof
3. What is the height of the stack outlet above ground level? feet OR meters?
4. What is the inside diameter of the stack outlet? inches OR feet OR meters
5. What is the direction of the exhaust from the stack outlet? horizontal OR vertical
6. Is the stack outlet: open or hinged rain flap OR rain capped
7. What is the exhaust flowrate during normal operation? feet3/min OR meters3/second
8. What is the typical temperature of the exhaust gas? degrees Fahrenheit OR degrees Celsius

SECTION B (Area/Volume Source)

This section applies to fugitive emissions that are NOT captured by a collection system nor directly emitted through a stack or other emission point. Volume sources have fugitive emissions generally released within a building or other defined space (e.g., dry cleaner, gasoline station canopy). Area sources are generally flat areas of release (e.g., landfill, quarry).

- 1. Is the emission source located within a building? YES (go to #2) OR NO (go to #3)
2. If YES (source inside building), provide building dimensions on line B1 in Section C
a. Does the building have a ventilation system that is vented to the outside? YES OR NO
b. If NO (ventilation), are the building's doors & windows kept open during hours of operation? YES OR NO
3. If NO (source not inside building), provide a description of the source, dimensions, & indicate location on plot plan.
External floating roof tank. Diameter = 128 ft, shell height = 48 ft. See attached figure for location (and Figures 2-1 and 2-2 of application for surrounding area).

(Go on to Section C)

HRSA-1

SECTION C (Building Dimensions)

Provide building dimensions. Use Line B1 only for building with source/stack on the roof or with fugitive emissions inside building. Use Lines B2-B9 for buildings surrounding the source (within 300 feet). Distance and direction are optional if map and/or aerial photo are adequately labeled with locations of buildings. Check one for units: feet OR meters

B#	Building name or description	Height	Width	Length	Distance To Source	Direction To Source
B1	Building with source:				n/a	n/a
B2	See attached figure for structures surrounding S-97.					
B3						
B4						
B5						
B6						
B7						
B8						

NOTE: Label buildings by B# on plot plan, map and/or aerial photo. Provide comments below for any details that need additional clarification (e.g., list buildings that are co-occupied by your employees and other workers, residents, students, etc).

(Go on to Section D)

SECTION D (Receptor Locations)

NOTE: Indicate on maps or aerial photos the residential and nonresidential areas surrounding your facility.

- Indicate the area where the source is located (check one):
 zoned for residential use zoned for mixed residential and commercial/industrial use
 zoned for commercial and/or industrial use zoned for agricultural use
- Distance from source (stack or building) to nearest facility property line = ~650 feet OR meters
- Distance from source (stack or building) to the property line of the nearest residence = ~4,000 feet OR meters
- Describe the nearest nonresidential property (check one): Industrial/Commercial OR Other
- Distance from source (stack or building) to property line of nearest nonresidential site = ~750 feet OR meters
- Distance from source to property line of nearest school* (or school site) = feet OR Greater than 1,000 feet
[Note: Helpful website with California Dept. of Education data: www.greatschools.net]
Provide the names and addresses of all schools* that have property line(s) within 1,000 feet of the source:

*K-12 and more than twelve children only

Form HRSA: Plot plan showing location of S-97 (Tank 1776) .



Source: Google Maps, queried January 2013.

APPENDIX A2

Construction Emissions

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*Valero Crude By Rail Project
Construction Emissions*

Summary of Construction-Related Emissions

Sources	Average Daily Emissions (lb/day)						
	ROG	CO	NOx	SOx	PM10	PM2.5	CO2e
Equipment Exhaust	6.96	26.60	49.67	0.06	2.56	2.35	5977
Onsite Vehicle Exhaust	0.18	1.63	0.79	0.00	3.57	0.38	297
Offsite Vehicle Exhaust	0.91	8.47	1.43	0.01	0.53	0.17	1307
Fugitive Emissions	0.11	---	---	---	2.63	1.38	---
Total Emissions	8.17	36.7	51.9	0.08	9.28	4.29	7581
CEQA Threshold	54	---	54	---	82	54	---
Threshold Exceeded (Y/N)	No	No	No	No	No	No	No

Sources	Average Annual Emissions (tpy)						
	ROG	CO	NOx	SOx	PM10	PM2.5	CO2e
Equipment Exhaust	0.61	2.33	4.35	0.01	0.22	0.21	523
Onsite Vehicle Exhaust	0.02	0.14	0.07	0.00	0.31	0.03	26
Offsite Vehicle Exhaust	0.08	0.74	0.13	0.00	0.05	0.02	114
Fugitive Emissions	0.01	---	---	---	0.23	0.12	---
Total Emissions	0.71	3.21	4.54	0.01	0.81	0.38	663

Civil Work Fugitive PM Emission Factors

Soil handling

Emission Factor [lb/cu. yd] = $k \times 0.0032 \times (\text{mean wind speed [mi/hr]} / 5)^{1.3} / (\text{moisture [\%]} / 2)^{1.4} \times (\text{number drops per ton}) \times (\text{density [ton/cu. yd]})$
 Reference: AP-42, Equation (1), Section 13.2.4, November 2006

Parameter	Value	Basis
Particle Size Multiplier for PM10 (k)	0.35	AP-42 Chapter 13.2.4
Particle Size Multiplier for PM2.5 (k)	0.053	AP-42 Chapter 13.2.4
Mean Wind Speed (mph)	5	Default, CalEEMod User Manual Appendix D, Table 1.1
Moisture (%)	12	Default, CalEEMod User Manual Appendix A
Number Drops	4	Assumed
Soil Density (ton/cu. yd)	1.264	Default, CalEEMod User Manual Appendix A

PM10 Emission Factor (Uncontrolled)	4.61E-04	lb/cu. yd
PM2.5 Emission Factor (Uncontrolled)	6.98E-05	lb/cu. yd
Mitigation Efficiency	0%	
Controlled PM10 Emission Factor	4.61E-04	lb/cu. yd
Controlled PM2.5 Emission Factor	6.98E-05	lb/cu. yd

Bulldozing

Emission Factor [lb/hr] = $k \times C \times (\text{silt content [\%]})^A / (\text{moisture})^B$
 Reference: AP-42, Table 11.9-1, October 1998

Parameter	PM10	PM2.5	Basis
Scaling Factor (k)	0.75	0.105	AP-42, Section 11.9, Table 11.9-1, July 1998
Coefficient (C)	1	5.7	AP-42, Section 11.9, Table 11.9-1, July 1998
Exponent A	1.5	1.2	AP-42, Section 11.9, Table 11.9-1, July 1998
Exponent B	1.4	1.3	AP-42, Section 11.9, Table 11.9-1, July 1998
Silt Content (%)	6.9	6.9	AP-42, Section 11.9, Table 11.9-3, July 1998 for overburden
Moisture (%)	7.9	7.9	AP-42, Section 11.9, Table 11.9-3, July 1998, for overburden

	PM10	PM2.5	Units
Uncontrolled Emission Factor	0.753	0.414	lb/hr
Mitigation Efficiency	0%	0%	%
Controlled Emission Factor	0.753	0.414	lb/hr

Grading

Emission Factor [lb/VMT] = $k \times A \times (\text{mean vehicle speed [mi/hr]})^B$
 Reference: AP-42, Section 11.9, Table 11.9-1, July 1998

Parameter	PM10	PM2.5	Basis
Scaling Factor (k)	0.6	0.031	AP-42, Section 11.9, Table 11.9-1, July 1998
Particle Size Multiplier (A)	0.051	0.04	AP-42, Section 11.9, Table 11.9-1, July 1998
Exponent B	2	2.5	AP-42, Section 11.9, Table 11.9-1, July 1998
Mean vehicle Speed (mph)	7.1	7.1	AP-42, Section 11.9, Table 11.9-3, July 1998
Blade Width (ft)	12	12	Default, CalEEMod User Manual Appendix A

Emission Factor	PM10	PM2.5	Unit
Uncontrolled Emission Factor	1.061	0.115	lb/acre
Mitigation Efficiency	0%	0%	
Controlled Emission Factor	1.061	0.115	lb/acre

Notes:

The above equations are used in CalEEMod model to estimate fugitive emissions from demolition of structures.

Fugitive VOC Emission Factors

Architectural Coating VOC Emission Factor			
Parameter	Value	Unit	Basis
Paint VOC Content	250	g/l	BAAQMD Architectural Coating Regulation Requirement
Coating Coverage	180	sq.ft/gal	Default, CalEEMod User Manual Appendix A
Fugitive VOC Emission Factor	0.012	lb/sq.ft	Default, CalEEMod User Manual Appendix A

Asphalt Paving VOC Emissions Factor			
Parameter	Value	Unit	Basis
Fugitive VOC Emission Factor	2.620	lb/acre	Basis: Default, CalEEMod User Manual Appendix A

Equipment and Vehicle Emission Factors (2013)

Equipment	Engine Rating (HP)	OFFROAD Category	Emission Factors (lb/hr) ¹							Fuel Consumption
			ROG	CO	NOx	SOx	PM10	PM2.5 ²	CO2e	gal/hr
Track Hoes (225)	300	Crawler Tractors	0.17018	0.63617	1.49875	0.00170	0.05813	0.05348	173.85033	11.77614
Bulldozer (D-5)	90	Crawler Tractors	0.08657	0.32517	0.51455	0.00052	0.04534	0.04171	44.21753	3.01908
Front End loader (644)	200	Rubber Tired Loaders	0.08425	0.24664	0.81170	0.00112	0.02791	0.02568	99.88438	6.75126
Air Compressor (185)	50	Air Compressors	0.06041	0.16870	0.14804	0.00019	0.01452	0.01336	15.02281	1.03664
Wheel Compactor (small)	60	Other Construction Equipment	0.06734	0.35324	0.47029	0.00063	0.03797	0.03493	54.25431	3.69356
50 Ton Hydraulic Crane	173	Cranes	0.06905	0.32272	0.52007	0.00061	0.02980	0.02742	53.91338	3.66769
25 Ton Hydraulic Crane	130	Cranes	0.06905	0.32272	0.52007	0.00061	0.02980	0.02742	53.91338	3.66769
120 Ton Crawler Crane	600	Cranes	0.17567	0.59574	1.64500	0.00204	0.05921	0.05447	203.19050	13.74438
Welding Machine (300)	30	Welders	0.06424	0.18246	0.16897	0.00022	0.01581	0.01455	17.49801	1.20501
Man Lift (40')	30	Aerial Lifts	0.03874	0.11649	0.12262	0.00017	0.01025	0.00943	13.20215	0.90544
Concrete Pumper (trailer mt.)	30	Pumps	0.06900	0.20670	0.21528	0.00030	0.01815	0.01670	23.11445	1.58573
Forklift - Telehandler TL1255	130	Forklifts	0.03794	0.22116	0.28300	0.00042	0.01628	0.01498	37.59458	2.55555
Bobcat - S770	50	Skid Steer Loaders	0.03461	0.15146	0.15254	0.00022	0.01051	0.00967	17.14806	1.17367
Excavator - 345BL/C	300	Excavators	0.11613	0.35283	0.98828	0.00154	0.03455	0.03179	156.68225	10.58421
Loader - 950G/H	200	Rubber Tired Loaders	0.08425	0.24664	0.81170	0.00112	0.02791	0.02568	99.88438	6.75126
Light Plant - 4,000 Watt Diesel	20	Light	0.06652	0.20859	0.23229	0.00033	0.01833	0.01686	25.30906	1.73303
Scraper - 613C	300	Scrapers	0.21329	0.81078	1.89360	0.00211	0.07357	0.06769	215.56795	14.60463
Off Road Truck - 730 CAT	300	Off-Highway Trucks	0.14523	0.42585	1.19594	0.00179	0.04241	0.03902	182.57509	12.33639
Dozer - D6N LGP	120	Crawler Tractors	0.08657	0.32517	0.51455	0.00052	0.04534	0.04171	44.21753	3.01908
Dozer - D5HXL W/RIPPERS	110	Crawler Tractors	0.08657	0.32517	0.51455	0.00052	0.04534	0.04171	44.21753	3.01908
Blade - 140H/M with GPS	170	Graders	0.09821	0.49170	0.74935	0.00093	0.04227	0.03889	83.13893	5.65398
Loader - John Deere 210 - 4/1 Bucket	90	Rubber Tired Loaders	0.06498	0.27793	0.40270	0.00046	0.03515	0.03234	39.55974	2.69776
Roller - (Dirt) 84" SD	90	Rollers	0.06601	0.27198	0.41860	0.00046	0.03572	0.03286	39.61205	2.70081
Paver - CAT AP800	150	Pavers	0.11898	0.52104	0.92177	0.00097	0.05148	0.04736	86.09952	5.85923
Excavator - 320CL	250	Excavators	0.08317	0.23706	0.76051	0.00120	0.02492	0.02293	106.37955	7.18656
Excavator - Compaction Wheel	0	Excavators	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Compactor - 32" Walk Behind	15	Other Construction Equipment	0.00788	0.04131	0.04932	0.00011	0.00191	0.00176	6.78076	0.46124
Paver - Lee boy Paver	60	Pavers	0.09286	0.33851	0.55942	0.00054	0.04880	0.04490	46.49592	3.17456
Roller - (AC) 42"/47"	60	Rollers	0.06601	0.27198	0.41860	0.00046	0.03572	0.03286	39.61205	2.70081
Loader - 966G/H	200	Rubber Tired Loaders	0.08425	0.24664	0.81170	0.00112	0.02791	0.02568	99.88438	6.75126
Track - Hydraulic Tie Jig	0	Other Construction Equipment	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Track - Low Railer	120	Other Construction Equipment	0.06734	0.35324	0.47029	0.00063	0.03797	0.03493	54.25431	3.69356
Track - Production Tamper	200	Other Construction Equipment	0.09720	0.35038	1.01664	0.00167	0.03288	0.03025	170.37094	11.50093
Track - Regulator	150	Other Construction Equipment	0.06261	0.39312	0.53628	0.00080	0.02811	0.02586	71.42018	4.85059
Loader - Backhoe - 420D	90	Tractors/Loaders/Backhoes	0.04648	0.23621	0.30559	0.00041	0.02564	0.02359	34.71473	2.36493

Vehicles	Fuel	EMFAC Category ³	Emission Factors (lb/mi) ⁴							Fuel Consumption
			ROG	CO	NOx	SOx	PM10	PM2.5	CO2e ⁵	gal/mi
Onsite 1/2 Ton Pick-up Truck	GAS	LDT2	0.00062	0.00652	0.00079	0.00001	0.01614	0.00165	1.03463	0.05676
Onsite Dump Truck (Tandum)	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.01689	0.00227	3.97538	0.18054
Onsite Shuttle Truck	GAS	LDT1	0.00126	0.01162	0.00105	0.00001	0.01614	0.00165	0.87092	0.04853
Onsite Concrete Trucks (8 yd)	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.01689	0.00227	3.97538	0.18054
Onsite Truck - Foreman/Superintendent/PM	GAS	LDT2	0.00062	0.00652	0.00079	0.00001	0.01614	0.00165	1.03463	0.05676
Onsite Truck - Crew w/Small Tools	GAS	LDT2	0.00062	0.00652	0.00079	0.00001	0.01614	0.00165	1.03463	0.05676
Onsite Truck - Water	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.01689	0.00227	3.97538	0.18054
Onsite Asphalt Delivery	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.01689	0.00227	3.97538	0.18054
Offsite Concrete Trucks (8 yd)	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.00106	0.00072	3.97538	0.18054
Offsite 18 Wheeler (Deliveries)	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.00106	0.00072	3.97538	0.18054
Offsite Asphalt Delivery	DSL	T7	0.00116	0.00522	0.02383	0.00004	0.00106	0.00072	3.97538	0.18054
Offsite Construction Worker Commute Vehicles	GAS	LDA	0.00054	0.00516	0.00045	0.00001	0.00031	0.00009	0.73759	0.04180

1. Load Factor Correction of 0.67 applied to emissions estimated using OFFROAD2007 emission factors - <http://www.arb.ca.gov/regact/2010/offroadlsi10/offroadappd.pdf>
OFFROAD2007 Load Factor Correction 0.67

2. PM2.5 Fraction of PM10 Value Source
Gasoline Exhaust 0.756 from Appendix A, Final-Methodology to Calculate Particulate Matter (PM) 2.5
Diesel Exhaust 0.920 and PM 2.5 Significance Thresholds, SCAQMD, October 2006

3. Vehicle emission factors were compiled by running the California Air Resources Board's EMFAC2011 Emissions Model with EMFAC2007 vehicle categories and dividing calculated daily emissions by daily vehicle-miles-traveled.

4. All vehicle emission factors account for the emissions from start, running and idling exhaust. In addition, the VOC emission factors take into account diurnal, hot soak, running and resting emissions, and PM10 and

5. N₂O and CH₄ factors from 2013 Climate Registry Default Emission Factors, Released: January 2, 2013. <http://www.theclimateregistry.org/downloads/2013/01/2013-Climat-Registry-Default-Emissions-Factors.pdf>

Parameters	Onsite Unpaved Road Dust Emission Factor	
	PM10	PM2.5
Particle Size Multiplier (k) - lb/VMT	1.5	0.15
Silt Content (%)	0.03	0.03
Mean Vehicle Weight (W) - tons	20	20
Emission Factor	1.60E-02	1.60E-03

AP-42, Section 13.2.2, November 2006

Parameters	Offsite Paved Road Dust Emission Factor	
	PM10	PM2.5
Particle Size Multiplier (k) - lb/VMT	0.0022	0.00054
Silt Loading (sL) - g/m ²	0.03	0.03
Average Fleet Weight (W) - tons	2.2	2.2
Emission Factor	2.02E-04	4.96E-05

AP-42, Section 13.2.1, January 2011

Fugitive Emissions Activity Rate Estimate

Activity	Value	Unit	Reference
Soil handled	23132	cu. yd Cut	per Sue G's email - 3/27/2013
	711	cu. yd Fill	per Sue G's email - 3/27/2013
Soil hauled	23843	cu. yd	
Truck Capacity	20	cu. yd	URBEMIS/CalEEMOD Default
Asphalt paving	3.9	Acres	per Sue G's email - 3/27/2013
Grading (Acres)	3.9	Acres	per Sue G's email - 3/27/2013
Architectural Coating	800.0	sq. ft	

Disturbed Area Estimate	Value	Unit	Reference
Approximate Distance from Loading rack to Facility Boundary	0.96	miles	Google Earth
	5069	feet	
Approximate Width of Distrubed Area	111	feet	from CBR project drawings
Approximate Area Disturbed/Graded	13	Acres	

Fugitive Emissions

Fugitive Activity Rate		
Source	Activity Rate Unit	Total for Project
Soil Handling	cu. yd	23,843
Bulldozing/Scraping	hr	578
Grading	Acres	13
Architectural Coating	sq. ft	800
Asphalt Paving	Acres	3.9

Fugitive PM10 Emissions				
Source	Emission Factor (lb/Unit)	Total Emissions (lb)	Average Annual Emissions (tpy)	Average Daily Emissions (lb/day)
Soil Handling	4.61E-04	11	0.005	0.06
Bulldozing	7.53E-01	435	0.218	2.49
Grading	1.06E+00	14	0.007	0.08
Total		460	0.23	2.63

Fugitive PM2.5 Emissions				
Source	Emission Factor (lb/Unit)	Total Emissions (lb)	Average Annual Emissions (tpy)	Average Daily Emissions (lb/day)
Soil Handling	6.98E-05	2	0.001	0.01
Bulldozing	4.14E-01	239	0.120	1.37
Grading	1.15E-01	1	0.001	0.01
Total		242	0.12	1.38

Fugitive VOC Emissions				
Source	Emission Factor (lb/Unit)	Total Emissions (lb)	Average Annual Emissions (tpy)	Average Daily Emissions (lb/day)
Architectural Coating	1.16E-02	9	0.005	0.05
Asphalt Paving	2.62E+00	10	0.005	0.06
Total		19	0.01	0.11

Equipment and Vehicle Activity Rate Data

Construction Duration
 Number of working days
 Number of hours/shift
 Number of shifts/day

25 weeks
 7 workdays per week
 10 hours/shift
 2 shifts/day

June 13 - Dec 31

Offroad Equipment	Engine Rating (HP)	OFFROAD Category	Fuel	Total Equipment-Hours over Project Duration
			GAS/DSL	
Track Hoes (225)	300	Crawler Tractors	DSL	700
Bulldozer (D-5)	90	Crawler Tractors	DSL	100
Front End loader (644)	200	Rubber Tired Loaders	DSL	800
Air Compressor (185)	50	Air Compressors	DSL	400
Wheel Compactor (small)	60	Other Construction Equipment	DSL	200
50 Ton Hydraulic Crane	173	Cranes	DSL	1000
25 Ton Hydraulic Crane	130	Cranes	DSL	2200
120 Ton Crawler Crane	600	Cranes	DSL	700
Welding Machine (300)	30	Welders	DSL	1100
Man Lift (40')	30	Aerial Lifts	DSL	1000
Concrete Pumper (trailer mt.)	30	Pumps	DSL	50
Forklift - Telehandler TL1255	130	Forklifts	DSL	1608
Bobcat - S770	50	Skid Steer Loaders	DSL	834
Excavator - 345BL/C	300	Excavators	DSL	528
Loader - 950G/H	200	Rubber Tired Loaders	DSL	580
Light Plant - 4,000 Watt Diesel	20	Light	DSL	1400
Scraper - 613C	300	Scrapers	DSL	186
Off Road Truck - 730 CAT	300	Off-Highway Trucks	DSL	386
Dozer - D6N LGP	120	Crawler Tractors	DSL	212
Dozer - D5HXL W/RIPPERS	110	Crawler Tractors	DSL	80
Blade - 140H/M with GPS	170	Graders	DSL	368
Loader - John Deere 210 - 4/1 Bucket	90	Rubber Tired Loaders	DSL	528
Roller - (Dirt) 84" SD	90	Rollers	DSL	488
Paver - CAT AP800	150	Pavers	DSL	200
Excavator - 320CL	250	Excavators	DSL	110
Compactor - 32" Walk Behind	15	Other Construction Equipment	DSL	80
Paver - Lee boy Paver	60	Pavers	DSL	40
Roller - (AC) 42"/47"	60	Rollers	DSL	136
Loader - 966G/H	200	Rubber Tired Loaders	DSL	210
Track - Low Railer	120	Other Construction Equipment	DSL	302
Track - Production Tamper	200	Other Construction Equipment	DSL	302
Track - Regulator	150	Other Construction Equipment	DSL	302
Loader - Backhoe - 420D	90	Tractors/Loaders/Backhoes	DSL	370

Onroad Vehicles	EMFAC (on road vehicle) Category	Fuel:	Total Equipment-Hours over Project Duration	Estimated speed (MPH)
		GAS / DSL		
1/2 Ton Pick-up Truck	LDT2	GAS		5
Dump Truck (Tandum)	T7	DSL	Based on Quantity of Dirt Hauled and Truck Capacity	
Shuttle Truck	LHD1	DSL	1600	5
Concrete Trucks (8 yd)	T7	DSL	Based on Quantity of Concrete Hauled and Truck Capacity	
Truck - Foreman/Superintendent/PM	LDT2	GAS	1824	5
Truck - Crew w/Small Tools	LDT2	GAS	2650	5
Truck - Water	T7	DSL	320	5
Asphalt Delivery	T7	DSL	Based on Quantity of Asphalt Hauled and Truck Capacity	
18 Wheeler (Deliveries)	T7	DSL	180	5
Construction Worker Commute Vehicles	LDA	GAS	Based on man-hours for project	

Concrete Requirement

Manholes, compr. relocation, sub/transformer fndn, fire monitor, custody transfer containment foundation, pipe supports

pipe supports	376 cu. Yd
Tank containment wall footings	420 cu. Yd
Pump pit, etc.	250 cu. Yd
Total Concrete Requirement	1046 cu. Yd
Concrete Truck Capacity	8 cu. Yd
Concrete Supplier - Syar Industries at 885 Lake Herman Rd, Vallejo, CA 94591	
One-way Offsite Concrete Truck Trip Length	4.1 miles

Total Asphalt Requirement	4375 tons
Asphalt Truck Capacity	25 ton/truck
Asphalt Supplier - County Quarry	
One-way Offsite Asphalt Truck Trip Length	8 miles

Construction Worker Trips	
OSBL Manhours	37500 man-hours/project
ISBL Manhours	76300 man-hours/project @ 16 wks, 10 hrs/day, 7 day/wk
Work hours/day	10
Total Project Worker Trips	11380

URBEMIS Material Delivery Truck Default Trip Length (7.3 miles/one-way
Worker Commute Trip Distance (H-W)	12.4 miles/one-way

Onsite Truck Trip Length 2 miles (Assumed)

Equipment and Vehicle Exhaust Emissions

Construction Duration	25	weeks
Number of working days	7	workdays per week
Number of hours/shift	10	hours/shift
Number of shifts/day	2	shifts/day

Offroad Equipment	Total Equipment-Hours over Project Duration	Total Emissions over The Project Duration (lb/Project)							Fuel Consumption (gal/Project)	
		ROG	CO	NOx	SOx	PM10	PM2.5	CO2e	Diesel	Gasoline
Track Hoes (225)	700	119.12	445.32	1049.12	1.19	40.69	37.44	121695	8243	0
Bulldozer (D-5)	100	8.66	32.52	51.45	0.05	4.53	4.17	4422	302	0
Front End loader (644)	800	67.40	197.31	649.36	0.90	22.33	20.54	79908	5401	0
Air Compressor (185)	400	24.16	67.48	59.22	0.08	5.81	5.35	6009	415	0
Wheel Compactor (small)	200	13.47	70.65	94.06	0.13	7.59	6.99	10851	739	0
50 Ton Hydraulic Crane	1000	69.05	322.72	520.07	0.61	29.80	27.42	53913	3668	0
25 Ton Hydraulic Crane	1100	75.95	354.99	572.07	0.67	32.78	30.16	59305	4034	0
120 Ton Crawler Crane	350	61.48	208.51	575.75	0.71	20.72	19.07	71117	4811	0
Welding Machine (300)	1100	70.66	200.70	185.87	0.25	17.39	16.00	19248	1326	0
Man Lift (40')	1000	38.74	116.49	122.62	0.17	10.25	9.43	13202	905	0
Concrete Pumper (trailer mt.)	50	3.45	10.34	10.76	0.01	0.91	0.83	1156	79	0
Forklift - Telehandler TL1255	1608	61.00	355.62	455.06	0.68	26.18	24.08	60452	4109	0
Bobcat - S770	834	28.86	126.32	127.22	0.18	8.76	8.06	14301	979	0
Excavator - 345BL/C	528	61.32	186.30	521.81	0.81	18.24	16.78	82728	5588	0
Loader - 950G/H	580	48.86	143.05	470.79	0.65	16.19	14.89	57933	3916	0
Light Plant - 4,000 Watt Diesel	1400	93.13	292.03	325.21	0.46	25.66	23.61	35433	2426	0
Scraper - 613C	186	39.67	150.80	352.21	0.39	13.68	12.59	40096	2716	0
Off Road Truck - 730 CAT	386	56.06	164.38	461.63	0.69	16.37	15.06	70474	4762	0
Dozer - D6N LGP	212	18.35	68.94	109.08	0.11	9.61	8.84	9374	640	0
Dozer - D5HXL W/RIPPERS	80	6.93	26.01	41.16	0.04	3.63	3.34	3537	242	0
Blade - 140H/M with GPS	368	36.14	180.94	275.76	0.34	15.56	14.31	30595	2081	0
Loader - John Deere 210 - 4/1 Bucket	528	34.31	146.75	212.62	0.24	18.56	17.08	20888	1424	0
Roller - (Dirt) 84" SD	488	32.21	132.73	204.28	0.23	17.43	16.04	19331	1318	0
Paver - CAT AP800	200	23.80	104.21	184.35	0.19	10.30	9.47	17220	1172	0
Excavator - 320CL	110	9.15	26.08	83.66	0.13	2.74	2.52	11702	791	0
Compactor - 32" Walk Behind	80	0.63	3.30	3.95	0.01	0.15	0.14	542	37	0
Paver - Lee boy Paver	40	3.71	13.54	22.38	0.02	1.95	1.80	1860	127	0
Roller - (AC) 42"/47"	136	8.98	36.99	56.93	0.06	4.86	4.47	5387	367	0
Loader - 966G/H	210	17.69	51.79	170.46	0.24	5.86	5.39	20976	1418	0
Track - Low Railer	302	20.34	106.68	142.03	0.19	11.47	10.55	16385	1115	0
Track - Production Tamper	302	29.35	105.82	307.03	0.50	9.93	9.14	51452	3473	0
Track - Regulator	302	18.91	118.72	161.96	0.24	8.49	7.81	21569	1465	0
Loader - Backhoe - 420D	370	17.20	87.40	113.07	0.15	9.49	8.73	12844	875	0

Vehicles	Total VMT over Project Duration	Total Emissions over The Project Duration (lb/Project)							Fuel Consumption (gal/Project)	
		ROG	CO	NOx	SOx	PM10	PM2.5	CO2e	Diesel	Gasoline
Onsite 1/2 Ton Pick-up Truck	3500	2.18	22.81	2.77	0.04	56.48	5.77	3621	0	199
Onsite Dump Truck (Tandum)	2384	2.76	12.45	56.81	0.09	40.27	5.42	9478	430	0
Onsite Shuttle Truck	8000	10.05	92.95	8.42	0.07	129.16	13.24	6967	0	388
Onsite Concrete Trucks (8 yd)	262	0.30	1.37	6.23	0.01	4.42	0.59	1040	47	0
Onsite Truck - Foreman/Superintendent/PM	9120	5.69	59.43	7.21	0.10	147.17	15.03	9436	0	518
Onsite Truck - Crew w/Small Tools	13250	8.26	86.34	10.48	0.14	213.82	21.84	13709	0	752
Onsite Truck - Water	1600	1.85	8.36	38.12	0.06	27.02	3.64	6361	289	0
Onsite Asphalt Delivery	350	0.40	1.83	8.34	0.01	5.91	0.80	1391	63	0
Offsite 18 Wheeler (Deliveries)	1314	1.52	6.86	31.31	0.05	1.39	0.95	5224	237	0
Offsite Asphalt Delivery	2800	3.24	14.62	66.72	0.11	2.96	2.02	11131	506	0
Offsite Concrete Trucks (8 yd)	1072	1.24	5.60	25.55	0.04	1.13	0.77	4262	194	0
Offsite Construction Worker Commute Vehicles	282224	153.61	1454.93	126.86	2.21	86.77	26.73	208166	0	11797

Total Project Equipment Emissions	lb/project	1218.75	4655.42	8692.99	11.33	447.92	412.09	1045904	70964	0
Total Project Onsite Vehicles Emissions	lb/project	31.49	285.53	138.38	0.52	624.24	66.32	52003	830	1857
Total Project Offsite Vehicles Emissions	lb/project	159.60	1482.02	250.43	2.41	92.26	30.46	228783	936	11797
Total Project All Sources Emissions	lb/project	1409.85	6422.96	9081.79	14.27	1164.42	508.87	1326690	72730	13654

Average Daily Equipment Emissions	lb/day	6.96	26.60	49.67	0.06	2.56	2.35	5977	406	0
Average Daily Onsite Vehicles Emissions	lb/day	0.18	1.63	0.79	0.00	3.57	0.38	297	5	11
Average Daily Offsite Vehicles Emissions	lb/day	0.91	8.47	1.43	0.01	0.53	0.17	1307	5	67
Average Daily All Sources Emissions	lb/day	8.06	36.70	51.90	0.08	6.65	2.91	7581	416	78

Average Annual Equipment Emissions	tpy	0.61	2.33	4.35	0.01	0.22	0.21	523		
Average Annual Onsite Vehicles Emissions	tpy	0.02	0.14	0.07	0.00	0.31	0.03	26		
Average Annual Offsite Vehicles Emissions	tpy	0.08	0.74	0.13	0.00	0.05	0.02	114		
Average Annual All Sources Emissions	tpy	0.70	3.21	4.54	0.01	0.58	0.25	663		