

METROLINK ORANGE COUNTY MAINTENANCE FACILITY PROJECT

INITIAL STUDY/
MITIGATED NEGATIVE DECLARATION
APPENDICES

ORANGE COUNTY TRANSPORTATION AUTHORITY

September 2023

Initial Study/
Mitigated Negative Declaration
Appendices

Metrolink Orange County Maintenance Facility Project

Orange County Transportation Authority
September 2023

Prepared for:
Gannett Fleming
Figueroa at Wilshire
601 S Figueroa St. #3800
Los Angeles, CA 90017

Prepared by:
AECOM
401 W A St., Suite 1200
San Diego, CA 92101

Appendix A
Technical Memorandum
Aesthetics

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority
550 S. Main St.
Orange, CA 92868

And

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

Prepared by:

AECOM
300 S. Grand Ave.
Los Angeles, CA 90071

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1. INTRODUCTION

The Southern California Regional Railroad Authority (SCRRA) Metrolink Commuter Rail System (Metrolink) is proposing to construct a new Orange County Maintenance Facility (hereafter referred to as "OCMF" or "the Project"). The Project would include several facilities including a transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth, sand silos, a maintenance facility, a maintenance facility extension, and 11 tracks. Approximately 80 employees would report to the Project. The Project consists of buildings that would have a total building area of approximately 90,000 square feet when combined. Metrolink currently operates two maintenance facilities across its service area: Central Maintenance Facility (CMF) in Los Angeles and Eastern Maintenance Facility (EMF) in San Bernardino County. Due to projected population expansion within its service area and the agency's goal to be prepared for the 2028 Los Angeles Summer Olympic Games, Metrolink will require an increased number of commuter rail services, as well as additional train storage and maintenance facilities associated with an increased fleet size. As a significant proportion of the expanded services will operate in Orange County, the Project would provide an optimal location for a new Metrolink maintenance facility. Metrolink's member agency, the Orange County Transportation Authority (OCTA), proposes to build this facility on an OCTA-owned parcel in the City of Irvine. OCTA is the lead agency under the California Environmental Quality Act (CEQA). The City of Irvine and SCRRA are the responsible agencies under CEQA.

The purpose of this memorandum is to describe the potential impacts that the Project would have on the existing baseline visual and aesthetic resources.

2. PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

As a result of the projected population expansion within the five-county area (Orange County, Los Angeles County, San Bernardino County, Riverside County, and Ventura County) currently served by the SCRRA, Metrolink will require an increased number of commuter rail services to support the growth. Consequently, the Metrolink system (Figure 2.1-1) would require additional train storage and maintenance facilities to support an increased fleet size.

Figure 2.1-1 Metrolink System Map



Source: SCRRA (2019)

Metrolink's CMF facility is located on the east bank of the Los Angeles River near the Interstate 5 (I-5) and Interstate 10 (I-10) highways, just south of the location of the former Southern Pacific Taylor Yard. The CMF is currently near capacity, which will impact the ability to provide the necessary train servicing for planned service-expansion of various Metrolink lines throughout the system under the Southern California Optimized Rail Expansion (SCORE) program. By transferring a portion of the current fleet from CMF to the proposed OCMF (specifically the Orange County Line trains), capacity for the non-Orange County trains will be increased at CMF. The Orange County Line has the highest ridership within the Metrolink system; therefore, a maintenance facility to serve the Orange County area with sufficient storage and servicing capabilities for both locomotives and rail cars is critical to controlling operating costs. In order to optimize rail service in the region, the proposed facility development would need to be completed by 2028. The SCORE program may also require heavy overhaul capabilities at OCMF, subject to pending decisions regarding fleet technology and management.

The expansion of Orange County and overall Metrolink commuter rail service will ultimately require additional or expanded equipment servicing capabilities for both locomotives and rail cars. Since a significant portion of the fleet will be in Orange County, a maintenance facility located along the Metrolink route through Orange County would be the optimal location as it would reduce operating costs by limiting non-revenue moves to the existing SCRRA storage and maintenance facilities in the cities of Los Angeles and San Bernardino. The proposed maintenance facility would provide equipment to inspect, clean, and maintain cars and locomotives on a regular and efficient basis. Much of the inspection and maintenance activity is federally mandated and must be performed at specific intervals. The OCMF will also provide refueling services thus reducing fuel costs, reducing fuel consumption, and will reduce emissions. Currently trains operating in the Orange County Region must travel either the CMF or EMF for refueling, which are sometimes non-revenue runs. The location of the Project is on a 21.3-acre OCTA-owned parcel on Ridge Valley south of Marine Way in the City of Irvine (Project Site). The Project Site is located within the boundaries of a closed military base (Marine Corps Air Station [MCAS] El Toro) formerly owned by the United States Department of the Navy (DON). After MCAS El Toro was closed, the site was quitclaimed by the Navy to Heritage Fields El Toro, LLC in 2011, and then by way of grant deed conveyed by Heritage Fields to the City of Irvine that same year. OCTA then purchased the fee ownership of the Project Site from the City of Irvine. Regional vehicle access to the Project Site is from I-5 at Sand Canyon Avenue. Local vehicle access is via Marine Way to Ridge Valley.

Prior to the current construction of the storage/set-out track, the Project Site was mostly vacant. The site currently includes 1,000-foot-long storage for miscellaneous rail equipment including temporary railroad bridges, signal houses, railroad ties, and signal components. Although not part of the Project, OCTA is currently installing a single 1,000-foot-long, single-ended storage track and fencing of the perimeter of the property to provide temporary storage of two trainsets and/or track maintenance equipment when necessary. There is a segment of an abandoned road, stormwater drains, and underground water transfer vault with a network of pipelines, valves and associated vents, that are currently not in use.

2.2 PROJECT DESCRIPTION

The OCMF would be located in the City of Irvine, on a 21.3-acre parcel owned by OCTA and adjacent to Marine Way and the Metrolink Orange subdivision between mileposts 183.50 and 184.00 on Metrolink's "Orange" Subdivision (Figure 2.2-1). The Project Site is located within Planning Area 51 of the updated City of Irvine General Plan, adopted in June 2015, and designated for the Great Park (formerly known as the Orange County Great Park (OCGP)), land use under the General Plan (City of Irvine, 2015). Per the City's zoning ordinance, the proposed use is a conditionally allowable use under the existing zone; therefore, OCTA is submitting a Conditional Use Permit to the City of Irvine for approval,

The Project would be developed in two phases with an anticipated completion date of 2028. Phase 1 focuses on developing facilities needed for the storage and routine cleaning, inspection, and servicing of the anticipated trainsets. The total area of the Phase 1 buildout would be approximately 20,996 square feet and would be comprised of the following facilities: the transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth and sand silos (Table 2.2-1). A total of 11 tracks would be built.The Phase 1 layout situates the train wash, fueling/sanding, and service and inspection tracks on the two tracks with the greatest tangent length, which are the ones nearest to the railroad right-of-way ("ROW"). This is important in fitting a second fueling/sanding facility so that there is one at each end of the service and inspection platform to support having the locomotive at either end, all within tangent track. Additionally, all six storage tracks and appurtenant features (air, water, head end power and toilet dump facilities) would be constructed. The storage tracks would be built near the middle of the site east of the service and inspection tracks. Phase 1 of the buildout would anticipate approximately 52 employees total throughout the entire day, split across three eight-hour shifts.

Table 2.2-1 Building Specifications

Building/Facility/Item	Building Area	Building Height
Transportation Building	7,495 sq. ft.	20 ft
Train Wash Building	11,110 sq. ft.	21 ft
Maintenance Building	40,392 sq. ft.	48 ft
Maintenance Building Expansion	27,880 sq. ft.	---
Utility Building	981 sq. ft.	20 ft
Pump House	750 sq. ft.	14 ft
Guard Booth	36 sq. ft.	---
Equipment Booth	48 sq. ft.	---
Sand Silos (2 Total)	576 sq. ft.	---
Total	89,268 sq. ft.	

Source: Gannett Fleming, Metrolink (February 2022)

Note: sq. ft. = square feet; ft = feet

A runaround track would be provided between the service and inspection tracks and storage tracks. Additionally, two temporary stub-ended set out tracks would be provided in the Phase 1 layout that occupies the footprint of the future shop tracks (one at the north and one at the south end of the yard). These set out tracks would be converted to shop access tracks in Phase 2 and therefore, would no longer be available as set out tracks. A new set out track would then be provided as part of Phase 2.

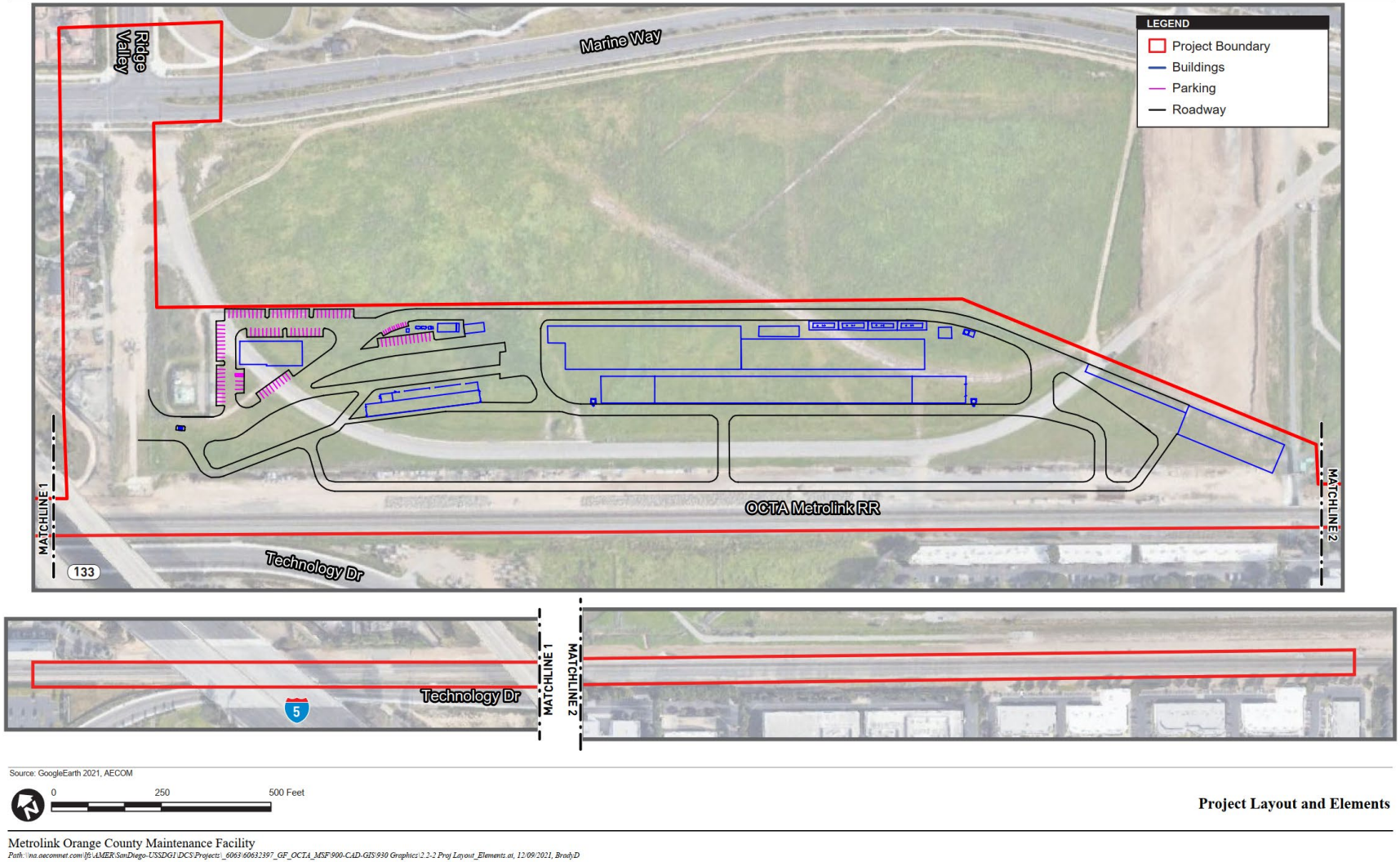
A transportation building that would be utilized for administrative purposes is also included in Phase 1. This building would house managerial offices, welfare spaces for train crews and on-site personnel. This facility would include restrooms, showers, locker rooms, a break/day room, vending space and a kitchenette.

Parking would be provided for staff reporting to the site. Fire department compliant roadways would be developed to permit circulation of the site for Metrolink vehicles as well as delivery trucks (sand and fuel).

Phase 2 completes the full buildout of the Project. It would include development of the maintenance shop building and its future extension that would comprise of a total buildout area of 68,272 square feet (Table 2.2-1). The shop would have capabilities to perform regular three-month, six-month, and one-year preventive maintenance cycles on trainsets. Phase 2 of the buildout would consist of approximately 28 employees. With the full buildout of Phase 1 and Phase 2, approximately 80 employees are expected to access the Project Site daily, split across three eight-hour shifts.Access to the OCMF would require a roadway extension along Ridge Valley from the intersection of Ridge Valley and Marine Way. The Project includes the southern extension of Ridge Valley Road from Marine Way and associated traffic signal improvements to provide access to the OCMF.

The 11 new east and west lead tracks, as discussed in this section above, would be constructed within the existing railroad corridor between MP 183.0 and MP 184.00 on Metrolink's "Orange" Subdivision to connect the existing mainline railroad to the proposed OCMF rail yard. A new single span concrete bridge over the Bee Canyon Channel (Channel) would be built for the east lead track. A segment of the Channel and utilities that are found to be in conflict would be lowered by approximately 2.5 feet to facilitate the construction of the bridge.

Figure 2.2-1 Project Layout and Elements



Source: ESRI (2021), OCTA (2021)

3. ENVIRONMENTAL SETTING

3.1 EXISTING CONDITIONS

The Project Site is located in a relatively flat area adjacent to the OCGP, with a multi-sport complex in close proximity to the northeast, office/industrial uses to the southwest, and the I-5 and State Route 133 (SR-133) highways. The existing area in the vicinity of the Project consists of an active railroad corridor, vacant, undeveloped land, active parkland associated with the OCGP, and other urbanized attributes areas containing medium-high rise commercial office buildings (Google Maps, 2018). A complex of two-story single-family homes is located at the northwest corner of Marine Way and Ridge Valley Boulevard. The City of Irvine and their private partner are converting 1,300 acres of the former military base into 472 acres of developed parkway for Great Park with amenities hosting: twenty-five tennis courts, thirteen soccer fields, a golf course, twelve baseball fields, and other community buildings and open space features (City of Irvine, 2020). Future development will consist of museums and other cultural and entertainment components that would require approval from the Irvine City Council. The OCGP would be the fourth largest sports complex in the nation after full build out.

The Santa Ana Mountains can be seen to the east of the Project Site and Bommer and Shady Canyon can be seen southwest of the Project Site. There are no designated Caltrans scenic vistas or scenic resources in the area (Caltrans, 2019).

The vacant parcel between the Project Site and Marine Way is currently being developed into an RV (recreational vehicle) storage area by the County of Orange. The intended use of this parcel is for storage of unoccupied vehicles.

The existing Project Site does not have any light sources. Sources of lighting in the vicinity of the Project Site include the OCGP's tennis courts, sports fields, and parking lot security lighting. The highways additionally have light sources for roadway visibility and headlights from motor vehicle traffic.

3.2 EXISTING VISUAL CHARACTER AND QUALITY

The existing visual character of the Project Site exhibits some natural landforms and vegetation, such as low grasses, due to the Project Site currently being vacant and undeveloped (Figure 3.2-1 and 3.2-2). Other landforms such as a narrow paved road traverses the visual landscape. Minor visual structural features on the Project Site include unused stormwater drains, valves and vents, rail equipment, signal houses, and storage of other rail or electrical related equipment. The form of the Project Site is generally flat, low, and simple, with no vertical elements that dominate the landscape. Lines associated with the Project Site are generally horizontal, curving and continuous, but occasionally irregular, which do not visually dominate the view. Colors that are visible within the landscape include primary hues of brown, with some patches of greens and variable lines including grays. The texture of the Project Site is fine-grained, dense, patchy, with occasional areas of striation. The existing visual quality of the Project Site is considered to have low vividness, intactness, and unity because the Project Site does not exhibit distinctive or memorable visual

elements; the integrity of the visual environment is not consistent or patterned; and the visual elements do not combine to form a coherent visual design or organization.

A majority of the areas surrounding the Project Site vary greatly in visual character from the Project Site in terms of form, line, color, and texture due to the presence of more and taller vertical features such as trees, residences, elevated highways, as well as vibrant large areas of green spaces. The visual quality of the surrounding area varies, but generally exhibits a slightly higher degree of vividness, intactness, and unity.

Figure 3.2-1 View from within the Project Site, Looking West



Source: Google Maps (2018)

Figure 3.2-2 View from within the Project Site, Looking Northeast



Source: Google Maps (2018)

3.3 VIEWER CHARACTERISTICS AND SENSITIVITY

Viewer sensitivity or concern is based on the visibility of resources in the landscape, the proximity of viewers to the aesthetic resource, the relative elevation of the viewers compared to the aesthetic resource, the frequency and duration of views, the number of viewers, and the types of individuals. In considering aesthetic impacts of the Project, key views and visually prominent features have been assessed to determine how they would most influence impact perception.

The viewer population is a mix of viewer groups, including residents, park patrons, office building and industrial workers, transit patrons, commuters and bicyclists. Commuters, including bicyclists and motorists on streets and freeways, are anticipated to have low sensitivity to visual change than other viewer groups because they are focused on driving in traffic. Similarly, transit patrons are anticipated to have low sensitivity to visual change because they are taking transit (e.g., Metrolink) typically for the specific purpose of traveling to and from their place of employment. Workers in the nearby office buildings and industrial buildings are anticipated to have low sensitivity to visual change because they are present in this area primarily to work, and not for leisure activities. The residents and park patrons would have high sensitivity to visual change in the area either because their activities are elective or because they spend a great deal of time in the area surrounding the Project Site.

Light sensitive receptors or land uses may include, but are not limited to, all types of residences; commercial or institutional uses that require minimal nighttime illumination for proper function, physical comfort, or commerce; and natural areas. In the vicinity of the Project Site, the sensitive receptors include the senior residential community to the northwest. OCGP, as a park, would be considered a light sensitive receptor; however, it already contains several sources of nighttime illumination for its sports fields. Therefore, the OCGP is not considered a light sensitive receptor for the purposes of this Project.

3.4 REGULATORY FRAMEWORK

City of Irvine General Plan Land Use Policy Objective A-1 Policy (a)- Objective A-1 of City of Irvine's Land Use Policy is to strengthen Irvine's identity. One policy mechanism to achieve this objective is through the conservation of visual resources along the scenic corridors that define the City of Irvine.

4. METHODOLOGY

Visual or aesthetic resources are the natural and built features of the landscape that can be seen. The combination of landform, water, and vegetation patterns represents the natural landscape features that define an area's visual character. Built features, such as buildings, roads, utility structures, and ornamental plantings, reflect human modifications to the landscape. These natural and built landscape features, or visual resources, contribute to the public's experience and appreciation of the environment.

The process used in this visual impact assessment generally follows the guidelines outlined in the publication *Guidelines for the Visual Impact Assessment of Highway Projects* published by the Federal Highway Administration (FHWA) in January 2015, which is an updated version of publication *Visual Impact Assessment for Highway Projects* also published by FHWA in March 1981. Although this guidance was

developed for highway projects, it is adaptable to many types of projects. The major components of the visual impact assessment include establishing the visual setting and assessing impacts of the project on visual resources, such as nearby natural or constructed features.

The degree of aesthetic or visual impact was determined by assessing the visible changes that would be introduced by the Project. The assessment focuses on areas where changes in the visual environment would be greatest, such as areas with higher viewer sensitivity and/or where sensitive views would be affected. The assessment of potential aesthetic impacts addresses the following:

- Conflicts or complements to the existing visual character;
- Changes in visual quality;
- Likely impact on viewers with consideration of viewer sensitivity;
- Visual intrusion and blockage of sensitive views with an emphasis placed on any views that are identified by local jurisdictions as requiring protection; and
- Increases in light and glare.

The viewer population is a mix of major viewer groups that includes residents, park patrons, office building and industrial workers, transit patrons, commuters and bicyclists. Scenic views are defined as long-range views toward preserved natural areas or recognized visual and/or historic landmarks. A visual change would be considered significant if it introduces obstructive elements substantially out of character with existing land uses or substantially obscures a scenic view or vista available to major viewer groups near project features. The degree of visual impact is determined by assessing visible changes that would be introduced by the Project during construction and operation, as well as viewers' exposure and sensitivity to these changes.

4.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT THRESHOLDS

CEQA considers an impact significant if the Project would:

1. Have a substantial adverse effect on a scenic vista.
2. Substantially degrade scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
3. In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings. (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, if the project would conflict with applicable zoning and other regulations governing scenic quality.
4. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

5. IMPACTS ANALYSIS

5.1 SCENIC VISTAS

A scenic vista generally provides focal views of objects, settings, or features of visual interest; or panoramic views of large geographic areas of scenic quality, primarily from a given vantage point. A significant impact would occur if a project introduced incompatible visual elements within a field of view containing a scenic vista or substantially altered a view of a scenic vista.

Scenic views or vistas are panoramic public views of various natural features, including the ocean, striking or unusual natural terrain, or unique urban or historic features. Public access to these views may be available from nearby parklands, private and public-owned sites, and public ROW.

The City of Irvine General Plan does not delineate or designate any specific views as protected scenic vistas in the Project Site. There are no designated Caltrans scenic vistas or scenic resources in the area. The closest designated scenic highway is Highway 91 and is located approximately 13 miles away from the Project. The Project Site is within an urban setting within the eastern portion of Irvine, directly adjacent to the Metrolink ROW and an elevated freeway. The Project Site is relatively flat, and implementation of the Project would not result in a significant alteration of its topography. The Project would include a new maintenance facility located along the Metrolink ROW and would involve the construction and operation of up to 30-foot-tall buildings, and approximately 30-foot-tall metal structures that would serve as bridges for utility lines. The construction and operations of the Project would include visible features; however, the Project would not alter the views of a designated scenic vista. The Project would not result in the disruption of any designated scenic vistas from the perspective of residences to the northwest of the Project Site or patrons at the surrounding OCGP complex. Therefore, construction and operational impacts related to effects on a scenic vista would be less than significant.

5.2 SCENIC RESOURCES

A significant impact would occur where scenic resources within a state scenic highway were damaged or removed as a result of the Project. The Project is not located along or near an officially designated California Scenic Highway or locally designated scenic highway. The closest designated scenic highway is Highway 91 and is located approximately 13 miles away from the Project. Old Town Irvine is a registered California historical landmark, located approximately ½ mile away from the Project Site; however, it is occluded by the SR-133 and I-5 highways (State of California Office of Historic Preservation, 2020; National Park Services, 2020).

The Project would not impact any groves of trees, street trees, rock outcroppings, historic buildings, or any other potential scenic resources during construction or operations as no existing scenic resources are located on the Project Site. Therefore, no construction or operational impacts would occur related to scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.

5.3 VISUAL CHARACTER

Construction Impacts

Project construction would include two phases and would be temporary in nature. Phase 1 would consist of the primary build-out of the facility and would last up to 30 months in duration. Phase 2 is a secondary build-out of up to 24 months in duration.

Visually, the Project Site consists of a vacant area with a minor accessory structure and access roads. The Project Site does not contain any buildings, trees, or landscaping and the existing landscape is not memorable. This is a contrast from the green open space area to the north which includes the OCGP. During the construction phase, construction equipment, staging areas, construction trucks and vehicles, and temporary fencing would be visible to several viewer groups and would result in a contrast and change in visual character from the existing vacant area. However, construction is currently ongoing for the County of Orange's RV park and, thus, construction activities such as grading would not be different than what is encountered now.

Transit patrons, commuters, and bicyclists would primarily experience views of construction activities while riding the adjacent Metrolink, driving along Marine Way adjacent to the Project Site, and while traveling in the bike path that also exists along Marine Way. The latter two groups would have some blockage of views of the construction site by the proposed RV storage area between Marine Way and the Project Site. In addition, commuters may have prolonged views while idling on the congested freeways. The change in the visual character of the Project Site during the construction phase would be noticed by these viewer groups. However, transit patrons, commuters, and bicyclists are considered to have a low sensitivity to any visual changes on the Project Site as they are likely passing through the vicinity of the Project Site to reach their destinations and their duration of exposure and awareness of landscape changes would be low.

The employees of office buildings and industrial land uses in the vicinity of the Project Site would primarily experience views of the construction activities on the Project Site as they approach and leave their place of work. Therefore, their views of the construction activities would primarily take place while en route to and from these locations in the Project Site. The change in the visual character of the Project Site during the construction phase would be noticed by these viewer groups. However, patrons and employees of office buildings and industrial land uses are considered to have a low sensitivity to any visual changes on the Project Site as they are likely passing through the vicinity to reach their place of work or business and their duration of exposure and awareness of landscape changes would be low.

Residents and OCGP patrons would primarily experience views of construction activities while driving to and from their homes and while recreating in the OCGP. Views from the residences located northwest of the Project Site would be blocked by existing mature trees on their properties, as well as the concrete wall which surrounds the residential complex. It would also be blocked by fencing that would surround the Project Site. In addition, park patrons would have prolonged views while spending time in the OCGP located directly north of the Project Site, although their view would be obstructed by the proposed RV storage area

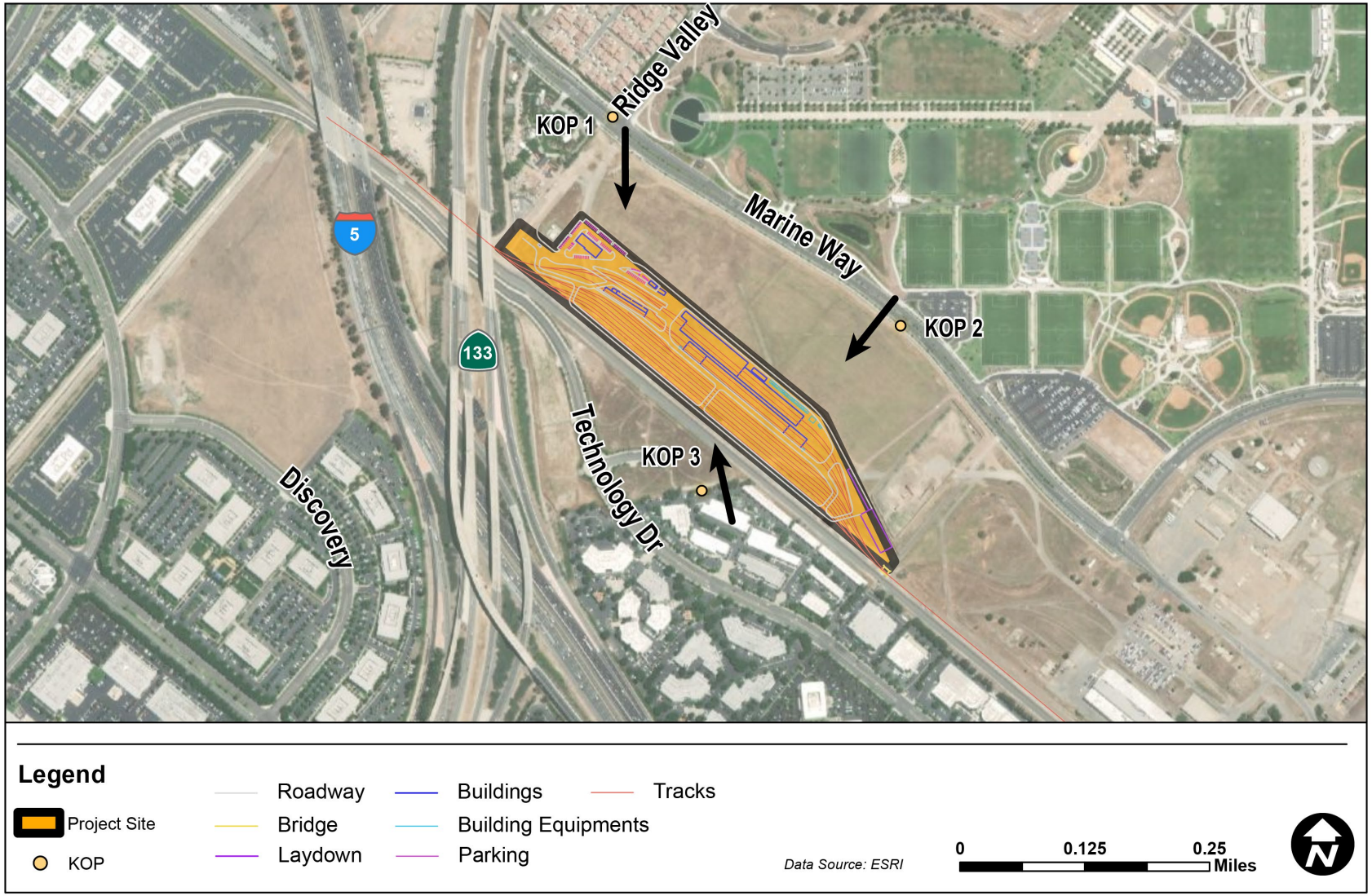
between Marine Way and the Project Site, as well as the fencing around the Project Site during construction and operations.

Overall, the construction phase would represent a temporary change in the visual quality and character of the Project Site. However, the construction site would be visibly similar to other construction projects in the City and urban areas. During construction, the Project Site would be surrounded by fencing that would also block the majority of the construction activities. Therefore, construction impacts related to visual character would be less than significant.

Operational Impacts

The Project would include a new maintenance facility located adjacent to the Metrolink ROW and would involve the construction and operation of up to 30-foot-tall buildings, and approximately 30-foot-tall metal structures that would serve as bridges for utility lines. The new structures would be set back on the Project Site over 500 feet from Marine Way to the north. The Project would be within an urban environment and would be consistent with the City's General Plan goals of conservation of visual resources along the scenic corridors in the City. To assess the potential visual changes that would result from the operation of the Project, three Key Observation Points (KOPs) were selected specifically for the Project, as shown below. KOPs represent key locations where the visual character is representative and can be used for visual simulations to evaluate potential visual impacts. Visual simulations from these KOPs were prepared to provide a before and after comparison of the visual effects that would result from the Project. The locations of the three KOPs are shown on Figure 5.3-1. The KOP existing views and simulations are shown on Figures 5.3-2 through 5.3-4.

Figure 5.3-1 Location of Key Observation Points



Source: ESRI (2021), OCTA (2021)

The KOPs are representative of direct views within the Project Site and its surrounding area; simulations from the same locations show how these views would change as a result of the implementation of the Project. The simulated views represent conceptual design and are not intended to represent the Project's final design.

KOP 1 shows the Project Site looking southeast from along Marine Way and the intersection with Ridge Way (see Figure 5.3-2). The Marine Way street ROW, including traffic signals and a streetlight pole, dominate the foreground of the view. Public parkway landscaping and fencing is visible directly adjacent to the roadway. The flat and somewhat vegetated Project Site is visible in the middle ground of the view with no existing structures present. The background of the view includes a segment of elevated freeway on the right, as well as trees and tall office buildings on the center and left. In the distance, the tops of hills can be seen above the elevated freeway.

As shown on Figure 5.3-2, the Project is visible in the middle ground of the view. The new buildings interrupt some of the background views of the distant office buildings, trees, and the elevated freeway. The tops of the hills can still be seen. The Project includes a solid wall that is visible throughout the center of the view from right to left. The simulated view from KOP 1 represents a visual change compared to existing conditions as the development would occur on a site with no existing structures. However, due to the urban and visual environment of the area surrounding the Project Site, including various types of uses and structures, this visual change would be consistent with other developments in the vicinity of the Project Site. The Project would include new large aboveground structures; however, the height and massing of the buildings would not substantially alter visual character for residential viewers since the residential buildings are surrounded by a tall concrete wall and large trees. Additionally, the Project would not substantially alter visual character from this viewpoint primarily due to the distance of the Project buildings from the residential viewers. No aesthetically significant view or landmark would be altered or blocked. Therefore, operational impacts related to visual character would be less than significant for KOP 1.

KOP 2 shows the Project Site looking southwest from along Marine Way, approximately 1,800 feet southeast of Ridge Valley (see Figure 5.3-3). The OCGP is located approximately 94 feet behind the view perspective. This view represents the perspective of vehicle drivers, pedestrians, cyclists, and OCGP patrons. Visible in the foreground is the public sidewalk, landscaping, small bushes, a small tree, and a small concrete slab housing a manhole cover and small, green aboveground utility box. Visible in the middle ground is a narrow dirt road, and a large area of green and brown ground vegetation within the Project Site. The elevated freeway is visible in the background on the right and center of the view. Mature trees, commercial and office buildings, other development, and distant hills are visible in the background in the center and partially in the right side of the view.

Figure 5.3-2 KOP 1 – Before and After Simulation View, Looking Southeast from Residential Uses at Marine Way/Ridge Valley Intersection



Source: Trimble (2021), OCTA (2021)

Figure 5.3-3 KOP 2 – Before and After Simulation View, Looking Southwest from Marine Way and the OCGP



Source: Trimble (2021), OCTA (2021)

As shown in the simulated view of Figure 5.3-3, the Project would be visible in the middle ground of the view, with the tallest buildings being on the right. The new buildings would block the background views of the elevated freeway on the right and would only partially block views of the mature trees, commercial and office buildings, other development, and distant hills. The Project would include a solid wall that would be visible throughout the center of the view from right to left. The simulated view from KOP 2 represents a visual change compared to existing conditions as the development would occur on a site with no existing structures. However, due to the urban and visual environment of the area surrounding the Project Site, including various types of uses and structures, this visual change would be consistent with other developments in the vicinity of the Project Site. The Project would include new large aboveground structures; however, the height

and massing of the buildings would not substantially alter visual character for vehicle drivers, pedestrians, cyclists, and OCGP patrons from this viewpoint primarily due to the distance of the Project from the viewers. Also, no aesthetically significant view or landmark is being altered or blocked. Therefore, operational impacts related to visual character would be less than significant for KOP 2.

KOP 3 shows the Project Site looking north from the parking lot adjacent to a commercial/office building located approximately 335 feet south of the Project Site (see Figure 5.3-4). This view represents the perspective of commercial and industrial building users. Visible in the foreground is a portion of the paved and striped surface parking lot, a mature and smaller tree, as well as small bushes and a chain-linked fence that spans the view from right to left. Visible in the middle ground of the view is a vacant site that is not a part of the Project Site, as well as the Project Site itself. The ground vegetation on the vacant site and Project Site render the sites indistinguishable in this view. The Metrolink ROW divides these two sites, but this is indistinguishable in this view due to the vegetation. The background includes distant views of residential buildings on the center/left, as well as mature trees, OCGP, and hills on the right and center.

As shown in the simulated view in Figure 5.3-4, the Project would be visible in the middle ground of the view. The proposed maintenance building blocks the distant background views of mature trees, OCGP, and hills that would be visible on the right and center of the view. The simulated view from KOP 3 represents a visual change compared to existing conditions as the development would occur on a site with no existing structures. However, due to the urban and visual environment of the area surrounding the Project Site, including various types of uses and structures, this visual change would be consistent with other developments in the vicinity of the Project Site. The Project would include new large aboveground structures. Although the height and massing of the buildings would substantially alter views for commercial, office, and industrial building users, these are considered viewers with low sensitivity. Additionally, no aesthetically significant view or landmark is being altered or blocked. Therefore, no operational impacts related to visual character would occur for KOP 3.

Figure 5.3-4 KOP 3 – Before and After Simulation View, Looking North from Commercial and Industrial Uses





Source: Trimble (2021), OCTA (2021)

Overall, the operation of the Project would represent a change in visual character as compared to the existing Project Site as the development would occur on a site with no existing structures. However, the Project is in an urban area that currently has a mix of open space, industrial and office buildings, residential homes, and adjacent elevated freeway segments. Commercial businesses and offices would have a low to moderate sensitivity to this visual change. Viewers including residents and park patrons would likely have high sensitivity to the visual change; however, views from the residences would be interrupted by mature trees, existing and proposed walls, as well as the RV storage area between Marine Way and the Project Site. As a result, the Project would not conflict with any other regulations governing scenic quality because the Project would not substantially change views in the area or along any scenic corridor. Therefore, operational impacts related to visual character would be less than significant.

5.4 LIGHTING AND GLARE

Construction Impacts

The Project Site does not currently have any sources of lighting. A high level of existing ambient lighting currently exists surrounding the Project Site, including a substantial amount of high-poled sports field lighting located in the OCGP complex to the north. Construction of the Project would not include nighttime construction activities (primarily due to construction noise restrictions on work hours), which would require nighttime construction lighting. However, the Project Site would include standard safety lighting during construction. Nevertheless, sensitive receptors (the OCGP and residences) would be too far from the Project Site to experience spillover lighting due to security lighting. Therefore, construction impacts related to lighting would be less than significant. Regarding glare, construction equipment is not likely to be a significant source of glare. Therefore, no impacts related to glare would occur.

Operational Impacts

The Project would include installation of new standard exterior and interior security lighting around and within the maintenance facility, including buildings, which would operate continuously. Although, the sensitive receptors for lighting are located too far from the Project Site to be impacted by spillover lighting, per best management practices, nighttime lighting fixtures would be installed to direct the majority of the light to within and directly adjacent to the facility, and away from sensitive areas, to the maximum extent feasible. In addition, the materials used in the exterior of buildings and structures visible above the proposed six-foot-tall wall between the Project Site and Marine Way would need to comply with applicable City regulations under their Municipal Code (Division 9) and Zoning Ordinance (Section 3.16) to ensure no substantial source of glare. Figure 5.4-1 and Figure 5.4-2 illustrate that the existing Central Maintenance Facility and Eastern Maintenance Facility, which the Project would be similar to, include typical exterior building materials, such as concrete, and do not exhibit reflective properties that could result in glare. Therefore, operational impacts related to the creation of a substantial source of light or glare would be less than significant.

Figure 5.4-1 Existing Central Maintenance Facility, Exterior Building Materials



Source: Google Maps (2021)

Figure 5.4-2 Existing Eastern Maintenance Facility, Exterior Building Materials



Source: Google Maps (2021)

6. MITIGATION MEASURES

No mitigation measures are required.

7. IMPACTS AFTER MITIGATION

Construction and operation of the Project would be less than significant.

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Appendix B
Technical Memorandum
Air Quality & Greenhouse Gases

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority

550 S. Main St.
Orange, CA 92868

And

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

AECOM
Kaiser Center
300 S. Grand Ave.
Los Angeles, CA 90071

September 2023

REVISION	DESCRIPTION	DATE
0	Draft Air Quality and Greenhouse Gases Technical Memorandum	03/03/21
1	Draft Air Quality and Greenhouse Gases Technical Memorandum (Incorporating OCTA's comments and results of Health Risk Analysis and Dispersion Modeling)	05/17/21
2	Draft Air Quality and Greenhouse Gases Technical Memorandum (Incorporating OCTA's comments, which includes clarifying receptor spacing for HRA model runs, maps illustrating maximum cancer risk impacts and contour maps of cancer risk, and rationale behind assessing the recreational exposure scenario).	08/04/21
3	Draft Air Quality and Greenhouse Gases Technical Memorandum (Revised calculations based on internal QA)	12/08/21
4	Final Air Quality and Greenhouse Gases Technical Memorandum	09/22/2023

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1 INTRODUCTION

The Southern California Regional Railroad Authority (SCRRA) Metrolink Commuter Rail System (Metrolink) is proposing to construct a new Orange County Maintenance Facility (hereafter referred to as "OCMF" or "the Project"). The Project would include several facilities including a transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth, sand silos, a maintenance facility, a maintenance facility extension, and 11 tracks. Approximately 80 employees would report to the Project. The Project consists of buildings that would have a total building area of approximately 90,000 square feet when combined. Metrolink currently operates two maintenance facilities across its service area: Central Maintenance Facility (CMF) in Los Angeles and Eastern Maintenance Facility (EMF) in San Bernardino County. Due to projected population expansion within its service area and the agency's goal to be prepared for the 2028 Los Angeles Summer Olympic Games, Metrolink will require an increased number of commuter rail services, as well as additional train storage and maintenance facilities associated with an increased fleet size. As a significant proportion of the expanded services will operate in Orange County, the Project would provide an optimal location for a new Metrolink maintenance facility. Metrolink's member agency, the Orange County Transportation Authority (OCTA), proposes to build this facility on an OCTA-owned parcel in the City of Irvine. OCTA is the lead agency under the California Environmental Quality Act (CEQA). The City of Irvine and SCRRA are the responsible agencies under CEQA.

The purpose of this memorandum is to present the results of the air quality and greenhouse gas (GHG) analyses and to describe the potential impacts associated with the Project.

2 PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

As a result of the projected population expansion within the five county area (Orange County, Los Angeles County, San Bernardino County, Riverside County, and Ventura County) currently served by SCRRA, Metrolink will require an increased number of commuter rail services to support the growth. Consequently, the Metrolink system (Figure 2.1-1) would require additional train storage and maintenance facilities to support an increased fleet size.

Figure 2.1-1 Metrolink System Map



Source: SCRRA (2019)

Metrolink's CMF facility is located on the east bank of the Los Angeles River near the Interstate 5 (I-5) and Interstate 10 (I-10) highways, just south of the location of the former Southern Pacific Taylor Yard. The CMF is currently near capacity, which will impact the ability to provide the necessary train servicing for planned service-expansion of various Metrolink lines throughout the system under the Southern California Optimized Rail Expansion (SCORE) program. By transferring a portion of the current fleet from CMF to the proposed OCMF (specifically the Orange County Line trains), capacity for the non-Orange County trains will be increased at CMF. The Orange County Line has the highest ridership within the Metrolink system; therefore, a maintenance facility to serve the Orange County area with sufficient storage and servicing capabilities for both locomotives and rail cars is critical to controlling operating costs. In order to optimize rail service in the region, the proposed facility development would need to be completed by 2028. The SCORE program may also require heavy overhaul capabilities at OCMF, subject to pending decisions regarding fleet technology and management.

The expansion of Orange County and overall Metrolink commuter rail service will ultimately require additional or expanded equipment servicing capabilities for both locomotives and rail cars. Since a significant portion of the fleet will be in Orange County, a maintenance facility located along the Metrolink route through Orange County would be the optimal location as it would reduce operating costs by limiting non-revenue moves to the existing SCRRA storage and maintenance facilities in the cities of Los Angeles and San Bernardino. The proposed maintenance facility would provide equipment to inspect, clean, and maintain cars and locomotives on a regular and efficient basis. Much of the inspection and maintenance activity is federally mandated and must be performed at specific intervals. The OCMF will also provide refueling services thus reducing fuel costs, reducing fuel consumption, and will reduce emissions. Currently trains operating in the Orange County Region must travel either the CMF or EMF for refueling, which are sometimes non-revenue runs.

The location of the Project is on a 21.3-acre OCTA-owned parcel on Ridge Valley south of Marine Way in the City of Irvine (Project Site). The Project Site is located within the boundaries of a closed military base (Marine Corps Air Station [MCAS] El Toro) formerly owned by the United States Department of the Navy (DON). After MCAS El Toro was closed, the site was quitclaimed by the Navy to Heritage Fields El Toro, LLC in 2011, and then by way of grant deed conveyed by Heritage Fields to the City of Irvine that same year. OCTA then purchased the fee ownership of the Project Site from the City of Irvine. Regional vehicle access to the Project Site is from I-5 at Sand Canyon Avenue. Local vehicle access is via Marine Way to Ridge Valley.

Prior to the current construction of the storage/set-out track, the Project Site was mostly vacant. The site currently includes 1,000-foot-long storage for miscellaneous rail equipment including temporary railroad bridges, signal houses, railroad ties, and signal components. Although not part of the Project, OCTA is currently installing a single 1,000-foot-long, single-ended storage track and fencing of the perimeter of the property to provide temporary storage of two trainsets and/or track maintenance equipment when necessary. There is a segment of an abandoned road, stormwater drains, and underground water transfer vault with a network of pipelines, valves and associated vents, that are currently not in use.

2.2 PROJECT DESCRIPTION

The OCMF would be located in the City of Irvine, on a 21.3-acre parcel owned by OCTA and adjacent to Marine Way and the Metrolink Orange subdivision between mileposts 183.50 and 184.00 on Metrolink's "Orange" Subdivision (Figure 2.2-1). The Project Site is located within Planning Area 51 of the updated City of Irvine General Plan, adopted in June 2015, and designated for the Great Park (formerly known as the Orange County Great Park (OCGP)) land use under the General Plan. The City has indicated that a Conditional Use Permit (CUP) would need to be obtained for the Project and application thereof filed with the City. The use of the site as a rail maintenance facility, although deemed consistent with the purpose and intent of the zoning district, has characteristics that the City has indicated would require Zoning Administrator review in order to avoid conflicts with surrounding land uses. Therefore, OCTA would be filing a CUP application for the Project.

The Project would be developed in two phases with an anticipated completion date of 2028. Phase 1 focuses on developing facilities needed for the storage and routine cleaning, inspection and servicing of the anticipated trainsets. The total area of the Phase 1 buildout would be approximately 20,996 square feet and would be comprised of the following facilities: the transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth and sand silos (Table 2.2-1). A total of 11 tracks would be built. The Phase 1 layout situates the train wash, fueling/sanding, and service and inspection tracks on the two tracks with the greatest tangent length, which are the ones nearest the railroad right of way ("ROW"). This is important in fitting a second fueling/sanding facility so that there is one at each end of the service and inspection platform to support having the locomotive at either end, all within tangent track. Additionally, six storage tracks and appurtenant features (air, water, head end power and toilet dump facilities) would be constructed. The storage tracks would be built near the middle of the site east of the service and inspection tracks. Phase 1 of the buildout would anticipate approximately 52 employees total throughout the entire day, split across three eight-hour shifts.

Table 2.2-1 Building Specifications

Building/Facility/Item	Building Area	Building Height
Transportation Building	7,495 sq. ft.	20 ft
Train Wash Building	11,110 sq. ft.	21 ft
Maintenance Building	40,392 sq. ft.	48 ft
Maintenance Building Expansion	27,880 sq. ft.	---
Utility Building	981 sq. ft.	20 ft
Pump House	750 sq. ft.	14 ft
Guard Booth	36 sq. ft.	---
Equipment Booth	48 sq. ft.	---
Sand Silos (2 Total)	576 sq. ft.	---
Total	89,268 sq. ft.	

Source: Gannett Fleming, Metrolink (February 2022)

Note: sq. ft. = square feet; ft = feet

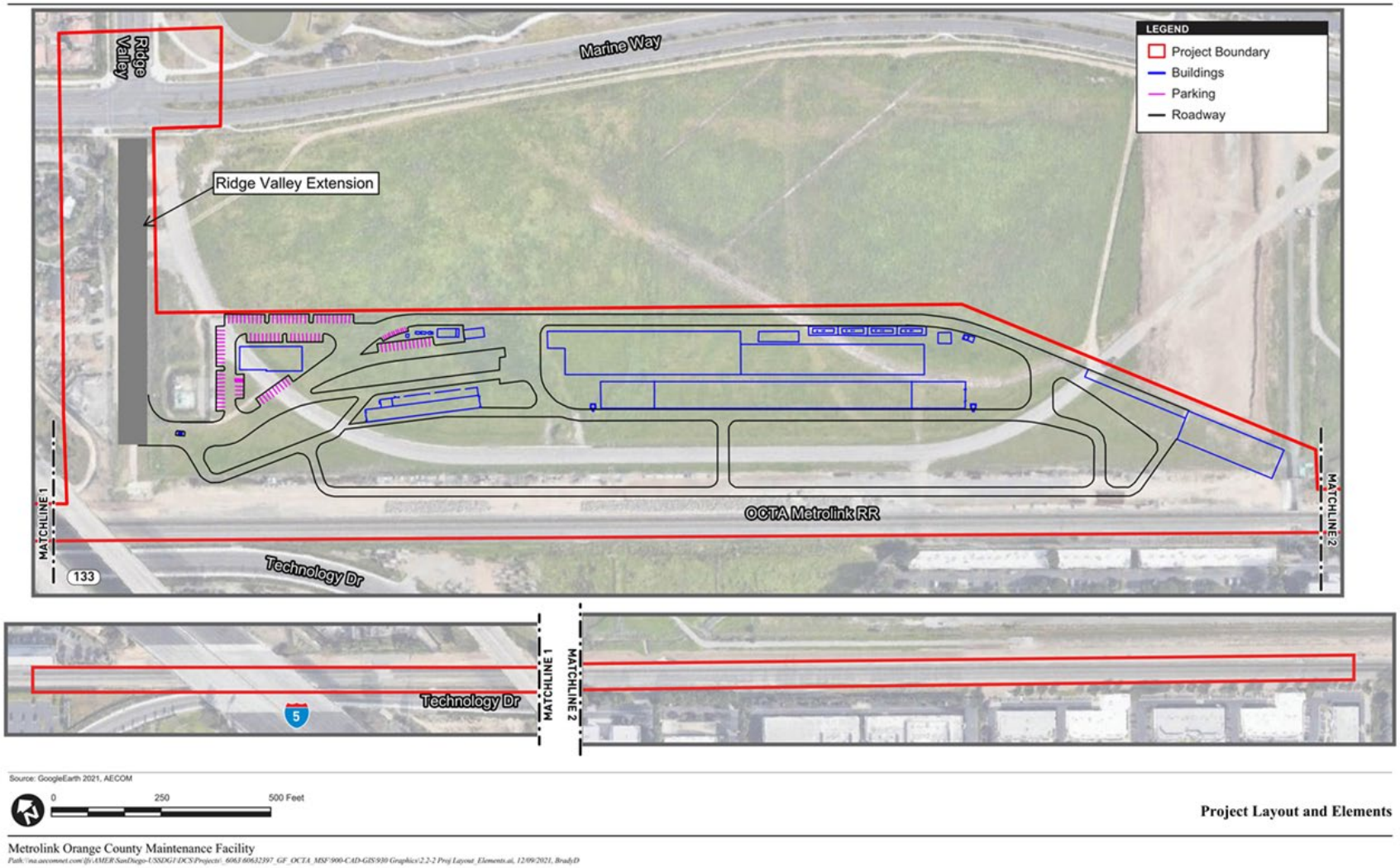
A runaround track would be provided between the service and inspection tracks and storage tracks. Additionally, two temporary stub-ended set out tracks would be provided in the Phase 1 layout that occupies the footprint of the future shop tracks (one at the north and one at the south end of the yard). These set out tracks would be converted to shop access tracks in Phase 2 and, therefore, would no longer be available as set out tracks. A new set out track would then be provided as part of Phase 2.

A transportation building that would be utilized for administrative purposes is also included in Phase 1. This building would house managerial offices, welfare spaces for train crews and on-site personnel. This facility would include restrooms, showers, locker rooms, a break/day room, vending space and a kitchenette. Approximately 120 automobile parking spaces would be provided for staff reporting to the site. Fire department compliant roadways would be developed to permit circulation of the site for Metrolink vehicles as well as delivery trucks (sand and fuel).

Phase 2 completes the full buildout of the Project. It would include development of the maintenance shop building and its future extension that would comprise of a total buildout area of 68,272 square feet (Table 2.2-1). The shop would have capabilities to perform regular three-month, six-month, and one-year preventive maintenance cycles on trainsets. Phase 2 of the buildout would consist of approximately 28 employees. With the full buildout of Phase 1 and Phase 2, approximately 80 employees are expected to access the Project Site daily, split across three eight-hour shifts. Access to the OCMF would require a roadway extension along Ridge Valley from the intersection of Ridge Valley and Marine Way. The Project includes the southern extension of Ridge Valley Road from Marine Way and associated traffic signal improvements to provide access to the OCMF.

The 11 new east and west lead tracks, as discussed in this section above, would be constructed within the existing railroad corridor between MP 183.0 and MP 184.00 on Metrolink's "Orange" Subdivision to connect the existing mainline railroad to the proposed OCMF rail yard. A new single span concrete bridge over the Bee Canyon Channel (Channel) would be built for the east lead track. A segment of the Channel and utilities that are found to be in conflict would be lowered by approximately 2.5 feet to facilitate the construction of the bridge.

Figure 2.2-1 Project Layout and Elements



Source: ESRI (2021), OCTA (2021)

3 AIR QUALITY ENVIRONMENTAL SETTING

3.1 EXISTING CONDITIONS

Air quality is defined by the concentration of pollutants in relation to their impact on human health. Concentrations of air pollutants are determined by the rate and location of pollutant emissions released by pollution sources, and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, and sunlight. Therefore, ambient air quality conditions within the local air basin are influenced by such natural factors as topography, meteorology, and climate, in addition to the amount of air pollutant emissions released by existing air pollutant sources.

Climate, topography, and meteorology influence regional and local ambient air quality. Southern California is characterized as a semiarid climate, although it contains three distinct zones of rainfall that coincide with the coast, mountain, and desert. The Project is located within the City of Irvine, which is within the South Coast Air Basin (SCAB). The SCAB is bounded by the Pacific Ocean to the west, the San Gabriel mountains, San Bernardino mountains, and San Jacinto mountains to the north and east, and the San Diego County line to the south.

The topography and climate of Southern California combine to make the SCAB an area of high air pollution potential. A warm air mass frequently descends over the cool, moist marine layer produced by the interaction between the ocean's surface and the lowest layer of the atmosphere. The warm upper layer forms a cap over the cooler surface layer, which traps the pollutants near the ground. Light winds can further limit ventilation. Additionally, abundant sunlight triggers the photochemical reactions that produce ozone and the majority of particulate matter (SCAQMD, 2017a).

The normal annual precipitation in Orange County, which occurs primarily from October through April, is approximately 13 inches (WRCC, 2003). Normal January temperatures range from an average minimum of 40 degrees Fahrenheit (°F) to an average maximum of 67°F, and August temperatures range from an average minimum of 60°F to an average maximum of 85°F (WRCC, 2003).

3.1.1 Criteria Pollutants

Individual air pollutants at certain concentrations may adversely affect human or animal health, reduce visibility, damage property, and reduce the productivity or vigor of crops and natural vegetation. Six air pollutants have been identified by the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) as being of concern on both nationwide and statewide levels: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead, and particulate matter (PM). PM is subdivided into two classes based on particle size: PM equal to or less than 10 micrometers in diameter (PM_{10}) and PM equal to or less than 2.5 micrometers in diameter ($PM_{2.5}$). Because the air quality standards for these air pollutants are regulated using human health and environmentally based criteria, they are commonly referred to as "criteria air pollutants."

Ozone. Ozone is the principal component of smog and is formed in the atmosphere through a series of reactions involving reactive organic gases (ROGs) or volatile organic compounds (VOC), and nitrogen oxides

(NO_X) in the presence of sunlight. ROG/VOC and NO_X are called precursors of ozone. NO_X includes various combinations of nitrogen and oxygen, including nitric oxide (NO), NO_2, and others. Significant ozone concentrations are usually produced only in the summer, when atmospheric inversions are greatest, and temperatures are high. ROG/VOC and NO_X emissions are both considered critical in ozone formation.

Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered the most susceptible sub-groups for ozone effects. Short-term exposure (lasting for a few hours) to ozone can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. In recent years, a correlation between elevated ambient ozone levels and increases in daily hospital admission rates, as well as mortality, has also been reported. An increased risk for asthma has been found in children who participate in sports and live in communities with high ozone levels.

Carbon Monoxide. CO is a colorless and odorless gas that, in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. Relatively high concentrations are typically found near crowded intersections and along heavily used roadways carrying slow-moving traffic. Even under most severe meteorological and traffic conditions, high concentrations of CO are limited to locations within a relatively short distance (300 to 600 feet) of heavily traveled roadways. Vehicle traffic emissions can cause localized CO impacts, and severe vehicle congestion at major signalized intersections can generate elevated CO levels, called “hot spots,” which can be hazardous to human receptors adjacent to the intersections. Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise, and electrocardiograph changes indicative of decreased oxygen supply to the heart. Inhaled CO has no direct toxic effect on the lungs but exerts its effect on tissues by interfering with oxygen transport. Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include fetuses, patients with diseases involving heart and blood vessels, and patients with chronic hypoxemia (oxygen deficiency) as seen at high altitudes.

Nitrogen Dioxide. NO_2 is a product of combustion and is generated in vehicles and in stationary sources, such as power plants and boilers. It is also formed when ozone reacts with NO in the atmosphere. As noted above, NO_2 is part of the NO_X family and is a principal contributor to ozone and smog generation. Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children, is associated with long-term exposure to NO_2 at levels found in homes with gas stoves, which are higher than ambient levels found in Southern California. Airway contraction and increased resistance to air flow are observed after short-term exposure to NO_2 in healthy subjects. Larger decreases in lung functions are observed in individuals with asthma or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these sub-groups.

Sulfur Dioxide. SO_2 is a combustion product, with the primary source being power plants and heavy industries that use coal or oil as fuel. SO_2 is also a product of diesel engine combustion. SO_2 in the atmosphere contributes to the formation of acid rain. SO_2 can irritate lung tissue and increase the risk of acute and chronic respiratory disease. In asthmatics, increased resistance to air flow and a reduction in

breathing capacity leading to severe breathing difficulties are observed after acute exposure to SO_2. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of SO_2. Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient SO_2 levels. In these studies, efforts to separate the effects of SO_2 from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically, or one pollutant alone is the predominant factor.

Lead. Lead is a highly toxic metal that may cause a range of human health effects. Previously, the lead used in gasoline anti-knock additives represented a major source of lead emissions to the atmosphere from mobile and industrial sources. EPA began working to reduce lead emissions soon after its inception, issuing the first reduction standards in 1973. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995. As a result of EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector and levels of lead in the air decreased dramatically. Fetuses, infants, and children are more sensitive than others to the adverse effects of lead exposure. Exposure to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased lead levels are associated with increased blood pressure. Lead poisoning can cause anemia, lethargy, seizures, and death, although it appears that there are no direct effects of lead on the respiratory system.

Particulate Matter. PM is a complex mixture of extremely small particles that consists of dry solid fragments, solid cores with liquid coatings, and small liquid droplets. PM is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, soot, and soil or dust particles. Natural sources of PM include windblown dust and ocean spray. The size of PM is directly linked to the potential for causing health problems. EPA is concerned about particles that are 10 micrometers in diameter or smaller, because these particles generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Health studies have shown a significant association between exposure to PM and premature death. Other important effects include aggravation of respiratory and cardiovascular disease, lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and irregular heartbeat (EPA, 2016). Individuals particularly sensitive to fine particle exposure include older adults, people with heart and lung disease, and children. A consistent correlation between elevated PM levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks, and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. In recent years, some studies have reported an association between long-term exposure to air pollution dominated by fine particles and increased mortality, reduction in lifespan, and an increased mortality from lung cancer. EPA groups PM into two categories, which are described below.

PM_{10}. PM_{10} includes both fine and coarse dust particles; the fine particles are $PM_{2.5}$. Coarse particles, such as those found near roadways and dust-producing industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter. Sources of coarse particles include crushing or grinding operations and dust from paved or unpaved roads. Control of PM_{10} is primarily achieved through the control of dust at

construction and industrial sites, the cleaning of paved roads, and the wetting or paving of frequently used unpaved roads.

$PM_{2.5.}$ Fine particles, such as those found in smoke and haze, are $PM_{2.5}$. Sources of fine particles include all types of combustion activities (motor vehicles, power plants, wood burning, etc.) and certain industrial processes. $PM_{2.5}$ is also formed through reactions of gases, such as SO_2 and NO_X, in the atmosphere. $PM_{2.5}$ is the major cause of reduced visibility (haze) in California.

3.1.2 Air Quality Standards

Health-based air quality standards have been established for these criteria pollutants by EPA at the national level and by CARB at the state level. These standards were established to protect the public with a margin of safety from adverse health impacts due to exposure to air pollution. California has also established standards for sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride. Table 3.1-1 presents the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS).

Both EPA and CARB use ambient air quality monitoring data to designate areas according to their attainment status for criteria air pollutants. The purpose of these designations is to identify the areas with air quality problems and initiate planning efforts for improvement. The three basic designation categories are nonattainment, attainment, and unclassified. An “attainment” designation for an area signifies that pollutant concentrations did not exceed the established standard. In most cases, areas designated or re-designated as attainment must develop and implement maintenance plans (i.e., an area that was previously in nonattainment but now attains the standard). These areas are designated as “maintenance” areas and are currently under a maintenance plan to ensure continued compliance with the standard.

In contrast to attainment, a “nonattainment” designation indicates that a pollutant concentration has exceeded the established standard. Nonattainment may differ in severity. To identify the severity of the problem and the extent of planning and actions required to meet the standard, nonattainment areas are assigned a classification that is commensurate with the severity of their air quality problem (e.g., moderate, serious, severe, extreme).

Finally, an unclassified designation indicates that insufficient data exist to determine attainment or nonattainment. In addition, the California designations include a subcategory of nonattainment-transitional, which is given to nonattainment areas that are progressing and nearing attainment. As shown in Table 3.1-1, the SCAB is designated as a maintenance area for CO and PM_{10}, as a nonattainment area for ozone and $PM_{2.5}$, and as an unclassifiable or attainment area for NO_2 and SO_2 under the NAAQS. Additionally, the SCAB is designated as a partial nonattainment area for the Los Angeles County portion of the SCAB for near-source monitors for the lead NAAQS. The SCAB is designated as an attainment area for all criteria air pollutants except ozone, PM_{10}, and $PM_{2.5}$ under the CAAQS. The most current monitoring station data and attainment designations for the area surrounding the Project Site are shown in Table 3.1-2.

Table 3.1-3.1-1 NAAQS and CAAQS Attainment Status - South Coast Air Basin

		CAAQS		NAAQS	
Criteria Pollutant	**Averaging Time**	**Averaging Time**	**Designation**	**Averaging Time**	**Designation**
Ozone (O_3)	1-Hour	0.09 ppm	Nonattainment	—	—
	8-Hour	0.070 ppm		0.070 ppm	Nonattainment (Extreme)
PM_{10}	24-Hour	50 µg/m^3	Nonattainment	150 µg/m^3	Attainment (Maintenance)
	Annual	20 µg/m^3		—	—
$PM_{2.5}$	24-Hour	—	Nonattainment	35 µg/m^3	Nonattainment (Serious)
	Annual	12.0 µg/m^3		12.0 µg/m^3	Attainment
CO	1-Hour	20 ppm	Attainment	35 ppm	Attainment (Maintenance)
	8-Hour	9 ppm		9 ppm	
NO_2	1-Hour	0.18 ppm	Attainment	0.10 ppm	Unclassifiable/Attainment
	Annual	0.030 ppm		0.053 ppm	Attainment
SO_2	1-Hour	0.25 ppm (655 µg/m^3)	Attainment	75 ppb	Designations Pending
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm	Unclassifiable/Attainment
	Annual Arithmetic Mean	—		0.03 ppm	Unclassifiable/Attainment
Lead	30-Day Average	1.5 µg/m^3	Attainment	—	—
	Rolling 3-Month Average 24 Hour	—		1.5 µg/m^3	Nonattainment (Partial)
Sulfates	24-Hour	25 µg/m^3	Attainment	No National Standards	
Hydrogen Sulfides	1-Hour	0.03 ppm (42 µg/m^3)	Attainment		
Vinyl Chloride	24-Hour	0.01 ppm (26 µg/m^3)	Attainment		

Notes: NO_2 = nitrogen dioxide; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; SO_2 = sulfur dioxide; ppm = parts per million; ppb = parts per billion; µg/m^3 = micrograms per cubic meter.
Source: SCAQMD 2016

3.1.3 South Coast Air Basin Existing Air Quality

The South Coast Air Quality Management District (SCAQMD) is responsible for enforcing the rules and regulations protecting air quality in the SCAB. Ambient air pollutant concentrations in the SCAB are measured at air quality monitoring stations operated by CARB and the SCAQMD. The closest SCAQMD air quality monitoring station to the Project is the Mission Viejo monitoring station, located at 26081 Via Pera, Mission Viejo, California, approximately 5 miles southeast of the Project Site. This station monitors ozone, PM_{10}, and $PM_{2.5}$. Air quality monitoring data for CO were obtained from the SCAQMD Historical Data by Year tables for the Saddleback Valley source receptor area. Air quality data for NO_2 was obtained from the Costa Mesa monitoring station, located at 2850 Mesa Verde Drive, Costa Mesa, California, approximately 10 miles west of the Project Site. Table 3.1-2 presents 3 years of the most recent information available, summarizing the exceedances of standards and the highest recorded pollutant. These concentrations represent the existing, or baseline, conditions for the area surrounding the Project Site and are based on the most recent information that is available.

As shown in Table 3.1-2, ambient air concentrations of NO_2 did not exceed the NAAQS or CAAQS in 2017 through 2019. The 1-hour and 8-hour ozone standards were exceeded in 2017 through 2019. PM_{10} and $PM_{2.5}$ concentrations also exceeded the standards between 2017 and 2019.

3.2 TOXIC AIR CONTAMINANTS

In addition to criteria pollutants, both federal and state air quality regulations also focus on toxic air contaminants (TACs). TACs can be separated into carcinogens and noncarcinogens based on the nature of the effects associated with exposure to the pollutant. For regulatory purposes, carcinogens are assumed to have no safe threshold below which health impacts would not occur. Any exposure to a carcinogen poses some risk of contracting cancer. Noncarcinogens differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

TACs may be emitted by stationary, area, or mobile sources. Common stationary sources of TAC emissions include gasoline stations, dry cleaners, and diesel backup generators, which are subject to local air district permit requirements. The other, often more significant, sources of TAC emissions are motor vehicles on freeways, high-volume roadways, or other areas with high numbers of diesel particulate matter-emitting activities, such as distribution centers and railyards. Off-road mobile sources are also major contributors of TAC emissions and include construction equipment, ships, and trains.

3.2.1 Diesel Particulate Matter

Particulate exhaust emissions from diesel-fueled engines (diesel PM) were identified as a TAC by CARB in 1998. Federal and state efforts to reduce diesel PM emissions have focused on the use of improved fuels, adding particulate filters to engines, and requiring the production of new-technology engines that emit fewer exhaust particulates.

Table 3.2-1 Ambient Air Quality Summary

Pollutant Standards	2017	2018	2019
Ozone			
State maximum 1-hour concentration (0.09 ppm)	0.103	0.121	0.106
National maximum 8-hour concentration (0.070 ppm)	0.083	0.088	0.087
State maximum 8-hour concentration (0.070 ppm)	0.084	0.088	0.088
CAAQS Exceeded?	Yes	Yes	Yes
NAAQS Exceeded?	Yes	Yes	Yes
Number of Days Standard Exceeded			
CAAQS 1-hour	3	2	3
CAAQS 8- hour /NAAQS 8-hour	27/25	10/9	11/11
Carbon Monoxide (CO) [a]			
National/State Maximum 8-hour concentration (9 ppm/9.0 ppm)	0.9	0.9	0.8
National/State Maximum 1-hour concentration (35 ppm/20 ppm)	1.4	1.2	1.0
NAAQS/CAAQS Exceeded?	No	No	No
Nitrogen Dioxide (NO_2)			
National/State maximum 1-hour concentration (0.18 ppm/100 ppb)	0.045	*	*
National/State Annual Average (0.053 ppm/0.030 ppm)	*	*	*
NAAQS/CAAQS Exceeded?	*	*	*
Number of Days Standard Exceeded			
NAAQS 1-hour	0	0	0
CAAQS 1-hour	0	0	0
Particulate Matter (PM_{10})			
National maximum 24-hour concentration (150 $\mu g/m^3$)	58.2	55.6	45.1
State maximum 24-hour concentration (50 $\mu g/m^3$)	58.2	55.6	44.2
State annual average concentration (20 $\mu g/m^3$)	18.8	19.1	16.7
CAAQS Exceeded?	Yes	Yes	No
NAAQS Exceeded?	No	No	No
Measured Number of Days Standard Exceeded			
NAAQS 24-hour	0	0	0
CAAQS 24-hour	1	1	0
Particulate Matter ($PM_{2.5}$)			
National maximum 24-hour concentration (35 $\mu g/m^3$)	19.5	38.9	20.8
National annual average concentration (12.0 $\mu g/m^3$)	*	*	7.1
State annual average concentration (12 $\mu g/m^3$)	*	*	*
NAAQS Exceeded?	No	Yes	No
Measured Number of Days Standard Exceeded			
NAAQS 24-hour (>35 $\mu g/m^3$)	0	1	0

Notes: $\mu g/m^3$ = micrograms per cubic meter; CAAQS = California Ambient Air Quality Standards;
NAAQS = National Ambient Air Quality Standards; ppb = parts per billion; ppm = parts per million

[a] Data obtained from the SCAQMD Historical Data by Year.

*Insufficient data to determine the value.

Source: CARB 2020a; SCAQMD 2020

Diesel engines tend to produce a much higher ratio of fine particulates than other types of internal combustion engines. The fine particles that make up diesel PM tend to penetrate deep into the lungs and the rough surfaces of these particles makes it easy for them to bind with other toxins within the exhaust, thus increasing the hazards of particle inhalation. Long-term exposure to diesel PM is known to lead to chronic, serious health problems, including cardiovascular disease, cardiopulmonary disease, and lung cancer.

In 2015, the SCAQMD published the Multiple Air Toxics Exposure Study IV (MATES IV), a monitoring and evaluation study conducted in the SCAB. The MATES IV consists of a monitoring program, an updated emissions inventory of TACs, and a modeling effort to characterize risk across the SCAB. The study focuses on the carcinogenic risk from exposure to air toxics. The MATES IV estimated population weighted risk in the SCAB is 897 per million, a decrease of about 57 percent compared to the previous study (MATES III). The study also showed that diesel exhaust emissions had declined by about 70 percent, but diesel PM continued to account for about two-thirds of the cancer risk from air toxics (SCAQMD, 2017b). MATES IV also extrapolated excess cancer risk levels throughout the SCAB by modeling specific grids. MATES IV estimates an excess cancer risk of 626 per million for the area surrounding the Project Site (SCAQMD, 2015). SCAQMD has begun the MATES V, which will include an updated emissions inventory of TACs and updated modeling effort to characterize risk across the SCAB.

3.2.2 Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos was identified as a hazardous air pollutant by EPA in 1971 and identified as a TAC by CARB in 1986 (EPA, 2019a; Van Gosen, 2011). Subsequently, CARB adopted two Airborne Toxic Control Measures (ATCM) to address some of the health concerns associated with exposure to asbestos: ATCM for Surfacing Applications and ATCM for Construction, Grading, Quarrying, and Surface Mining Operations (discussed in more detail in Section 5.2.3 below).

Asbestos can be released from serpentine and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos-bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed.

Serpentine may contain chrysotile asbestos, especially near fault zones. Ultramafic rock, a rock closely related to serpentinite, may also contain asbestos minerals. Asbestos can also be associated with other rock types in California, though much less frequently than serpentinite and/or ultramafic rock. Serpentinite and/or ultramafic rock are known to be present in 44 of California's 58 counties. These rocks are particularly abundant in counties of the Sierra Nevada foothills, the Klamath Mountains, and

Coast Ranges. The California Department of Conservation, Division of Mines and Geology has developed a map showing the general location of ultramafic rock in the state. According to the General Location Guide for Ultramafic Rocks in California, Orange County and the Project Site are not identified as areas likely to contain natural occurrences of asbestos (CDMG, 2000; Van Gosen, 2011).

3.3 ODOR

Odors are considered an air quality issue both at the local level (e.g., odor from wastewater treatment) and at the regional level (e.g., smoke from wildfires). Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

The ability to detect odors varies considerably among the population and is subjective. Some individuals have the ability to smell minute quantities of specific substances, while others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person (e.g., from a fast-food restaurant or bakery) may be perfectly acceptable to another. Unfamiliar odors may be more easily detected and likely to cause complaints than familiar ones.

Offensive odors can potentially affect human health in several ways. First, odorant compounds can irritate the eyes, nose, and throat, which can reduce respiratory volume. Second, the ROGs that cause odors can stimulate sensory nerves to cause neurochemical changes that might influence health, for instance, by compromising the immune system. Finally, unpleasant odors can trigger memories or attitudes linked to unpleasant odors, causing cognitive and emotional effects, such as stress.

Several examples of common land use types that generate substantial odors include wastewater treatment plants, landfills, composting/green waste facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting/coating operations, rendering plants, and food packaging plants. There are no wastewater treatment plants, landfills, composting facilities, refineries, or chemical plants in the vicinity of the Project Site.

3.4 SENSITIVE RECEPTORS

Some members of the population are especially sensitive to air pollutant emissions and should be given special consideration when evaluating air quality impacts from projects. The SCAQMD considers a sensitive receptor to be a receptor such as residence, hospital, or convalescent facility where it is possible that an individual could remain for 24 hours (SCAQMD, 2008a).

Residential areas are considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to pollutants present. Recreational land uses are considered moderately sensitive to air pollution. Exercise places a high demand on respiratory functions, which can be impaired by air pollution even though exposure periods during exercise are generally short. In addition, noticeable air pollution can detract from the

enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution because exposure periods are relatively short and intermittent as the majority of the workers tend to stay indoors most of the time.

The Project Site is adjacent to the Great Park which serves outdoor recreational activities for the community. The nearest sensitive receptors to the Project Site are the residences in the senior housing community located approximately 650 feet north of the Project Site on Ridge Valley.

4 GREENHOUSE GAS EMISSIONS ENVIRONMENTAL SETTING

4.1 SCIENTIFIC BASIS OF CLIMATE CHANGE

Certain gases in the earth's atmosphere, classified as greenhouse gases (GHGs), play a critical role in determining the earth's surface temperature. A portion of the solar radiation that enters the earth's atmosphere is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. This infrared radiation (i.e., thermal heat) is absorbed by GHGs within the earth's atmosphere. As a result, infrared radiation released from the earth that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the "greenhouse effect," is responsible for maintaining a habitable climate on the earth.

GHGs are present in the atmosphere naturally, are released by natural and anthropogenic sources, and are formed from secondary reactions taking place in the atmosphere. Natural sources of GHGs include the respiration of humans, animals, and plants; decomposition of organic matter; and evaporation from the oceans. Anthropogenic sources include the combustion of fossil fuels, waste treatment, and agricultural processes. The following are GHGs that are widely accepted as the principal contributors to human-induced global climate change:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF_6)

The majority of anthropogenic CO_2 emissions are byproducts of fossil fuel combustion. CH_4 is the main component of natural gas and is associated with agricultural practices and landfills. N_2O is a colorless GHG that results from industrial processes, vehicle emissions, and agricultural practices. HFCs are synthetic chemicals used as a substitute for chlorofluorocarbons in automobile air conditioners and refrigerants. PFCs are produced as a byproduct of various industrial processes associated with aluminum production and the manufacturing of semiconductors. SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable GHG used for insulation in electric power transmission and distribution equipment, and in semiconductor manufacturing. The primary GHGs that would be emitted during construction and operation of the Project are CO_2, CH_4, and N_2O.

Global warming potential (GWP) is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to CO_2. The GWP of a GHG is based on several factors, including the relative

effectiveness of a gas to absorb infrared radiation and length of time (i.e., lifetime) that the gas remains in the atmosphere ("atmospheric lifetime"). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of 1. The other main GHGs that have been attributed to human activity include CH_4, which has a GWP of 25, and N_2O, which has a GWP of 298 (EPA, 2017a). For example, 1 ton of CH_4 has the same contribution to the greenhouse effect as approximately 25 tons of CO_2. GHGs with lower emissions rates than CO_2 may still contribute to climate change because they are more effective at absorbing outgoing infrared radiation than CO_2 (i.e., high GWP). The concept of CO_2-equivalents (CO_2e) is used to account for the different GWP potentials of GHGs to absorb infrared radiation.

Although the exact lifetime of any particular GHG molecule is dependent on multiple variables, it is understood by scientists who study atmospheric chemistry that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. GHG emissions related to human activities have been determined as "extremely likely" to be responsible (indicating 95 percent certainty) for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's atmosphere and oceans, with corresponding effects on global circulation patterns and climate (CARB, 2014).

4.2 GHG INVENTORIES

GHG emissions contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, electric utility, residential, commercial, and agricultural categories. Emissions of CO_2 are byproducts of fossil fuel combustion and CH_4 is the primary component in natural gas and is associated with agricultural practices and landfills. N_2O is also largely attributable to agricultural practices and soil management.

4.2.1 National

EPA prepares the official United States Inventory of Greenhouse Gas Emissions and Sinks to comply with existing commitments under the United Nations Framework Convention on Climate Change (UNFCCC). In 2018, the United States generated 6,676 million metric tons (MMT) CO_2e (EPA, 2020). The transportation sector was the single largest source of GHG emissions in 2018, accounting for 29 percent of total GHG emissions. The transportation sector was followed by the electric power and industry sectors, which account for 27 and 22 percent of the total GHG emissions, respectively (EPA, 2020).

4.2.2 California

CARB performs an annual GHG inventory for emissions and sinks of the six major GHGs. California produced 425 MMT CO_2e in 2018 (CARB, 2020b). Combustion of fossil fuel in the transportation category was the single largest source of California's GHG emissions in 2018, accounting for 40 percent of total GHG emissions in the state. The transportation category was followed by the industrial and electric power (including in-state and out-of-state sources) categories, which account for 21 and 15 percent of the state's total GHG emissions, respectively (CARB, 2020b).

5 AIR QUALITY REGULATORY FRAMEWORK

Air quality in the SCAB is regulated by EPA, CARB, and the SCAQMD. Each of these agencies develops rules, regulations, or policies, and/or goals to attain the directives imposed through legislation. Although EPA regulation may not be superseded, both state and local regulations may be more stringent.

5.1 FEDERAL STANDARDS

EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970 and amended in 1977 and 1990. The CAA requires EPA to establish the NAAQS and requires each state with regions that have not attained the NAAQS to prepare a State Implementation Plan (SIP), detailing how these standards are to be met in each local area. The SIP is a legal agreement between each state and the federal government to commit resources to improving air quality. It serves as the template for conducting regional and project-level air quality analysis. The SIP is not a single document, but a compilation of new and previously submitted attainment plans, emissions reduction programs, district rules, state regulations, and federal controls.

The CAA Amendments also require that states and local air quality agencies develop a Title V Operating Permit Program, which requires all "major sources" of pollutants to obtain Title V permits. The program is designed to ensure compliance with all applicable requirements of the CAA and to enhance EPA's ability to enforce the CAA. Air pollution sources subject to the program must obtain an operating permit; states must develop and implement the program; and EPA must issue permit program regulations, review each state's proposed program, and oversee the state's efforts to implement any approved program.

Before 1994, there were no standards to limit the amount of emissions from off-road equipment. In 1994, EPA established emission standards for hydrocarbons, NO_X, CO, and PM to regulate new pieces of off-road equipment. These emission standards came to be known as Tier 1. Since that time, increasingly more stringent Tier 2, Tier 3, and Tier 4 (interim and final) standards were adopted by EPA, as well as by CARB. Tier 1 emission standards became effective in 1996. The more stringent Tier 2 and Tier 3 emission standards became effective between 2001 and 2008, with the effective date dependent on engine horsepower. Tier 4 interim standards became effective between 2008 and 2012, and Tier 4 final standards became effective in 2014 and 2015. Each adopted emission standard was phased in over time. New engines built in and after 2015 across all horsepower sizes must meet Tier 4 final emission standards. In other words, new manufactured engines cannot exceed the emissions established for Tier 4 final emissions standards.

5.1.1 Locomotive Emissions Standards

In March 2008, EPA adopted a three-part emissions standard program to reduce emissions from diesel locomotives over time. The regulation tightens emission standards for existing remanufactured locomotives and sets exhaust emission standards for newly built locomotives of model years 2011-2014 (Tier 3) and 2015 and beyond (Tier 4). The regulation is expected to reduce PM emissions from

applicable engines by as much as 90% and NO_X emissions by as much as 80 percent when fully implemented.

5.1.2 Code of Federal Regulations 49 Parts 200-299

Metrolink operations are subject to Federal Regulations that dictate the frequency and nature of mechanical inspections. The following rules describe the federal requirements:

- 229.21 Daily Inspections - Requires locomotives to be inspected and tested daily.
- 238.303 Exterior Inspections - Exterior mechanical inspection of passenger equipment each calendar day.
- 238.305 Interior Inspections - Interior mechanical inspection of passenger equipment each calendar day.
- 232.205 Class 1 Brake Test Initial Terminal Inspection – Functional air brake test at location where train is assembled.
- 238.313 Class 1 Air Brake Test – Functional air brake test required each calendar day.

5.2 STATE STANDARDS

CARB is the lead agency responsible for developing the SIP in California. Local air districts and other agencies prepare air quality attainment plans or air quality management plans, and submit them to CARB for review, approval, and incorporation into the applicable SIP.

5.2.1 California Clean Air Act

CARB is also responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA was adopted in 1988 and requires CARB to establish CAAQS. In most cases, CAAQS are more stringent than NAAQS. Other CARB responsibilities include, but are not limited to, overseeing local air district compliance with state and federal laws; approving local air quality plans; submitting SIPs to EPA; monitoring air quality; determining and updating area designations and maps; and setting emission standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels. CARB maintains air quality monitoring stations throughout the state in conjunction with local air districts. Data collected at these stations are used by CARB to classify air basins as being in attainment or nonattainment with respect to each pollutant and to monitor progress in attaining air quality standards.

The CCAA requires that each area exceeding the CAAQS for ozone, CO, SO_2, and NO_2 develop a plan aimed at achieving those standards. California Health and Safety Code Section 40914 requires air districts to design a plan that achieves an annual reduction in district-wide emissions of 5 percent or more, averaged every consecutive 3-year period. To satisfy this requirement, the local air districts have to develop and implement air pollution reduction measures, which are described in their air quality

attainment plans, and outline strategies for achieving the CAAQS for any criteria pollutants for which the region is classified as nonattainment.

CARB has established emission standards for vehicles sold in California and for various types of equipment. California gasoline specifications are governed by both state and federal agencies. During the past decade, federal and state agencies have imposed numerous requirements on the production and sale of gasoline in California. CARB has also adopted control measures for diesel PM and more stringent emissions standards for various on-road mobile sources of emissions, including transit buses and off-road diesel equipment (e.g., tractors, generators).

5.2.2 Tanner Toxics Act

TACs in California are regulated primarily through the Tanner Air Toxics Act (Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act (Chapter 1252, Statutes of 1987). Assembly Bill (AB) 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before CARB can designate a substance as a TAC. The Air Toxics Hot Spots Information and Assessment Act requires that TAC emissions from stationary sources be quantified and compiled into an inventory according to criteria and guidelines developed by CARB, and if directed to do so by the local air district, a health risk assessment (HRA) must be prepared to determine the potential health impacts of such emissions.

The CARB adopted a Diesel Risk Reduction Plan, which recommends control measures to achieve a diesel PM reduction of 85 percent by 2020 from year 2000 levels. Recent regulations and programs include the low-sulfur diesel fuel requirement and more stringent emission standards for heavy-duty diesel trucks and off-road in-use diesel equipment. As emissions are reduced, it is expected that the risks associated with exposure to the emissions will also be reduced.

The CARB has also developed the *Air Quality and Land Use Handbook: A Community Health Perspective* to provide guidance on land use compatibility with sources of TACs (CARB, 2005). These sources include freeways and high-traffic roads, commercial distribution centers, rail yards, refineries, dry cleaners, gasoline stations, and industrial facilities. The handbook is not a law or adopted policy but offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs. The handbook indicates that land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality of life issues. The recommendations relevant to the Project include to avoid siting new sensitive land uses within 1,000 feet of a major service and maintenance rail yard. In response to new research demonstrating benefits of compact, infill development along transportation corridors, CARB released a technical supplement, *Technical Advisory: Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways* (Technical Advisory; CARB 2017a), to the 2005 Air Quality and Land Use Handbook. This Technical Advisory was developed to identify strategies that can be implemented to reduce exposure at specific developments or as recommendations for policy and planning documents. It is important to note that it is not intended as guidance for a specific project and does not discuss the feasibility of mitigation measures for the purposes of compliance with the California Environmental Quality Act (CEQA). Some of the strategies

identified in the Technical Advisory include implementation design that promotes air flow and pollutant dispersion along street corridors, solid barriers, vegetation for pollutant dispersion, and indoor high efficiency filtration (CARB, 2017a).

5.2.3 Airborne Toxic Control Measures Related to Address Asbestos Exposure

The EPA requires specific work practices to control the release of asbestos fibers relating to a renovation and/or demolition activity. The EPA delegates enforcement authority to state and local agencies for renovation and/or demolition activities that involve the handling of asbestos. After identifying asbestos as a TAC in 1986, CARB adopted two ATCMs to address some of the health concerns associated with exposure to asbestos: ATCM for Surfacing Applications (adopted in 1990) and ATCM for Construction, Grading, Quarrying, and Surface Mining Operations (adopted in 2001). The two asbestos regulations address minimizing the placement of asbestos-containing materials on unpaved surfaces and requiring work practices to minimize asbestos emissions from such activities where naturally-occurring asbestos is found or is likely to be found. The ATCMs were intended to minimize the release of asbestos fibers during activities involving the handling of asbestos.

5.3 REGIONAL AND LOCAL STANDARDS

In Orange County, the SCAQMD is the agency responsible for protecting public health and welfare through the administration of federal and state air quality laws and policies. Included in the SCAQMD's tasks are monitoring of air pollution, preparation of air quality plans, and promulgation of rules and regulations.

The SCAQMD monitors air quality within the Project Site and the SCAB, which includes Orange County and portions of Los Angeles, Riverside, and San Bernardino Counties. The SCAB is bounded by the Pacific Ocean to the west; the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east; and the San Diego County line to the south.

Under the CCAA, the SCAQMD is required to develop an air quality attainment plan for nonattainment criteria pollutants within the air district. The most recent air quality plan developed by the SCAQMD is the 2016 Air Quality Management Plan (AQMP). The 2016 AQMP is the legally enforceable blueprint for how the region will meet and maintain the NAAQS and CAAQS. The 2016 AQMP identifies strategies and control measures needed to achieve attainment of the 8-hour ozone standard and federal annual and 24-hour standard for PM2.5 in the SCAB (SCAQMD, 2017a). The future emission forecasts are primarily based on demographic and economic growth projections provided by Southern California Association of Governments (SCAG).

SCAQMD rules relevant to the Project include, but are not limited to:

- Regulation IV: Prohibitions; Rule 401: Visible Emissions. Prohibits the generation of particulate matter emissions that exceed the visible emissions threshold.
- Regulation IV: Prohibitions; Rule 402: Nuisance. Prohibits the discharge, from any source, of such quantities of air contaminants or other materials that cause or have a tendency to cause injury, detriment, nuisance, annoyance to people and/or the public, or damage to any business or property.
- Regulation IV: Prohibitions; Rule 403: Fugitive Dust. Regulates fugitive dust emissions from any commercial construction or demolition activity capable of generating fugitive dust emissions, including active operations, open storage piles, and inactive disturbed areas, as well as track-out and carry-out onto paved roads beyond a project site.
- Regulation XI: Source Specific Standards; Rule 1113: Architectural Coatings. Requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.
- Regulation XIV: Toxics and Other Non-Criteria Pollutants; Rule 1403: Requires notification and work practice standards to limit asbestos emissions from building demolition and renovation activities, including the removal and associated disturbance of asbestos-containing materials.
- Regulation XIV: Toxics and Other Non-Criteria Pollutants; Rule 1470: Requires all internal combustion engines (ICEs) greater than 50 brake horsepower to obtain a permit to construct from the SCAQMD prior to installation of the engines at a site.

The Project is required to comply with these rules, and conformance would be incorporated into Project specifications and procedures.

6 GREENHOUSE GAS REGULATORY FRAMEWORK

6.1 FEDERAL STANDARDS

EPA is the federal agency responsible for implementing the federal CAA. The Supreme Court of the United States ruled on April 2, 2007, that CO_2 is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs.

6.1.1 Greenhouse Gas Findings Under the Federal Clean Air Act

On December 7, 2009, EPA signed two distinct findings regarding GHGs under Section 202(a) of the CAA:

- Endangerment Finding: The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding: The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

Although these findings did not themselves impose any requirements on industries or other entities, this action was a prerequisite to finalizing EPA's *Proposed Rulemaking to Establish Light Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards* (EPA, 2009). On May 7, 2010, the final *Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards* were published in the Federal Register (EPA, 2010). Phase 1 of the emissions standards required model year 2012 through 2016 vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile, which is equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2 level solely through fuel economy improvements.

On August 28, 2012, the U.S. Department of Transportation (USDOT) and EPA issued a joint Final Rulemaking requiring additional federal GHG and fuel economy standards for Phase 2 of the emissions standards for model year 2017 through 2025 passenger cars and light-duty trucks. The standards would require these vehicles to meet an estimated combined average emissions level of 163 grams of CO_2 per mile in model year 2025, which is equivalent to 54.5 miles per gallon if the improvements were made solely through fuel efficiency. However, on April 2, 2018, EPA issued a Mid-term Evaluation Final Determination, which finds that the model year 2022 through 2025 emissions standards are not appropriate and should be revised. This Mid-term Evaluation is not a final agency action; rather, this determination led to the rule making of the Safer Affordable Fuel Efficient (SAFE) Vehicles Rule (EPA, 2018).

In addition to the standards for light-duty vehicles, USDOT and EPA adopted complementary standards to reduce GHG emissions and improve the fuel efficiency of heavy-duty trucks and buses on September 15, 2011. The Phase 1 standards together form a comprehensive heavy-duty national program for all on-road vehicles rated at a gross vehicle weight at or above 8,500 pounds for model years 2014 through 2018. The standards were phased in with increasing stringency in each model year from 2014 through 2018. The EPA standards adopted for 2018 represent an average per-vehicle reduction in GHG emissions of 17 percent for diesel vehicles and 12 percent for gasoline vehicles (EPA, 2011). Building on the success of the Phase 1 standards, EPA and the National Highway Traffic Safety Administration finalized Phase 2 standards for medium- and heavy-duty vehicles through model year 2027. The Phase 2 standards are expected to lower CO_2 emissions by approximately 1.1 billion MT. On November 16, 2017, EPA released a proposed rule to repeal the emission standards for heavy-duty glider vehicles, glider engines, and glider kits (EPA, 2017b).

6.1.2 Safer Affordable Fuel Efficient Vehicles Rule

In September 2019, the National Highway Traffic Safety Agency (NHTSA) and the EPA published the SAFE Vehicles Rule Part One: One National Program. The SAFE Part One Rule revokes California's authority and vehicle waiver to set its own emissions standards and set zero emission vehicle mandates in California for passenger cars and light trucks and establish new standards, covering model years 2021 through 2026. In April 2020, the EPA and NHTSA issued the second part of the proposed SAFE Vehicles Rule. This final rule became effective on June 29, 2020. The Final SAFE Rule relaxed the federal GHG emissions and fuel economy standards to increase in stringency at only about 1.5 percent per year from model year 2020 levels over model years 2021–2026. The previously established emission standards and related "augural" fuel economy standards would have achieved about 4 percent per year improvements through MY 2025 (CARB, 2020c). During the period the federal action is in effect, the CARB will administer the affected portions of its program on a voluntary basis. On January 20, 2021, President Joseph Biden signed an Executive Order directing consideration of labor unions, States, and industry views to propose suspension, revision, or rescindment of the SAFE Vehicles Rule (The White House, 2021).

6.1.3 Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA published the Final Mandatory Greenhouse Gas Reporting Rule (Reporting Rule) in the Federal Register. The Reporting Rule requires reporting of GHG data and other relevant information from fossil fuel and industrial GHG suppliers, vehicle and engine manufacturers, and all facilities that would emit 25,000 MT or more of CO_2e per year. Facility owners are required to submit an annual report with detailed calculations of facility GHG emissions on March 31 for emissions from the previous calendar year. The Reporting Rule also mandates recordkeeping and administrative requirements to enable EPA to verify the annual GHG emissions reports.

6.2 STATE STANDARDS

CARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the CCAA.

6.2.1 Assembly Bill 1493

AB 1493, signed in July 2002, requires CARB to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with model year 2009. In June 2009, the EPA Administrator granted a CAA waiver of preemption to California. This waiver allowed California to implement its own GHG emissions standards for motor vehicles beginning with model year 2009. California agencies worked with federal agencies to conduct joint rulemaking to reduce GHG emissions for passenger car model years 2017 through 2025. However, this waiver was revoked and the GHG emission standards were relaxed with the passage of the SAFE Rule, as discussed above.

6.2.2 Executive Order S-3-05

Executive Order (EO) S-3-05, signed in June 2005, proclaimed that California is vulnerable to the impacts of climate change. EO S-3-05 declared that increased temperatures could reduce the Sierra Nevada's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the executive order established total GHG emissions targets. Specifically, emissions were to be reduced to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below the 1990 levels by 2050. The statewide GHG emissions in 2000 were approximately 466 MMT CO_2e (CARB, 2012). In 2010, overall statewide GHG emissions were approximately 453 MMT CO_2e, exceeding the 2010 goal established by Executive Order S-3-05 (CARB, 2012).

6.2.3 Assembly Bill 32

In 2006, California passed the California Global Warming Solutions Act of 2006 (AB 32; California Health and Safety Code Division 25.5, Sections 38500, et seq.). AB 32 further details and puts into law the mid-term GHG reduction target established in Executive Order S-3-05: reduce GHG emissions to 1990 levels by 2020. AB 32 also identifies CARB as the state agency responsible for the design and implementation of emissions limits, regulations, and other measures to meet the target. AB 32 also established several programs to achieve GHG emission reductions, including the Low Carbon Fuel Standard and the Cap-and-Trade program. As of 2017, the state has reduced emissions below the revised AB 32 limit of 427 MMT CO_2e.[1]

6.2.4 Senate Bill 32

In 2016, the California State Legislature adopted Senate Bill (SB) 32 and its companion bill AB 197, and both were signed by Governor Edmund Brown (California Legislative Information). SB 32 establishes a new climate pollution reduction target of 40 percent below 1990 levels by 2030 (California Legislative Information, 2015-2016).

6.2.5 CARB Climate Change Scoping Plans

In December 2008, CARB adopted its *Climate Change Scoping Plan. A Framework for Change* (Scoping Plan), which contains the main strategies California will implement to achieve the required GHG reductions required by AB 32 (CARB, 2008). The Scoping Plan also includes CARB-recommended GHG reductions for each emissions sector of California's GHG inventory. CARB further acknowledges that decisions about how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors.

CARB is required to update the Scoping Plan at least once every 5 years to evaluate progress and develop future inventories that may guide this process. CARB approved *First Update to the Climate Change Scoping Plan: Building on the Framework* in June 2014 (CARB, 2014). The Scoping Plan update

[1] For more detail, please see https://ww2.arb.ca.gov/ghg-2020-limit and https://ww2.arb.ca.gov/ghg-inventory-graphs.

includes a status of the 2008 Scoping Plan measures and other federal, state, and local efforts to reduce GHG emissions in California, and potential actions to further reduce GHG emissions by 2020.

In November 2017, CARB released the 2017 Climate Change Scoping Plan, which establishes a framework of action for California to reduce statewide emissions by 40 percent by 2030, compared to 1990 levels (CARB, 2017b). The 2017 Scoping Plan builds upon the framework established by the 2008 Scoping Plan and the 2014 Scoping Plan Update, while also identifying new, technologically feasible and cost-effective strategies to ensure that California meets its GHG reduction targets.

6.2.6 Executive Order S-1-07

EO S-1-07, which was signed by then California governor Arnold Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, at more than 40 percent of statewide emissions. EO S-1-07 establishes a goal that the carbon intensity of transportation fuels sold in California should be reduced by a minimum of 10 percent by 2020. CARB adopted the low carbon fuel standard (LCFS) on April 23, 2009. In November 2015, the Office of Administrative Law approved re-adoption of the LCFS.

6.2.7 Executive Order B-30-15

In April 2015, Governor Edmund Brown issued an EO establishing a statewide GHG reduction goal of 40 percent below 1990 levels by 2030. The emission reduction target acts as an interim goal between the AB 32 goal (i.e., achieve 1990 emission levels by 2020) and Governor Brown's EO S-03-05 goal of reducing statewide emissions 80 percent below 1990 levels by 2050. In addition, the EO aligns California's 2030 GHG reduction goal with the European Union's reduction target (i.e., 40 percent below 1990 levels by 2030) that was adopted in October 2014.

6.2.8 Senate Bill 350

California's Renewables Portfolio Standard (RPS) was established in 2002 under SB 1078 and accelerated in 2006 under SB 107, by requiring that 20 percent of electricity retail sales be served by renewable energy sources by 2010. Subsequent recommendations in California energy policy reports advocated a goal of 33 percent by 2020, and on November 17, 2008, then governor Arnold Schwarzenegger signed EO S-14-08 requiring retail sellers of electricity to serve 33 percent of their load with renewable energy by 2020. In April 2011, SB X1-2 codified EO S-14-08, setting the new RPS targets at 20 percent by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020 for all electricity retailers. In October 2015, Governor Edmund Brown signed SB 350, which extended the RPS target by requiring retail sellers to procure 50 percent of their electricity from renewable energy resources by 2030. This was followed by SB 100 in 2018, which further increased the RPS target to 60 percent by 2030 along with the requirement that all of the state's electricity come from carbon-free resources by 2045.

6.3 REGIONAL AND LOCAL STANDARDS

CARB acknowledges that local governments have broad influence and, in some cases, exclusive jurisdiction over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations.

6.3.1 Southern California Association of Governments

On September 23, 2020, the SCAG adopted Connect SoCal, the 2020-2045 Regional Transportation Plan/Sustainable Communities Strategies. As a plan with the goal of accelerating the region's progress toward transportation and GHG reduction targets, programs within the Regional Transportation Plan/Sustainable Communities Strategy(RTP/SCS) focus on shifting travel to active transportation modes, expanding the transit network, and efficient movement of goods (SCAG, 2020a).

6.3.2 City of Irvine

On July 9, 2020, City Council voted to develop a City Climate Action Plan. The Climate Action Plan has not been prepared at the time of this analysis.

7 EMISSION ESTIMATES METHODOLOGY

Construction-related and operational activities associated with the Project will include emissions-generating sources. These emissions were estimated in accordance with SCAQMD and CARB guidelines, and as detailed below for construction and operations. Maximum potential emissions for construction and operations were each compared to the SCAQMD's thresholds of significance. The regional thresholds of significance were designed to identify those projects that would result in significant levels of air pollution and to assist the region in attaining the applicable state and federal ambient air quality standards, which were established using health-based criteria to protect the public with a margin of safety from adverse health impacts due to exposure to air pollution. Because regional air quality standards have been established for these criteria pollutants to protect the public with a margin of safety from adverse health impacts due to exposure to air pollution, these thresholds of significance can also be used to assess the Project's emissions and inform the Project's impacts to regional air quality and health risks under CEQA. The SCAQMD's thresholds of significance are shown in Table 9.1-1 in this memo. In addition, the SCAQMD has established localized thresholds of significance.

Project-related criteria air pollutant emissions may have the potential to exceed the CAAQS and NAAQS in the area surrounding the Project Site, even though these pollutant emissions may not be significant enough to create a regional impact to the SCAB. In order to assess local air quality impacts, the SCAQMD has developed Localized Significance Thresholds (LSTs) and supporting LST Methodology to assess the Project-related emissions in the project vicinity (SCAQMD, 2008a). The LST Methodology found that the primary emissions of concern are NO_2, CO, PM_{10}, and $PM_{2.5}$.

The LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standards and are developed based on the ambient concentrations of that pollutant for each source receptor area. Since the LSTs consider the ambient air quality, LSTs can also be used to identify those projects that would result in significant levels of air pollution and impact sensitive receptors.

The LST Methodology provides Look-Up Tables with different thresholds based on the location and size of the project site and distance to the nearest sensitive receptors. The Look-Up Tables provide thresholds for 1, 2, and 5-acre projects sites. Since the Project Site is approximately 21.3 acres, the 5-acre project site threshold was utilized in order to provide a conservative analysis for CO and PM_{10} emissions. Since the region is in nonattainment for ozone and $PM_{2.5}$ and the Project Site is larger than 5 acres, consistent with SCAQMD guidance, project-specific localized dispersion modeling was performed for NO_2 (an ozone precursor) and $PM_{2.5}$. The Project Site is located within Source Receptor Area 19, Saddleback Valley.

As described previously, the nearest sensitive receptors are the residences in the senior housing community located approximately 650 feet (200 meters) north of the Project Site. As such, the applicable LST for PM_{10} was determined assuming a receptor distance of 200 meters. In addition, since it is reasonable to assume that offsite workers located at the nursery to the west of the Project Site and buildings along Technology Drive could be present for periods of one to eight hours, the LST analysis was also performed for these worker receptors for pollutants with shorter averaging times, such as CO. The LST for CO was based on a 5-acre Project Site and 25-meter receptor distance. Since Project-specific localized dispersion modeling was performed for NO_2 and $PM_{2.5}$, the LSTs were based on the SCAQMD ambient air quality thresholds for these criteria pollutants. The applicable LSTs are summarized in Table 9.1-2in this memo.

7.1 CONSTRUCTION

Construction-related activities are temporary, short-term sources of emissions. Sources of construction-related criteria air pollutant and GHG emissions include construction equipment exhaust; construction-related trips by workers, delivery and hauling truck trips; fugitive dust from site preparation activities; and off-gassing from traffic coating and paving activities.

Construction of Phase 1 was assumed to begin in 2023 and last approximately 30 months. Construction of Phase 2 is anticipated to begin in 2025 and last approximately 23 months. Emissions generated by construction activities were modeled using emission factors from the CARB's OFFROAD 2017[2] and

[2] *OFFROAD2017 is CARB's emissions inventory database for off-road diesel engines, used to quantify the amount of pollutants from thousands of engines in equipment used in industrial applications, agriculture, construction, mining, oil drilling, power generation, and many other industries. OFFROAD2017 was used to generate emission factors for the different types of equipment anticipated to be used by the project. To develop the emission factors associated with each piece of off-road construction equipment that would be needed for the project, OFFROAD2017 was first used to generate an emissions inventory for Orange County. Equipment was aggregated to include all model years. This approach allows for the identification of typical characteristics for off-road vehicle equipment in Orange County (since the specific fleet that would be used for the project is unknown). The emissions inventory provided the total pollutant emissions (in tons per day) and equipment activity in Orange*

EMFAC 2017[3] inventory models. Construction emissions from the operation of diesel-fueled off-road equipment were estimated by multiplying construction equipment usage information by the equipment-specific emissions factors, based on aggregate model years and horsepower provided in OFFROAD. Construction equipment usage was provided by the Project engineers and include a range of equipment including, but not limited to, backhoes, concrete saws, dump trucks, excavators, generators, graders, rubber tired dozers, and electric/pneumatic equipment such as nail guns and power wrenches. Additional details on equipment types, counts, and estimated usage per day by construction phase are available in Appendix A.

Emissions from on-site and off-site on-road motor vehicles were estimated using vehicle trips, vehicle miles travelled (VMT), and EMFAC 2017 mobile source emission factors. The emission factors represent the fleet-wide average emission factors in Orange County. On-road emissions estimates also considered PM from break wear, tire wear, and re-entrained roadway dust. On-road motor vehicle usage was based on construction crew size and estimated number of haul truck trips provided by the Project engineers. The construction crew size ranged from approximately 10 to 57 workers per day depending on the individual construction subphases. It was assumed each construction worker would travel to and from the site each day (two one-way trips) and each trip length was assumed to be 14.7 miles based on the California Emissions Estimator Model (CalEEMod) default trip length for workers in Orange County. The analysis also assumed approximately 120,000 cubic yards (CY) of material import would be required, resulting in 7,500 loaded truck trips, during the earthwork subphase during construction of Phase 1. Material import truck trip lengths were assumed to be 20 miles based on the CalEEMod default for haul trucks. In addition, the analysis accounted for concrete truck deliveries based on the anticipated concrete needs as identified by the Project engineers and an assumed concrete truck capacity of 9 CY. The analysis assumed 163 and 204 concrete trucks trips would be required during construction of Phase 1 and Phase 2, respectively. Concrete truck trip lengths were assumed to be 6.9 miles based on the CalEEMod default trip length for vendor trips. Additionally, the analysis assumed three delivery options for track material (i.e., rail, turnouts, ballast, and other track materials) deliveries. One option for delivery of these materials is delivery by haul trucks. It is estimated that approximately 1,224 and 333 truckloads of material would be required during construction of Phase 1 and Phase 2, respectively. The other option includes the use of two welded rail trains. Based on information provided by the Project engineers, the analysis assumed the flash butt welding machine is electric-powered and available in truck-design which was assumed to have a 599-horsepower diesel engine and require two full days of operation. The third material delivery option includes delivery by rail car. The analysis assumed one hour of train travel within the SCAB to deliver materials to the Project Site and an additional hour of idling to

County (in annual horsepower-hours (hp-hrs). Total daily pollutant emissions were then multiplied by 365 (to convert to tons per year), converted to grams, and then divided by total hp-hrs to derive an emissions rate in terms of grams per horsepower hour (g/hp-hr) for each vehicle classification and horsepower bin (e.g., 100 hp to 175 hp). To estimate the total daily mass of criteria air pollutant emissions from a piece of off-road construction equipment, the equipment's emissions factor (g/hp-hr) for each pollutant was multiplied by the equipment's horsepower, engine load factor, and maximum daily runtime hours. To estimate total mass emissions over the duration of construction, the daily mass emissions were multiplied by the maximum duration of use (days).

[3] The EMFAC 2017 factors, as applicable to vehicle categories, were adjusted off-model to account for the impacts of the "Safer Affordable Fuel-Efficient Vehicles Rule Part One: One National Program" adopted by the USEPA and the National Highway Traffic Safety Administration.

unload materials. It was assumed that the local work train delivering the materials would be a Tier-4 locomotive. Additional details regarding trip counts, trip lengths, and phasing are available in Appendix A.

Fugitive dust emissions were estimated using the U.S. EPA Compilation of Air Pollutant Factors (AP 42) and CalEEMod methodology for activities including material loading into haul trucks, vehicle miles traveled, earthwork quantities and activities including graders, scrapers, and dozers leveling land or moving dirt. Fugitive dust emission estimates of PM_{10} and $PM_{2.5}$ include reductions associated with implementation of fugitive dust control practices per SCAQMD Rule 403 (e.g., watering disturbed surface areas at least twice per day). Additional details are available in Appendix A.

The analysis also estimated VOC emissions associated with architectural coatings of the buildings and painting of stripes, handicap symbols, directional arrows, and car space descriptions in parking lots using CalEEMod version 2016.3.2 methodology and the anticipated building and parking lot square footages. The analysis also estimated off-gassing emissions associated with asphalt paving of the parking lot and paved access road using CalEEMod methodology. Additional details are available in Appendix A.

7.2 OPERATIONS

After construction of the Project, operations would generate long-term emissions of criteria air pollutants and GHGs from a variety of sources. Emissions generated by operational activities were modeled for locomotive operations, heavy-duty equipment used on-site (such as cranes and forklifts), emergency generator operations, sand silo refilling and use, fuel tank emissions, natural gas consumption, and on-road vehicle travel for worker, delivery, and haul trips to and from the Project Site. Indirect emissions were also modeled for indirect sources associated with electricity use, water demand, and waste generation. Operation of Phase 1 was assumed to begin in 2026 and emission factors used were based on anticipated equipment and vehicle fleets for this earliest possible operational year.

Locomotive emissions were estimated for on-site activity, which would include idling during service and inspection activities as well travel through the wash bay. Diesel locomotive engine power is controlled by “notched” throttles. Idling, braking, and moving the locomotive is conducted by placing the throttle in one of several available “notch” settings. A locomotive’s duty cycle is a description of how much, on average, the locomotive spends in each notch setting while operating. Emission factors for calculations were based on EPA’s 2009 Emission Factors for Locomotives Technical Highlights (EPA-240-F-09-025) and the conversion factors for CH_4 and N_2O from EPA’s 2018 Emission Factors for Greenhouse Gas Inventories guide. Emission standards are defined per unit of activity (in grams per horsepower-hour) for both Tier 2 and Tier 4 engines that would be serviced by the Project. Based on information provided by OCTA, the current fleet mix includes approximately 27 percent Tier 2 engines and approximately 73 percent Tier 4 engines. Per information provided by OCTA, it is anticipated that all locomotives would be Tier 4 by 2028. Since the first operational year of Phase 1 is anticipated to be 2026, the analysis assumed the fleet mix would be 8 percent Tier 2 and 92 percent Tier 4 locomotives by 2026 (using a linear conversion schedule based on the existing fleet mix and future 100 percent Tier 4 fleet). Emissions were estimated using the estimated on-site idling and operational time per train per day during service

at the Project Site. To estimate annual GHG emissions, daily emissions were annualized assuming 365 operating days per year. Additional details are available in Appendix A.

Train fueling and sanding would also occur on the Project Site. Fuel would be stored in four aboveground storage tanks with 30,000-gallon capacity and one aboveground storage tank with a 10,000-gallon capacity. Fugitive emissions associated with fueling were estimated using TankESP modeling software, based on the projected fuel daily throughput of approximately 13,000 gallons per day. Fugitive dust emissions associated with the sand silos were also estimated. The sand silos are used to store and distribute sand to locomotives as needed. Sand is used to provide traction and prevent wheel slip when moving locomotives. Sand throughput for the Project was estimated based on the throughput for a reference project (Los Angeles Commerce Railyard Maintenance Facility) and scaled based on facility operations. Emissions were estimated using EPA AP 42 Table 11.12-2 methodology. Additional details are available in Appendix A.

Emissions from the operation of diesel-fueled off-road yard equipment were estimated using emission factors from CARB's OFFROAD 2017 emissions database. Emissions were estimated by multiplying estimated daily equipment usage information (the number of each equipment type and hours of daily use) by the equipment-specific emissions factors, based on aggregate model years and horsepower provided in OFFROAD 2017. It was assumed the yard equipment would include four cranes and four forklifts. Emissions associated with limited testing and use of the on-site backup generator were also estimated and accounted for using emission factors and load factor from CalEEMod, and assuming up to 50 hours of use per year. On-road vehicle emissions were modeled using emission factors from the CARB EMFAC 2017[4] emissions inventory database. Emissions from on-road motor vehicles were estimated using vehicle trips per day, estimated trip distances, and EMFAC 2017 mobile source emission factors specific to the range of vehicle categories serving the Project for worker trips, delivery trips (including sand and fuel deliveries), and haul trips. The emission factors represent the fleet-wide average emission factors in Orange County for each vehicle category. On-road emissions estimates also considered particulate matter from break wear, tire wear, and re-entrained roadway dust. Re-entrained roadway dust emissions were estimated using the AP 42 Section 13.2.1 methodology for paved roads. Based on information provided by OCTA, the analysis assumed 40 workers would travel to and from the site each day and that 10 delivery haul trucks and 2 fuel trucks would travel to and from the site to represent a maximum daily emissions scenario. Additional details are available in Appendix A.

The Project would not result in an increase in commuter rail service or additional locomotive train travel in the region. Therefore, regional emissions associated with in-transit locomotive operations were assumed to remain like existing conditions. However, as described in more detail in Section 8.0 below, for the purposes of localized emissions and health risk assessment, emissions associated with on-site idling and train travel within one mile of the proposed Project Site were estimated. As described in Section 2, a maintenance facility located along the Metrolink route through Orange County, such as the

[4] The EMFAC 2017 factors, as applicable to vehicle categories, were adjusted off-model to account for the impacts of the "Safer Affordable Fuel-Efficient Vehicles Rule Part One: One National Program" adopted by the USEPA and the National Highway Traffic Safety Administration.

Project, would be the optimal location as it would reduce operating costs by limiting non-revenue moves to the existing SCRRA storage and maintenance facilities in the cities of Los Angeles and San Bernardino. The Project would provide equipment to inspect, clean, and maintain cars and locomotives on a regular and efficient basis. The storage and maintenance activities that would occur operationally at this facility would be a shift in these operations from the existing storage and maintenance facilities to the proposed Project Site. As such, due to the optimal location of the proposed Project Site, the Project is also anticipated to result in reduced locomotive travel in the region and a reduction in the emissions associated with locomotive and rail car travel in the region. It is also anticipated that total regional emissions associated with train idling would decrease at the existing maintenance facilities due to more efficient operations and logistics.

Natural gas would be consumed by on-site building operations. Monthly forecasted natural gas use for the facility was based upon default CalEEMod data for a general office building, and adjusted for the size of the proposed facility; this land use was selected as the most conservative assumption for units of natural gas consumption per 1,000 square feet of land use.

Indirect emissions associated with electricity generation, water use and waste disposal were calculated to estimate GHG emissions. Emission factors for electricity use were based on the utility-specific data for Southern California Edison (the electricity provider) and EPA eGrid data. Although GHG emissions associated with electricity production are anticipated to decline over time due to state regulations and the Renewables Portfolio Standards, emissions were estimated using the most current (2018) emissions factors which is estimated to be approximately 474 pounds per megawatt-hour. Monthly forecasted electricity use for the facility was based upon default CalEEMod data for a general office building and adjusted for the size of the proposed facility; this land use was selected as the most conservative assumption for units of electricity consumption per 1,000 square feet of land use. Estimated waste generation and emission factors for waste disposal were based upon default emissions factors available from the CalEEMod emissions estimating tool for Climate Zone 8. Water demand associated with train washes was estimated for the Project, and typical operational water demand for building operations was added to this using water demand estimates from CalEEMod for a general office building; this land use was selected as the most conservative assumption for units of water demand per 1,000 square feet of land use. Electricity demand associated with water supply, treatment and disposal were based on CalEEMod default data inputs. Using the same emission factors as previously described for Southern California Edison electricity, the indirect emissions associated with water demand were estimated using the Project specific water usage estimates and CalEEMod estimates of electricity consumption per gallon of water use. Additional details are available in Appendix A.

Consistent with CalEEMod methodology, emissions associated with periodic architectural coatings were also accounted for in the operational emissions estimates. The analysis assumed up to 10 percent of building and parking surface areas are repainted annually.

8 HEALTH RISK ASSESSMENT METHODOLOGY

8.1 DISPERSION MODELING

The American Meteorological Society/U.S. EPA Regulatory Model (AERMOD) dispersion model (Version 19191) (EPA, 2019b) was used to estimate pollutant concentrations at specific distances from Project emission sources, in conjunction with representative meteorological data from nearby John Wayne International Airport. AERMOD was applied with the regulatory default options and the urban modeling option (dispersion coefficients) with a population of 3,010,323 (Orange County), consistent with SCAQMD modeling guidance (SCAQMD, 2021a). Information regarding other model inputs are provided in the following sections.

8.1.1 Meteorological Data

AERMOD requires a sequential hourly record of dispersion meteorology representative of the region within which the Project would be located. AERMOD was supplied with 5 years (2012 to 2016) of hourly meteorological data consisting of surface observations from the John Wayne International Airport meteorological station in Santa Ana, the nearest station to the Project Site. Upper air data for this 5-year period was from San Diego, California. SCAQMD provides AERMOD-ready meteorological files on their website (SCAQMD, 2021b) to use for HRAs. This meteorological dataset was processed with the regulatory-approved low wind option (adjusted u-star). A wind rose of the 5 years of data is shown in Figure 8.1-1. The wind rose indicates that the predominant wind direction is onshore, from the southwest.

John Wayne International Airport is located approximately 6.2 miles west from the Project Site. An inspection of aerial imagery and topographic maps indicates there are no significant elevated terrain features between the two sites. Both sites are located at similar distances from the coastline and have higher terrain to the north and east. Therefore, the John Wayne International Airport data is the most representative meteorological dataset available for dispersion modeling.

8.1.2 Terrain and Receptor Data Processing

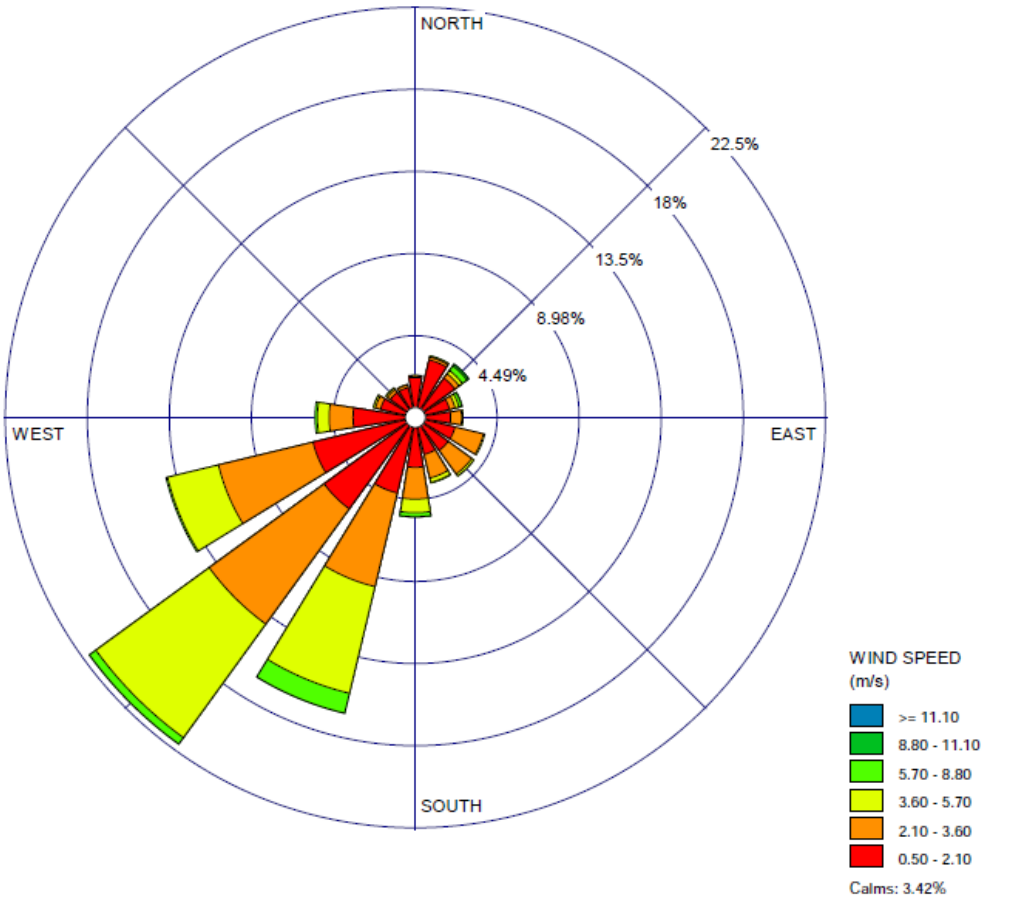
Terrain elevations were obtained from commercially available digital terrain elevations in the National Elevation Dataset (NED) developed by the U.S. Geological Survey (USGS, 2021). The NED data provide terrain elevations with 1-meter vertical resolution and 10-meter (1/3 arc-second) horizontal resolution based on a Universal Transverse Mercator (UTM) coordinate system. The U.S. Geological Survey specifies coordinates in North American Datum 83, UTM Zone 11. EPA's terrain pre-processor, AERMAP (Version 18081), was used to process the NED data and assign elevations to the receptor locations and sources.

As shown in Figure 8.1-2, construction-related pollutant concentrations were estimated for nearby receptors located within 1,000 feet of the Project and 500 feet on either side of roadways to account for Project-related traffic. Receptor spacing within 1,000 feet of the Project and 500 feet of roadways are set at 20-meter intervals. Pollutant concentrations for operations were estimated for nearby receptors

located within 1¼ miles of the Project Site. Figure 8.1-3 shows a map of the nested receptor grid used in assessing impacts from operations. The nested receptor grid used the following interval spacing:

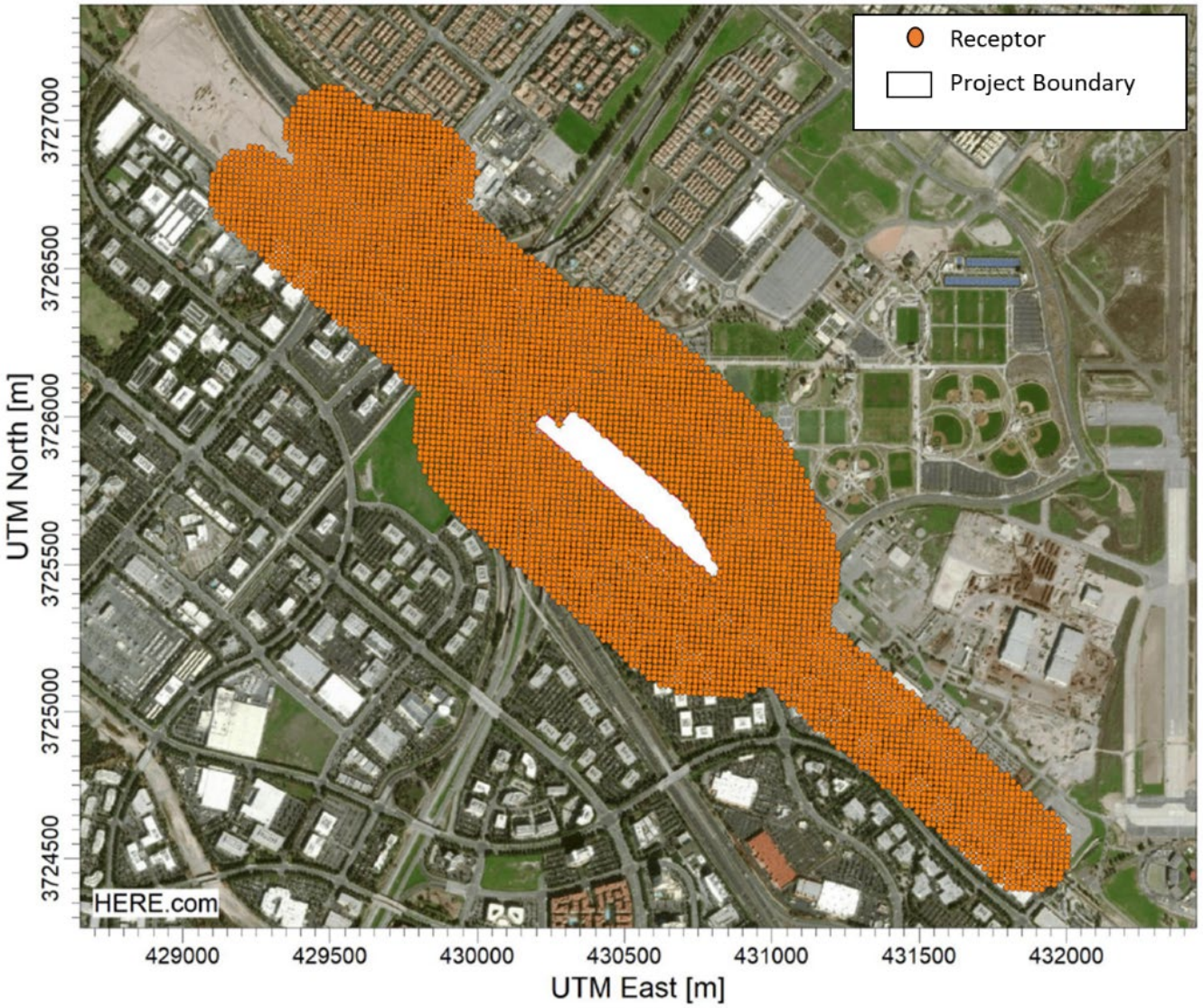
- Receptors within 500 meters of the Project boundary are spaced 20-meters apart,
- Receptors located between 500 meters and 970 meters are at 50-meter intervals, and
- Receptors beyond 970 meters to 1 ¼ mile are spaced 100 meters apart.

Figure 8.1-8.1-1 Wind Rose for John Wayne International Airport 2012-2016



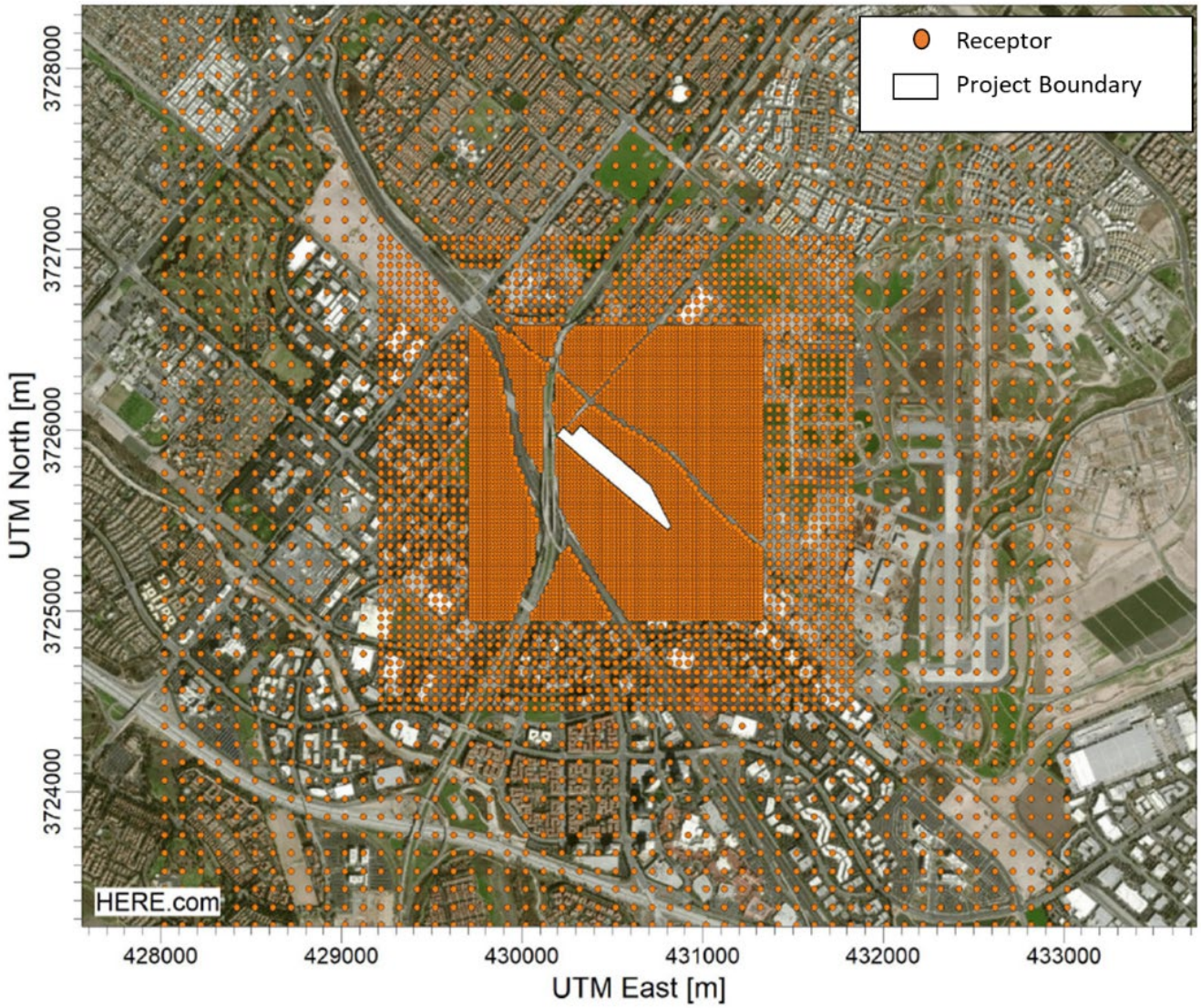
Source: OCTA (2021)

Figure 8.1-8.1-2 HRA Receptor Locations for Construction Impact Analysis



Source: OCTA (2021)

Figure 8.1-8.1-3 HRA Receptor Locations for Operational Impact Analysis



Source: OCTA (2021)

8.1.3 Construction Sources

Off-road construction equipment utilized for on-site Project activities were modeled as multiple adjacent volume sources over the areas of construction-related activity. The locations of the volume sources vary by construction phase (Phase 1 and Phase 2). Phase 1 consists of construction activities in 2023 through first half of 2025. Phase 2 involves construction from July 2025 through June 2027. To account for potential turbulent mixing that can occur with engine exhaust from construction equipment, an initial vertical dimension of 1.4 meters for each volume source was used. Table 8.1-1 lists the volume source parameters used for construction-related activities, consistent with SCAQMD guidance (SCAQMD, 2008a).

Table 8.1-8.1-1 SCAQMD Adjacent Volume Source Parameters

Parameter	Adjacent Volume Sources
Release Height (m)	5.0
Lateral Dimension (m)[1]	20 by 20
Initial Vertical Height (m)	1.4

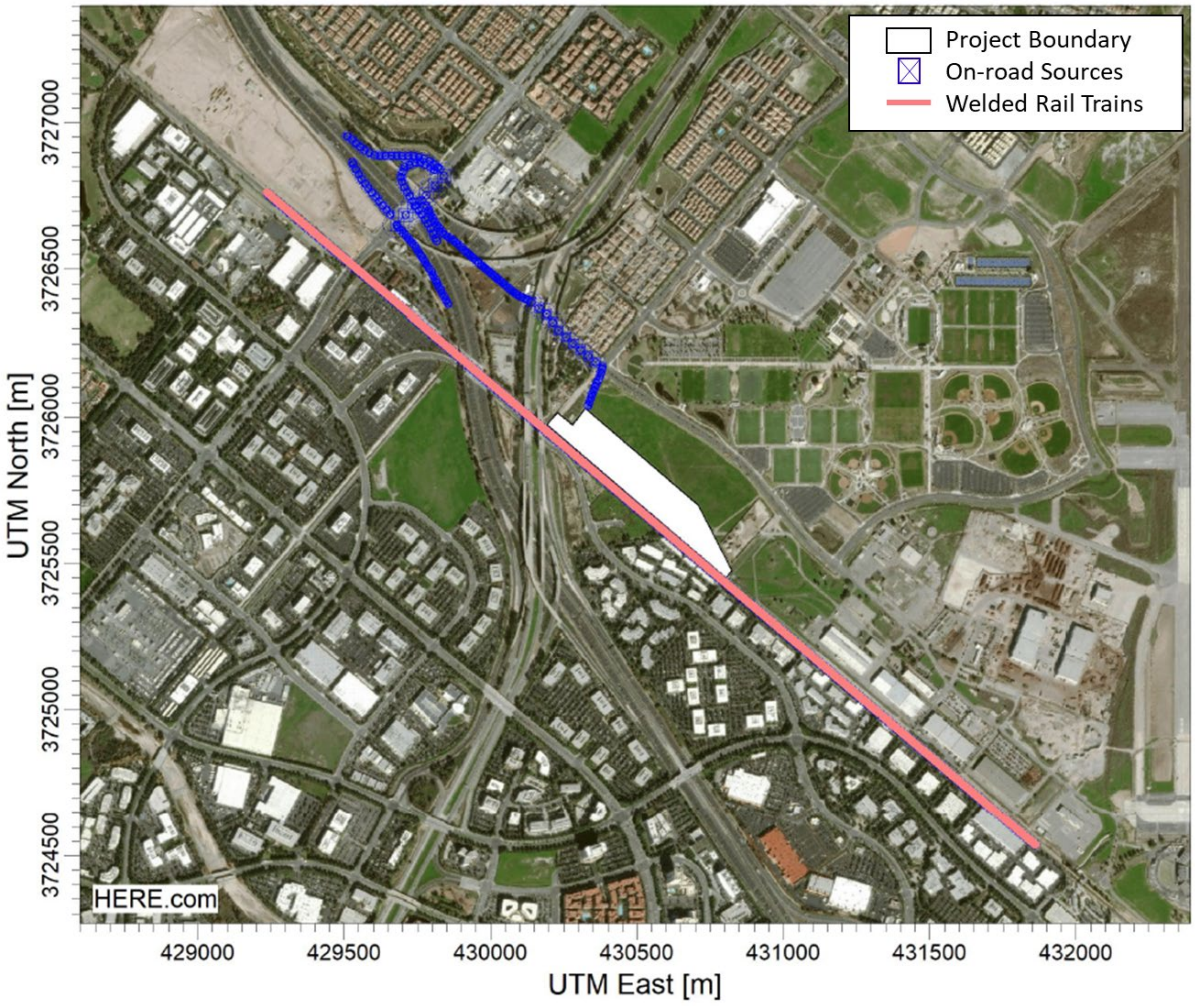
Notes: m = meters.
[1] For projects areas ≥ 5 acres.
Source: SCAQMD 2008a

On-road emissions from construction worker vehicles, haul trucks, material delivery trucks, and Project-related work trucks traveling to and from the Project Site were modeled as adjacent volume sources. The release height of these sources was set to 2 meters and the initial vertical dimension was set to 2.3 meters. The initial lateral dimensions vary depending on roadway width. All construction-related traffic would access the Project Site from Marine Way. As shown in Figure 8.1-4, traffic was modeled from the intersection of Marine Way and Ridge Valley to the on/off ramps of I-5 (with access from Sand Canyon Avenue). On-road traffic within 4,000 feet of the Project Site was included in the model. Modeling parameters for the area and roadway sources are summarized in Appendix B.

As discussed in Section 7.1, track materials delivered on site may arrive by two welded rail trains. These emission sources were modeled as adjacent volume sources along the existing rail line located adjacent to the southern boundary of the Project Site. The volume sources extended out approximately 4,000 feet in either direction from the Project Site. Figure 8.1-4 illustrates the segments of track included in the model for the welded rail trains. A release height of 5 meters and an initial vertical dimension of 1.40 meters were used, based on similar analyses (SJRRC, 2018) for rail sources.

Construction would occur Monday through Friday from 7 a.m. to 5 p.m. (2,607 hours per year); therefore, those hours were modeled in AERMOD using the EMISFACT HRDOW keywords to account for these Project-specific weekdays and hours.

Figure 8.1-8.1-4 On-Road/Rail Construction Emission Sources



Source: OCTA (2021)

8.1.4 Operational Sources

Operational emission sources evaluated as part of the HRA include locomotive operations, heavy-duty equipment used on-site (such as cranes and forklifts), fuel tank emissions, emergency generator, sand silos, and on-road vehicle travel to and from the site. Operation of Phase 1 was assumed to begin in July 2025 and operation of Phase 2 was assumed to begin in January 2028 (at the completion of construction of Phase 2).

Locomotive operations (including in-transit and idling) were modeled as adjacent volume sources along each section of track to be built on the site. Phase 1 includes 11 segments of track with Phase 2 adding another 5 segments for a total of 16 segments by 2028. For exhaust parameters, a similar methodology was used to that presented in the HRA conducted for the Central Maintenance Facility (Metrolink, 2014). This methodology included using EPA's SCREEN3 (EPA, 2013) screening-level dispersion model to estimate plume rise for the locomotives for daytime and nighttime hours. Table 8.1-2 summarizes the inputs to

SCREEN3. Based on the results from SCREEN3, separate daytime and nighttime model parameters for the locomotives were used, as listed in Table 8.1-3.

Table 8.1-8.1-2 Inputs to SCREEN3 for Locomotive Plume Rise Calculations

Parameter	Locomotives (Daytime)[4]	Locomotives (Nighttime)[4]
Release Height (m)[1]	4.6	4.6
Stack Diameter (m) [1]	0.666	0.666
Exit Velocity (m/s)[2]	7.03	7.03
Exit Temperature (K)[2]	422.38	422.38
Average Wind Speed (m/s)[3]	3.59	2.47
Average Air Temperature (K)[3]	294.89	290.64
Stability Class[1]	D	F

Notes: m = meters, m/s = meters per second, K = Kelvin
[1] Values obtained from Metrolink HRA (2014)
[2] Weighted average of idling, brake test, and in-transit velocity or temperature presented in Metrolink HRA. Assumed 10 minutes of idling and 1 hour of additional on-site engine operations (locomotive movement, maintenance, and testing) per train per day.
[3] Based on 2012-2016 meteorology from John Wayne International Airport.
[4] Included building information to account for downwash. Height (4.57 m), width (3 m), and length (20 m), consistent with Metrolink HRA.

Table 8.1-8.1-3 Adjacent Volume Source Parameters for Locomotives in AERMOD

Parameter	Daytime	Nighttime
Release Height (m)	10.64	23.76
Lateral Dimension (m)[1]	9.1	9.1
Initial Vertical Height (m)	13.79	10.84

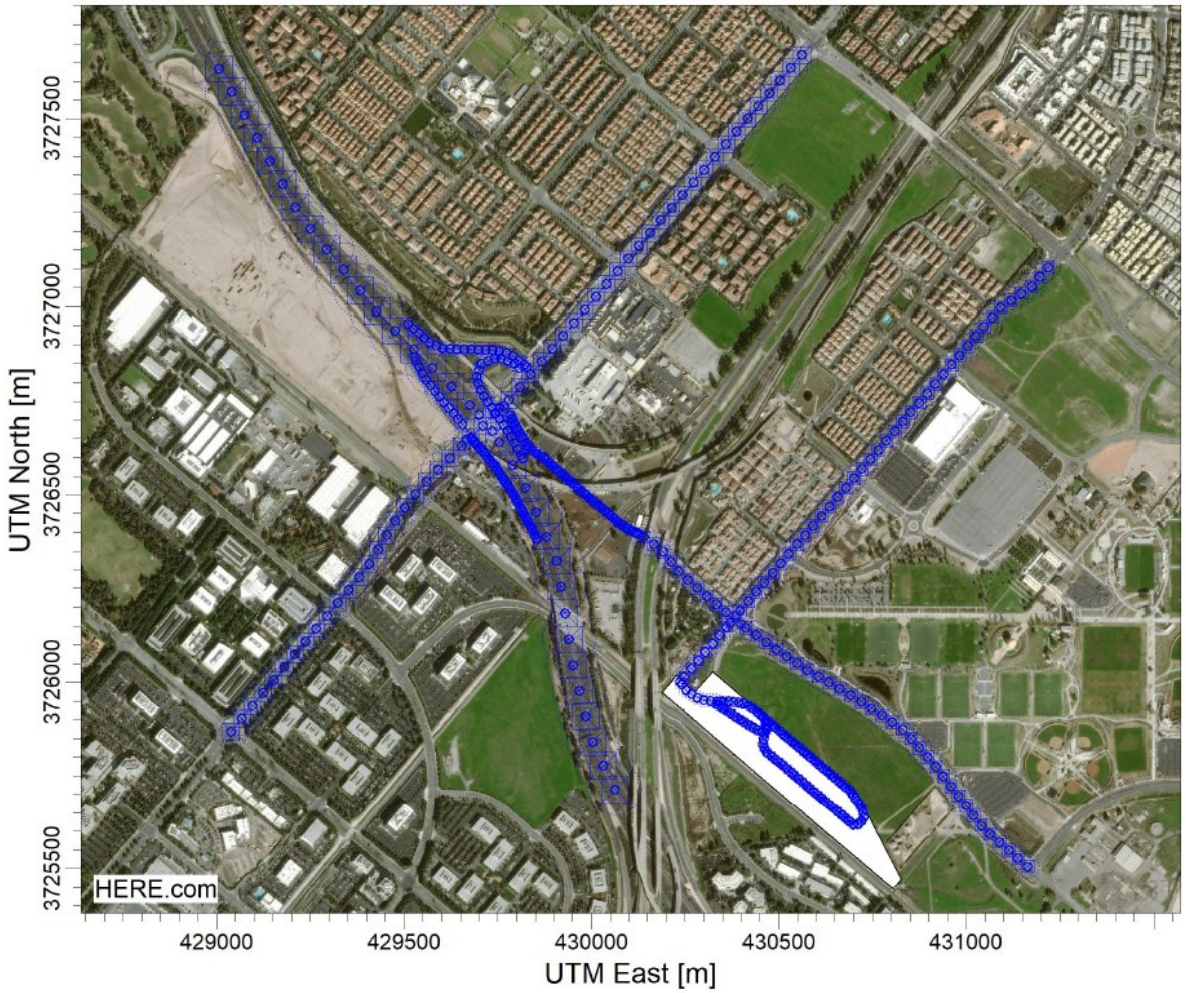
Notes: m = meters.
[1] Width of track (3 m) plus wake zone (6 m) for a total width of 9.1 meters

Daytime locomotive emissions were modeled from 9 a.m. to 6 p.m. with nighttime emissions occurring from 6 p.m. until 9 a.m. Eighty percent of daily emissions were allocated to occur at night and the remaining 20 percent were assumed to occur during the day, given the majority of on-site activity that is anticipated to occur overnight.

In addition to open track areas, on-site train movement and idling would occur for short periods of time in the train wash or the maintenance buildings. Emissions from these locations were modeled as volume sources located at the height of the roof for each building. The parameters for these emissions sources are provided in Appendix B.

On-road emissions from operational vehicles associated with the Project Site were modeled as adjacent volume sources. The release height of these sources was set to 2 meters and the initial vertical dimension was set to 2.3 meters. The initial lateral dimensions vary depending on roadway width. Project-generated on-road traffic up to 6,500 feet of the Project Site was modeled. Fuel and sand deliveries were also accounted for in the on-road emissions. The on-site delivery routes are shown in Figure 8.1-5 with the on-road sources located within the Project Site. Figure 8.1-5 also illustrates the on-road vehicle routes modeled for Project operations (located off site), which aligns with traffic turn data from Figure 4.2-1 of the Traffic Technical Memorandum (AECOM, 2021). The source parameters are summarized in Appendix B.

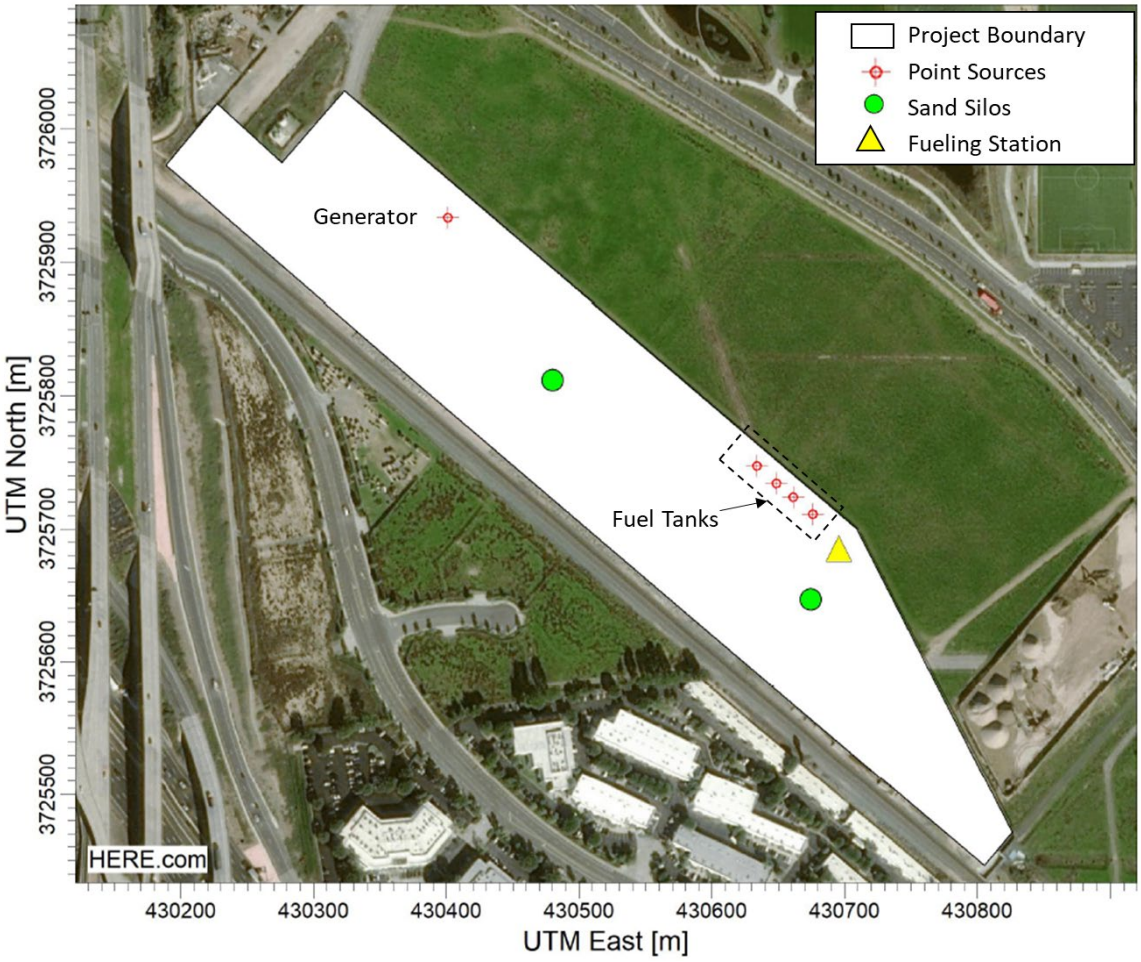
Figure 8.1-8.1-5 On-Road Vehicles Routes for Operations



Source: OCTA (2021)

The on-site generator, sand silos, fuel tanks and dispenser were all modeled as stationary sources as shown in Figure 8.1-6. The generator and fuel tanks were modeled as vertical, uncapped point sources. Tank filling and silos were modeled as individual volume sources. Details on the source parameters for these stationary sources included in the model are provided in Appendix B.

Figure 8.1-8.1-6 Stationary Source Locations for Project Operations



Source: OCTA (2021)
Note: Fuel tanks were modeled both as point sources and as volume sources to account for fueling/spillage.

8.2 HEALTH RISK CHARACTERIZATION AND ESTIMATION

Risk characterization integrates exposure information provided by the dispersion modeling with potential health effects associated with specific TACs. This step provides quantitative estimates of potential health risks associated with TACs to which the potential existing off-site receptors of the Project would be exposed. AERMOD was run using unit emissions. Each source was modeled assuming emissions of 1 gram per second (g/s) for point sources, 1 g/s divided by the number of volume sources in a road segment, or 1 g/s divided by the area source in square meters. The unitized AERMOD results for each source are output in micrograms per cubic meter ($\mu g/m^3$) per g/s [$(\mu g/m^3)(g/s)^{-1}$]. Maximum hourly and period-average plot files generated by AERMOD as described above were input to HARP2 with corresponding TAC emission rates for each phase of construction as well as the Project's operational emissions to calculate the Project's concentration contributions. The HARP2 (Version 21081) (CARB, 2005) model was created by CARB and is used to estimate carcinogenic and noncarcinogenic health risks from proposed projects. The HARP2 model uses the equations and algorithms contained in the Office of Environmental Health Hazard Assessment's

(OEHHA) *Air Toxics Hot Spots Program Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments* (OEHHA 2015 Risk Assessment Guidelines) to calculate health risks based on input parameters such as emissions, "unit" ground-level concentrations, and toxicological data based on the OEHHA 2015 Risk Assessment Guidelines. These concentrations were then used to estimate the long-term effects of TACs on nearby receptors.

The assessment was performed in accordance with the OEHHA 2015 Risk Assessment Guidelines, CAPCOA Guidance Document: Health Risk Assessments for Proposed Land Use Projects (CAPCOA, 2009), and SCAQMD guidance (Table 9.1-3). Based on the guidance above, the maximum cancer risk associated with the Project's on- and off-site sources was assessed for the following exposure scenarios:

- **MEIR** – Maximally-exposed individual resident (MEIR) based on a 30-year lifetime exposure period. The MEIR assumes an exposure of 24 hours per day, and 350 days per year.
- **MEIW** – Maximally-exposed individual worker (MEIW) based on a 25-year lifetime exposure period. The MEIW assumes an exposure of 8 hours per day, and 245 days per year and a starting age of 16 years.
- **Recreational** – Considering the proximity to recreational facilities, a maximally-exposed individual located at a recreational site (outdoor fields, running/walking paths, training facility, park, etc.) based on a 40-year lifetime exposure. An exposure of 2 hours per day for 245 days and an elevated breathing rate of 1,097 liters per kilogram per day (L/kg/day) were assumed.

Table 8.2-1 summarizes the HARP2 options selected for the HRA.

Table 8.2-1 Summary of HARP2 Options

Option	Cancer – Resident	Cancer – Worker	Cancer – Recreation
Exposure Duration	30 years	25 years	40 years
Exposure Frequency (hours/day, days/year)	24, 350	8, 245	2, 245
Start Age	3rd Trimester	16 years	0 years
Method	RMP using Derived Method	OEHHA Derived Method	RMP using Derived Method

In addition to cancer risk, non-cancer chronic (long-term) and acute (short-term) exposure to TACs were assessed. Since only diesel PM was assessed for the construction modeling, only cancer and chronic risk were evaluated for construction emissions.

8.3 CRITERIA AIR POLLUTANTS LOCALIZED DISPERSION MODELING METHODOLOGY

As shown in Section 10.1 below, construction and operational-related activities would result in emissions of criteria air pollutants, but at levels that would not exceed the SCAQMD localized thresholds of significance. However, considering that the region is in nonattainment for ozone and $PM_{2.5}$ and since the Project Site is larger than 5 acres (mass-rate LSTs developed by SCAQMD are for project sites up to 5 acres, as detailed in Section 7 and presented in Table 9.1-2), criteria pollutant modelling specific to the Project was performed to determine localized impacts for NO_2 (an ozone precursor) and $PM_{2.5}$.

NO_2 and $PM_{2.5}$ emissions were provided as inputs to AERMOD for all project-related operational sources. Similar to the TAC analysis, there were two phases of operations: Phase 1 (2025-2027) and Phase 2 (2028). The model output was then compared against the applicable thresholds listed in Table 9.1-2 below.

9 THRESHOLDS OF SIGNIFICANCE

9.1 AIR QUALITY

Table 9.1-9.1-1 SCAQMD Regional Thresholds of Significance

Pollutant	Daily Emissions lbs/day (Construction)	Daily Emissions lbs/day (Operation)
NO_X	100	55
PM_{10}	150	150
$PM_{2.5}$	55	55
CO	550	550
VOC	75	55
SO_X	150	150
Lead[1]	3	3

Notes: NO_X = nitrogen oxides; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; VOC = volatile organic compounds; SO_X = sulfur oxides; lbs/day = pounds per day.

[1] This analysis does not directly evaluate lead because little to no quantifiable and foreseeable emissions of these substances would be generated by the Project. Lead emissions have significantly decreased due to the near elimination of leaded fuel use.

Source: SCAQMD 2019

Table 9.1-9.1-2: SCAQMD Localized Thresholds

Threshold [1]	NO_X	CO	PM_{10}	$PM_{2.5}$
Mass-Rate Look Up Tables for LSTs for a 5-Acre Project Site Construction (lbs/day)	197	1,804	74	30
Mass-Rate Look Up Tables for LSTs for a 5-Acre Project Site Operations (lbs/day)	197	1,804	18	8
Operational Ambient Air Quality Standards for Criteria Pollutants	0.18 ppm(338.4 µg/m^3) 0.03 ppm (56.4 µg/m^3)	20 ppm	2.5 µg/m^3	2.5 µg/m^3

Notes: LST = localized significance threshold; NO_X = nitrogen oxides; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; lbs/day = pounds per day; ppm = parts per million; µg/m^3 = micrograms per cubic meter.

[1] The mass-rate LSTs developed by SCAQMD are for a 5-acre project site. As detailed in Section 8.3 above, due to the region's nonattainment status for ozone and PM2.5 and the Project Site size, criteria pollutant modeling was performed for NO_2 (an ozone precursor) and $PM_{2.5}$.

Source: SCAQMD 2008a, 2019

Table 9.1-9.1-3 SCAQMD Health Risk Assessment Thresholds

TACs	Threshold
Maximum Incremental Cancer Risk	10 in 1 million
Chronic & Acute Hazard Index	1.0

Notes: TAC = toxic air contaminant
Source: SCAQMD 2019

9.2 GREENHOUSE GAS EMISSIONS

The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; however, no single project alone is expected to measurably contribute to a noticeable incremental change in the global average temperature, or to a global, local, or micro climate. Therefore, the geographic scope of consideration for GHG emissions is on a global scale as such emissions contribute, on a cumulative basis, to global climate change. Given the nature of environmental consequences from GHGs and global climate change, CEQA requires that lead agencies evaluate the cumulative impacts of GHGs, even relatively small additions, on a global basis. By their nature, GHG evaluations under CEQA are a cumulative study. (See *Center for Biological Diversity v. California Department of Fish and Wildlife* [2015] 62 Cal.4th 204.)

The CEQA Guidelines encourage but do not require lead agencies to adopt thresholds of significance (CEQA Guidelines, §15064.7). When developing these thresholds, and consistent with the December 2018 CEQA and Climate Change Advisory published by the California Office of Planning and Research (OPR, 2018), the Guidelines allow lead agencies to develop their own significance threshold and/or to consider thresholds of significance adopted or recommended by other public agencies, or recommended by experts, provided that the thresholds are supported by substantial evidence. Individual lead agencies may also undertake a case-by-case approach for the use of significance thresholds for projects consistent with available guidance and current CEQA practice (OPR, 2018).

As the City of Irvine has not established screening thresholds for GHG emissions, the analysis reviewed the applicable significance thresholds developed by the SCAQMD. The SCAQMD has adopted a significance threshold of 10,000 MT of CO_2e per year for industrial (stationary source) projects (SCAQMD, 2008b).

The SCAQMD recommends that construction emissions associated with a project be amortized over the life of the Project (typically assumed to be 30 years). Therefore, this analysis includes a quantification of the total modeled construction-related GHG emissions. Those emissions are then amortized and evaluated over the life of the project (assumed to be 30 years). The Project's type is closest to an industrial project (i.e., doesn't include residential or commercial land uses). The 10,000 MT CO_2e threshold was developed in 2008 and was intended to ensure at least 90 percent of new GHG emissions would be reviewed and assessed for mitigation, thereby contributing to GHG emissions reduction goals of AB 32. However, the Project would begin construction in 2023; thus, construction-related GHG emissions should also be analyzed in the SB 32 statewide framework (which established a 2030 GHG emissions reduction target of 40 percent below 1990 levels). However, the SCAQMD has not adopted a threshold of significance consistent

with SB 32 goals. To provide this additional information to put the Project-generated GHG emissions in the appropriate statewide context, this analysis presumes that a 40 percent reduction in the SCAQMD's existing threshold (resulting in 6,000 MT CO_2e) is necessary to achieve the State's 2030 GHG reduction goal (which is a 40 percent reduction below 1990 GHG emissions levels).

It is not the intent of this CEQA document to cause the adoption of these thresholds as mass emissions limits for this or other projects, but rather to provide this additional information to put the Project-generated GHG emissions in the appropriate statewide context.

10 AIR QUALITY IMPACTS

10.1 CRITERIA AIR POLLUTANTS

10.1.1 Construction Emissions

Tables 10.1-1 and 10.1-2 present the maximum daily emissions associated with Project construction of Phase 1 for comparison to the SCAQMD regional and localized thresholds of significance, respectively.

Table 10.1-10.1-1 Phase 1 Construction-Related Maximum Daily Emissions

Description	VOC	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Phase 1 Maximum Daily Emissions (lbs/day)[1]	38.06	77.07	75.20	0.25	41.47	22.82
SCAQMD Threshold (lbs/day)	75	550	100	100	150	55
Exceeds Threshold?	No	No	No	No	No	No

Notes: VOC = volatile organic compounds; SO_X = sulfur oxides; NO_X = nitrogen oxides; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; lbs/day = pounds per day.

[1] Phase 1 emissions are based on the overlap of subphases per the anticipated construction schedule. Maximum daily emissions for NOx and SOx occur during the overlap of site utilities/electric, earthwork, foundations, bridge, and roadways/paving construction activities. Maximum daily emissions of VOC and CO occur during the overlap of site utilities/electric, foundations, bridge, roadways/paving, and building construction activities. Maximum daily emissions for PM_{10} and $PM_{2.5}$ occur during the overlap of clear and grub, site utilities/electric, demolition, and earthwork construction activities.

Table 10.1-10.1-2 Phase 1 Localized Construction-Related Maximum Daily Emissions

Description	NO_X	CO	PM_{10}	$PM_{2.5}$
Maximum Daily On-Site Emissions (lbs/day)[1]	63.96	69.49	38.63	21.98
SCAQMD Localized Threshold (lbs/day)	197	1,804	74	30
Exceeds Threshold?	No	No	No	No

Notes: NO_X = nitrogen oxides; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; lbs/day = pounds per day.

[1] Maximum daily localized emissions account for on-site activities including off-road equipment use, fugitive dust, and on-site on-road vehicle travel. It was assumed that approximately 7% of the total on-road vehicles would occur on site (estimated portion of vehicle emissions occurring on site compared to the CalEEMod average trip length).

As shown in Tables 10.1-1 and 10.1-2, Phase 1 construction activities would not exceed the SCAQMD regional and localized thresholds of significance. Tables 10.1-3 and 10.1-4 summarize the maximum daily emissions associated with Phase 2 construction for comparison to the SCAQMD regional and localized thresholds of significance, respectively.

Table 10.1-10.1-3 Phase 2 Construction-Related Maximum Daily Emissions

Description	VOC	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Phase 2 Maximum Daily Emissions (lbs/day)[1]	80.36	57.92	45.32	0.12	14.22	8.02
SCAQMD Threshold (lbs/day)	75	550	100	100	150	55
Exceeds Threshold?	**Yes**	No	No	No	No	No

Notes: VOC = volatile organic compounds; SO_X = sulfur oxides; NO_X = nitrogen oxides; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; lbs/day = pounds per day.
[1] Phase 2 emissions are based on the overlap of subphases per the anticipated construction schedule. Maximum daily emissions for all pollutants except PM_{10} and $PM_{2.5}$ occur during the overlap of site utilities/electric, building, trackwork-direct fixation, and major equipment construction activities. Maximum daily emissions for PM_{10} and $PM_{2.5}$ occur during the overlap of site utilities/electric and earthwork construction activities.

Table 10.1-10.1-4 Phase 2 Localized Construction-Related Maximum Daily Emissions

Description	NO_X	CO	PM_{10}	$PM_{2.5}$
Maximum Daily On-Site Emissions (lbs/day)[1]	44.91	51.99	13.32	7.76
SCAQMD Localized Threshold (lbs/day)	197	1,804	74	30
Exceeds Threshold?	No	No	No	No

Notes: NO_X = nitrogen oxides; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; lbs/day = pounds per day.
[1] Maximum daily localized emissions account for on-site activities including off-road equipment use, fugitive dust, and on-site on-road vehicle travel. It was assumed that approximately 7% of the total on-road vehicles would occur on-site (estimated portion of vehicle emissions occurring on-site compared to the CalEEMod average trip length).

As shown in Tables 10.1-3 and 10.1-4, Phase 2 construction activities would not exceed any of the localized thresholds of significance or regional thresholds of significance for any pollutant except VOC. Therefore, this impact would be potentially significant, and mitigation would be required. Project construction of Phase 2 would overlap with Phase 1 operational activities. Therefore, the maximum daily emissions associated with overlapping activities of Phase 1 operations and Phase 2 construction are summarized in Tables 10.1-7 and 10.1-8 below.

10.1.2 Operational Emissions

Tables 10.1-5 and 10.1-6 present the maximum daily emissions associated with Project operations for comparison to the SCAQMD regional and localized thresholds of significance, respectively. As detailed in Section 7.2 of this Technical Memorandum, on-site idling of trains for storage and maintenance purposes

would not result in a regional increase in emissions, as these activities (and related emissions) currently occur at the existing storage and maintenance facilities, and would simply shift these emissions sources to the proposed Project Site. However, these emissions are considered for the purposes of localized emissions impacts in Table 10.1-6.

Table 10.1-10.1-5 Operational Maximum Daily Increase in Regional Emissions

Description	VOC (lbs/day)	CO (lbs/day)	NO_X (lbs/day)	SO_X (lbs/day)	PM_{10} (lbs/day)	$PM_{2.5}$ (lbs/day)
Yard Equipment	0.83	3.48	2.53	0.01	0.11	0.11
Staff and Truck Vehicles	0.06	2.00	1.58	0.02	2.26	0.01
Architectural Coatings	0.13	-	-	-	-	-
Natural Gas Consumption	0.04	0.32	0.39	0.002	0.03	0.03
Train Fueling	0.41	-	-	-	-	-
Sand Silos	-	-	-	-	0.04	0.01
Total Maximum Daily Increase in Regional Emissions	**1.48**	**5.80**	**4.50**	**0.03**	**2.44**	**0.16**
SCAQMD Threshold	55	550	55	100	150	55
Exceeds Threshold?	No	No	No	No	No	No

Notes: VOC = volatile organic compounds; SO_X = sulfur oxides; NO_X = nitrogen oxides; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; lbs/day = pounds per day.

Table 10.1-10.1-6 Localized Operational Maximum Daily Emissions

Description	NO_X (lbs/day)	CO (lbs/day)	PM_{10} (lbs/day)	$PM_{2.5}$ (lbs/day)
On-Site Locomotive Operations (Maintenance and Testing)	98.30	101.85	1.98	1.92
Yard Equipment	2.53	3.48	0.11	0.11
Staff and Truck Vehicles[1]	0.11	0.14	0.16	<0.01
Natural Gas Consumption	0.39	0.32	0.03	0.03
Sand Silos	-	-	0.04	0.01
Total Maximum Daily Localized Emissions (lbs/day)	**101.34**	**105.80**	**2.32**	**2.07**
SCAQMD Localized Threshold	197	1,804	18	8
Exceeds Threshold?	No	No	No	No

Notes: NO_X = nitrogen oxides; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; lbs/day = pounds per day.

[1] Maximum daily localized emissions account for on-site activities including on-site locomotive operations, on-site off-road equipment use (e.g., forklifts, cranes), and on-road vehicle travel. It was assumed that approximately 7% of the total on-road vehicles would occur on site (estimated portion of vehicle emissions occurring on site compared to the CalEEMod average trip length).

As shown in Tables 10.1-5 and 10.1-6, Project operational emissions would not exceed the SCAQMD regional and localized thresholds of significance. As described previously, since construction of Phase 2 may overlap with operation of Phase 1, the overlapping emissions are summarized in Tables 10.1-7 and 10.1-8. Consistent with SCAQMD guidance, these overlapping emissions are compared to the SCAQMD thresholds of significance applicable to operations. As explained previously, on-site idling of trains for storage and maintenance purposes would not result in a regional increase in emissions, as these activities (and related emissions) currently occur at the existing storage and maintenance facilities, and would simply shift these emissions sources to the proposed Project Site. However, note that these emissions are considered for the purposes of localized emissions impacts in Table 10.1-8.

Table 10.1-10.1-7 Overlapping Construction and Operational Maximum Daily Increase in Regional Emissions

Description	VOC (lbs/day)	CO (lbs/day)	NO_X (lbs/day)	SO_X (lbs/day)	PM_{10} (lbs/day)	$PM_{2.5}$ (lbs/day)
Phase 2 Construction Emissions	80.36	57.92	45.32	0.12	14.22	8.02
Yard Equipment	0.83	3.48	2.53	0.01	0.11	0.11
Staff and Truck Vehicles	0.06	2.00	1.58	0.02	2.28	0.60
Architectural Coatings	0.13	-	-	-	-	-
Natural Gas Consumption	0.04	0.32	0.39	0.00	0.03	0.03
Train Fueling	0.41	-	-	-	-	-
Sand Silos	-	-	-	-	0.04	0.01
Total Maximum Daily Increase in Regional Emissions (lbs/day)	**81.83**	**63.72**	**49.82**	**0.15**	**16.66**	**8.18**
SCAQMD Threshold	55	550	55	100	150	55
Exceeds Threshold?	**Yes**	No	No	No	No	No

Notes: VOC = volatile organic compounds; SO_X = sulfur oxides; NO_X = nitrogen oxides; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; lbs/day = pounds per day.

Table 10.1-10.1-8 Overlapping Construction and Operational Localized Operational Maximum Daily Emissions

Description	NO_X	CO	PM_{10}	$PM_{2.5}$
Phase 2 Localized Construction Emissions	44.91	51.99	13.32	7.76
On-Site Locomotive Operations (Maintenance and Testing)	98.30	101.85	1.98	1.92
Yard Equipment	2.53	3.48	0.11	0.11
Staff and Truck Vehicles[1]	0.11	0.14	0.17	0.04
Natural Gas Consumption	0.39	0.32	0.03	0.03
Sand Silos	-	-	0.04	0.01
Total Maximum Daily Localized Emissions (lbs/day)	**146.25**	**157.79**	**15.64**	**9.87**
SCAQMD Localized Threshold	197	1,804	18	8
Exceeds Threshold?	No	No	No	Yes[2]

Notes: NO_X = nitrogen oxides; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; lbs/day = pounds per day.

[1] Maximum daily localized emissions account for on-site activities including on-site locomotive operations, on-site off-road equipment use (e.g., forklifts, cranes), and on-road vehicle travel. It was assumed that approximately 7% of the total on-road vehicles would occur on site (estimated portion of vehicle emissions occurring on site compared to the CalEEMod average trip length).

[2]As described in Table 9.1-2, the mass-rate LSTs are based on a 5-acre project site and thus, exceedance of this threshold does not represent a significant impact. Project-specific dispersion modeling was performed for $PM_{2.5}$ for comparison to the SCAQMD's ambient air quality thresholds as described below and shown in Table 10.1-9.

As described above, due to the Project size, the exceedance of the mass-rate screening LST for $PM_{2.5}$, and the region's nonattainment status for ozone and $PM_{2.5}$, Project-specific dispersion modeling was performed for NO_2 and $PM_{2.5}$ for comparison to the SCAQMD's ambient air quality thresholds. The results of the criteria pollutant modeling analysis for 1-hour and annual NO_2 and 24-hour $PM_{2.5}$ are summarized in Table 10.1-9 for both phases of operations (2025-2027 and 2028[5]). As shown in Table 10.1-9, the maximum modeled concentration at the point of maximum exposure (PMI) for both pollutants and averaging periods modeled were less than their respective SCAQMD ambient air quality thresholds. Therefore, this impact would be less than significant.

[5] *Phase 2 of construction would be completed at the end of 2027 and result in additional operational emissions sources beyond Phase 1. Furthermore, all trains serviced at the facility are assumed to be Tier 4 by 2028. Based on these changes, the dispersion analysis was conducted for the initial operational period from July 2025 through end of 2027, followed by years of operation from 2028 and later.*

Table 10.1-10.1-9 NO_2 and $PM_{2.5}$ Localized Dispersion Modeling Results

Criteria Pollutant	Averaging Period	Rank	Maximum Modeled Concentration (µg/m³)[1]		SCAQMD Threshold (µg/m³)	Exceeds Threshold?
			2025-2027[2]	2028+[3]		
NO_2	1-hour	1st	103.1	102.3	338.4	No
	Annual	1st	5.7	3.8	56.4	No
$PM_{2.5}$	24-hour	8th	1.3	1.2	2.5	No

Notes:
NO_2 = nitrogen dioxide; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; µg/m³ = micrograms per meter cubed; SCAQMD = South Coast Air Quality Management District.
[1] The point of maximum exposure (unoccupied land near OCTA boundary, to the north).
[2] Period when train fleet mix includes both Tier 2 and Tier 4 locomotive engines.
[3] Period when trains are all Tier 4.

As shown in Table 10.1-7, VOC emissions during construction of Phase 2 would exceed the SCAQMD threshold of significance. Overlapping activities associated with construction and operation of the Project would not exceed the SCAQMD regional thresholds of significance for any of the other pollutants. Therefore, VOC emissions associated with construction of the Project are potentially significant. As shown in Tables 10.1-8 and 10.1-9, localized emissions associated with the overlapping activities would not exceed the SCAQMD localized thresholds of significance and ambient air quality thresholds.

10.2 TOXIC AIR CONTAMINANTS AND HEALTH RISK ASSESSMENT RESULTS

10.2.1 Construction

The greatest potential for TAC emissions during construction would be related to diesel PM emissions associated with heavy-duty equipment operations. According to OEHHA methodology, health effects from carcinogenic TACs are usually described in terms of individual cancer risk, which is based on a 30-year exposure duration (or residency time) to TACs as the basis for public notification and risk reduction audits and plans.

CARB has adopted the In-Use Off-Road Diesel-Fueled Fleets Regulation and ATCMs applicable to off-road diesel equipment and portable diesel engines. The In-Use Off-Road Diesel-Fueled Fleets Regulation require diesel engines to comply with emission limits on a fleet-average basis. The purpose of ATCMs is to reduce emissions of TAC emissions, including diesel PM, from engines subject to the rule. CARB has also adopted an ATCM that limits diesel-fueled commercial motor vehicles idling. The rule restricts vehicles from idling for more than 5 minutes at any location with exceptions for idling that may be necessary in the operation of the vehicle. All off-road diesel equipment, on-road heavy-duty diesel trucks, and portable diesel equipment used for the Project would be subject to CARB's regulations and ATCMs.

A quantified HRA was performed to evaluate the Project's construction-related TAC emissions on existing nearby off-site sensitive receptors. Table 10.2-1 summarizes the results of the construction-related health

risks. The maximum incremental cancer risk exposure during the 4.5-year period of construction is less than 0.5 in a million. The chronic hazard index is also well below the SCAQMD threshold of 1.0. Therefore, sensitive receptors would not be exposed to substantial TAC concentrations during construction of the Project and this impact would be less than significant.

Table 10.2-1: Summary of Construction-Related Health Risks

Construction Period	Project Construction Incremental Cancer Risk (in a million)	Chronic Hazard Index
2023	0.20	2.24E-04
2024	0.18	2.21E-04
2025	0.01	8.48E-05
2026	0.01	5.14E-05
2027	0.004	3.07E-05
Total Project Construction (4.5 years)	**0.40**	**0.001**
SCAQMD Threshold	10	1.0
Exceeds Threshold?	No	No

Note: SCAQMD = South Coast Air Quality Management District

As described above in Section 3.2, asbestos is also a listed TAC; however, the Project Site is not located in an area known to contain naturally occurring asbestos. Further, demolition activities associated with Project construction are minimal and limited to an abandoned road, stormwater drains, and underground bunker with a network of pipelines, valves, and associated vents that are currently not in use. Prior to Project Site demolition activities, building materials must be carefully assessed for the presence of asbestos-containing materials (ACM), and removal of this material, where necessary, must comply with state and federal regulations, including SCAQMD Rule 1403. SCAQMD Rule 1403 specifies work practices with the goal of minimizing asbestos emissions during building demolition activities, including the removal and associated disturbance of ACMs. The requirements for demolition and renovation activities include asbestos surveying; notification; ACM removal procedures and time schedules; ACM handling and cleanup procedures; and storage, disposal, and landfill disposal requirements for asbestos-containing waste materials. If ACM are found during construction, the Project would comply with the requirements of SCAQMD Rule 1403. Therefore, exposure to asbestos during construction would be less than significant.

10.2.2 Operation

As discussed previously, following construction of the Project, operations would generate long-term emissions, including TACs, from a variety of sources. Diesel PM would be the dominant TAC generated at the Project Site. Sources of diesel PM at the Project Site include: locomotive usage (used during fueling, servicing, inspection, brake testing, train washing, load testing, yard switching, idling, and train movement throughout the yard), on-site equipment (emergency generator, cranes, and forklifts used for maintenance activities), refueling, and on-road trucks (fuel and vendor delivery trucks). The majority of the diesel PM emissions would be generated along the tracks, maintenance building, fueling/sanding pit, and the service

and inspection facility which are located at distances of approximately 1,100 feet from the nearest residential receptors. As discussed in Section 5.2.2, the CARB recommends a 1,000-foot buffer between sensitive receptors and major service and maintenance rail yards based on a study which found that the area of highest impact is within 1,000 feet of the yard (CARB, 2005); the next highest impact was found to be between a half to one mile of the maintenance rail yards. As described previously, the nearest sensitive receptors are the residences in the senior housing community located approximately 650 feet (200 meters) north of the Project Site. The closest recreational fields and walking/running paths to the Project Site are located approximately 700 feet from maintenance buildings. The nearest worker receptors are located at the nursery to the west of the Project Site and buildings along Technology Drive. As such, a quantified HRA was performed to evaluate the Project's operational TAC emissions on existing nearby off-site receptors, including the nearby residences, recreational facilities, and adjacent workers located at the buildings along Technology Drive and at the nearby nursery.

The results of the HRA for operations are summarized in Table 10.2-1. The operational period would begin in July 2025, upon the completion of Phase 1 construction. Phase 2 of construction would be completed at the end of 2027 and result in additional operational emissions sources. Furthermore, all trains serviced at the facility are assumed to be Tier 4 by 2028. Based on these changes, the HRA for operations includes an initial operational period from July 2025 through end of 2027, followed by years of operation from 2028 and later. The total of these two operational periods are compared against the SCAQMD threshold of 10 in a million.

Maximum modeled excess cancer exposure was estimated for residential, worker, and recreation receptors within the modeled domain. The closest residential receptor was at the intersection of Marine Way and Ridge Valley, which is part of a 55 and older housing community. The closest residential receptor that was not part of this community was located at Ridge Valley and Pinehurst. The location of the maximum worker receptor is to the west of the Project at a nursery. The closest recreation area is the OCGP, located to the north of the Project Site on the other side of Marine Way.

As shown in Tables 10.2-2 and Table 10.2-3, the maximum incremental cancer risk, and chronic and acute hazard index, respectively, for the maximally exposed individual resident and maximally exposed individual worker would not exceed the SCAQMD thresholds of significance. Therefore, receptors would not be exposed to substantial pollutant concentrations of TACs during operations and this impact would be less than significant.

Figure 10.2-1 illustrates the locations of the PMI, MEIR, MEIW and MEI Recreation (maximally exposed individual at recreation area) for the maximum incremental cancer risk associated with operations of the Project. Figure 10.2-2 through Figure 10.2-4 provide maps of the cancer risk zones using contour plots.

Table 10.2-2: Summary of Excess Cancer Risks

Receptor	Years of Age	Maximum Modeled Excess Cancer Risk (in a million)			SCAQMD Threshold	Exceeds Threshold?
		2025-2027[1]	2028+[2]	Total		
$MEIR_{<50}$	3rd Trimester – 30 (30 years)	5.85	3.40	9.25	10	No
$MEIR_{\geq 50}$	50 - 80 (30 years)	0.24	1.45	1.68	10	No
MEIW	16 – 41 (25 years)	0.94	4.37	5.31	10	No
MEI Recreation	0 – 39 (40 years)	1.29	2.05	3.33	10	No

Notes: $MEIR_{<50}$ = maximally exposed individual resident in non-55+ age restricted communities; $MEIR_{\geq 50}$ = maximally exposed individual resident in 55+ age restricted communities; MEIW = maximally exposed individual worker; MEI Recreation = maximally exposed individual at recreation area; SCAQMD = South Coast Air Quality Management District.
[1] Period when train fleet mix includes both Tier 2 and Tier 4 locomotive engines.
[2] Period when trains are all Tier 4.

Table 10.2-3: Summary of Chronic and Acute Risks

Risk	Years of Age	Maximum Modeled Risk			SCAQMD Threshold	Exceeds Threshold?
		2025-2027[1]	2028+[2]	Total		
Chronic	PMI	0.05	0.01	0.06	1.0	No
Acute		0.0006	0.0004	0.001	1.0	No

Notes: PMI = point of maximum exposure (unoccupied land near OCTA boundary, to the north); SCAQMD = South Coast Air Quality Management District.
[1] Period when train fleet mix includes both Tier 2 and Tier 4 locomotive engines.
[2] Period when trains are all Tier 4.

Figure 10.2-1: Location of PMI, MEIR, MEIW and MEI Recreation for Cancer Risk

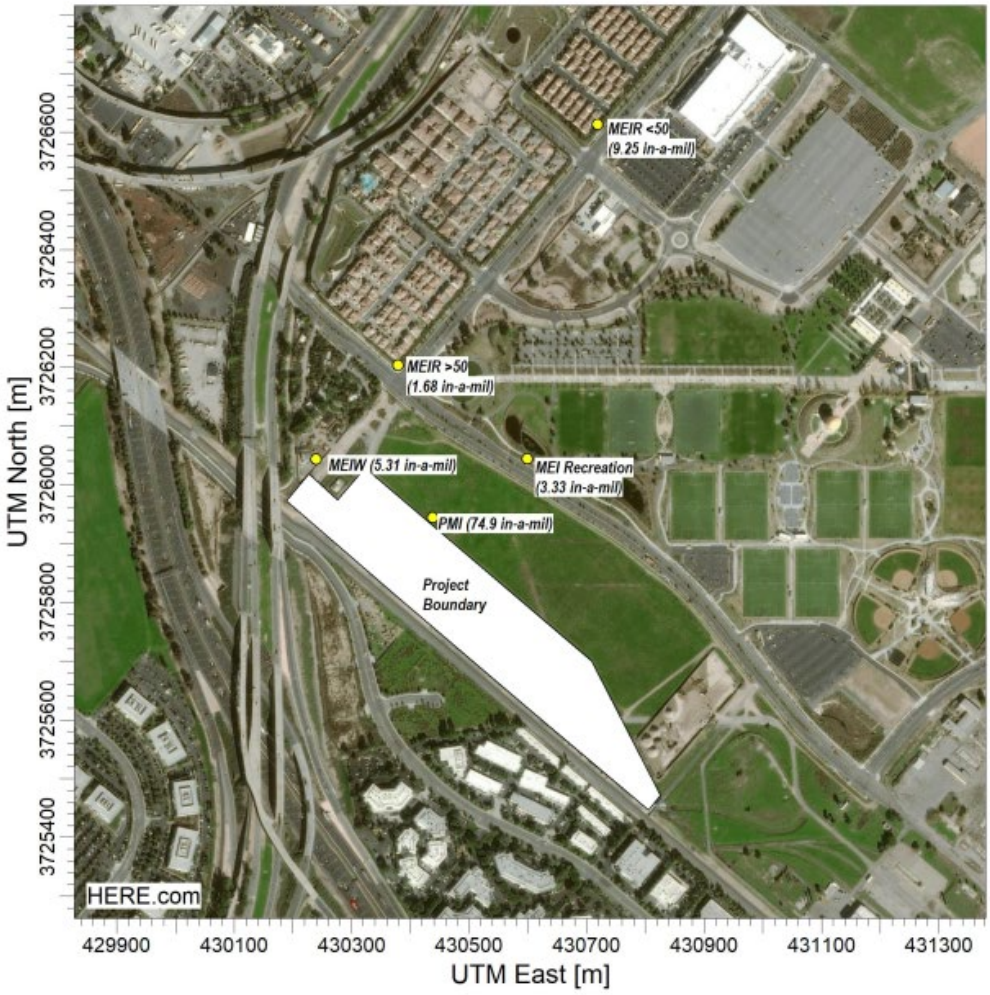
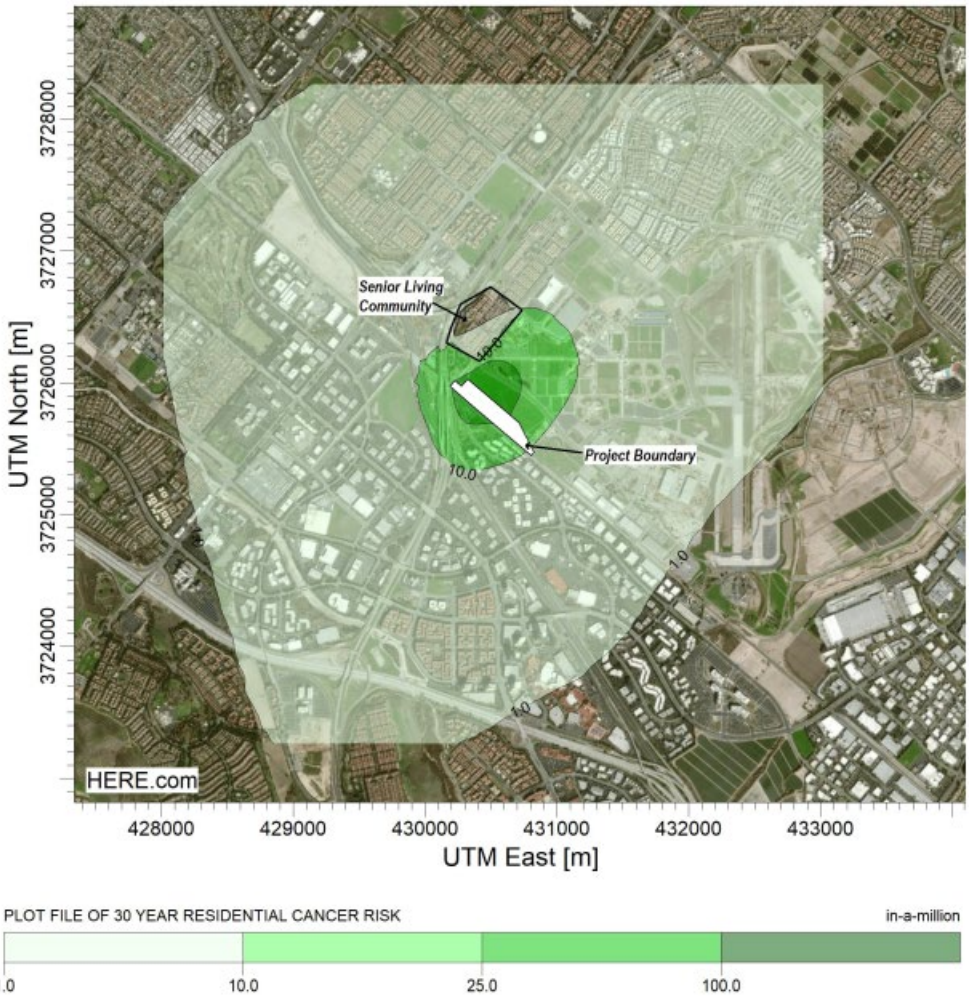


Figure 10.2-2: Contour Map of 30-Year Residential Cancer Risk



Notes: Receptors within Senior Living Community use starting age of 50-years old. All other receptors use starting age of 3rd trimester.

Figure 10.2-3: Contour Map of 25-Year Worker Cancer Risk

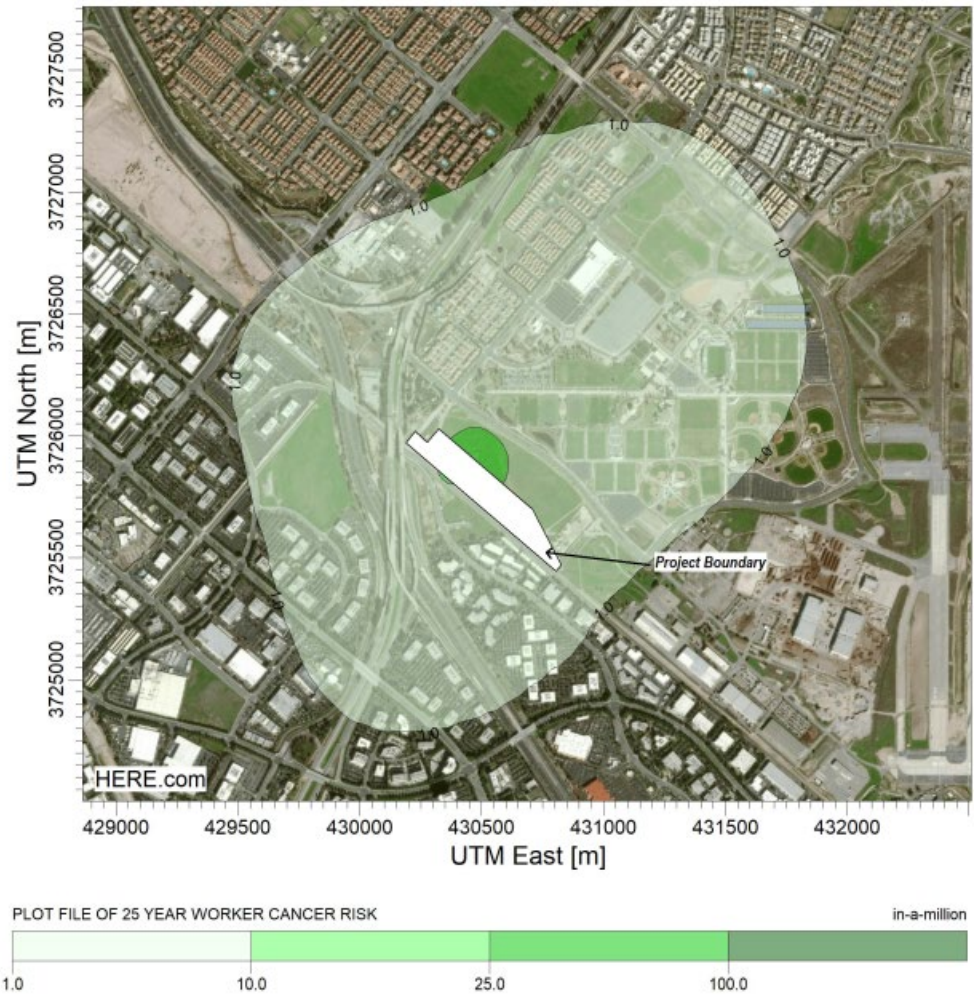
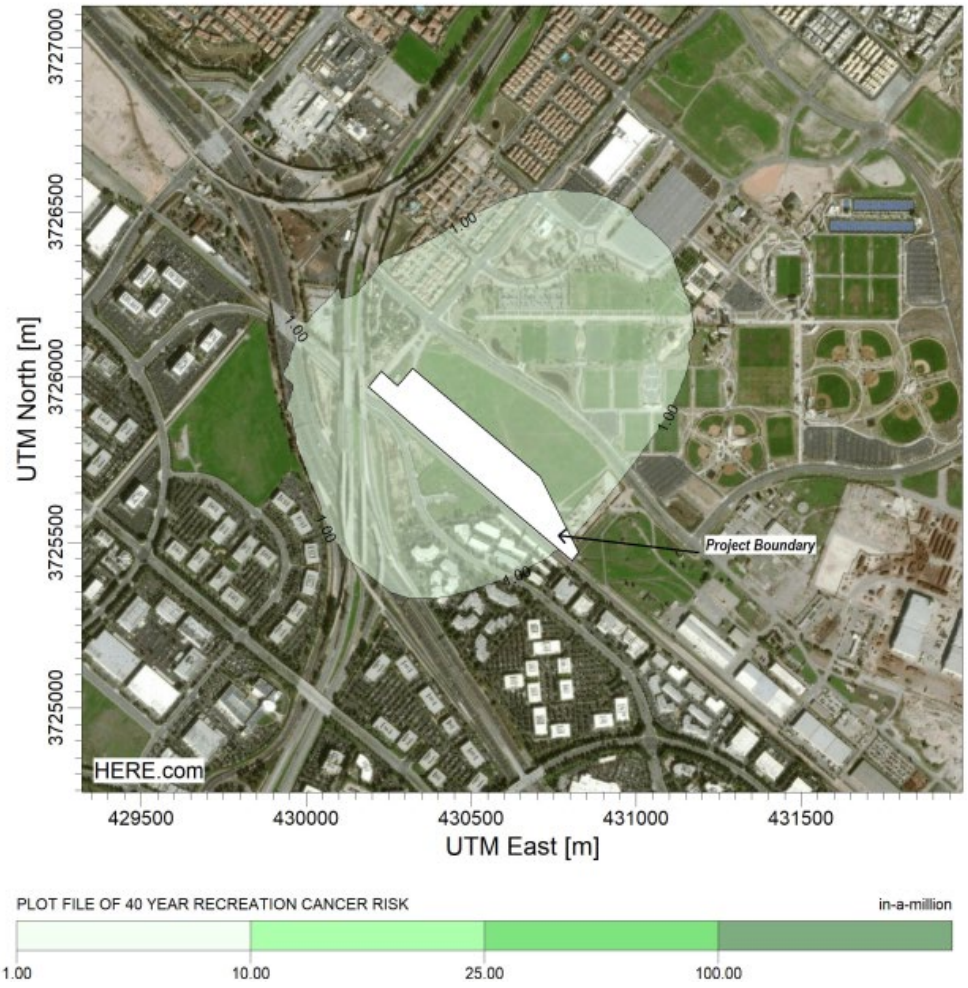


Figure 10.2-4: Contour Map of 40-Year Recreational Cancer Risk



10.3 CUMULATIVE EFFECTS

By its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development within the SCAB, and this regional impact is cumulative rather than being attributable to any one source. A project's emissions may be individually limited, but cumulatively considerable when taken in combination with past, present, and future development projects. The thresholds identified in Table 9.1-1 are designed to identify those projects that would result in significant levels of air pollution and to assist the region in attaining the applicable state and federal ambient air quality standards. Projects that would not exceed the thresholds of significance would not contribute a considerable amount of criteria air pollutant emissions to the region's emissions profile and would not impede attainment and maintenance of ambient air quality standards.

As shown in Table 10.1-1, the maximum daily emissions associated with construction of Phase 1 would not exceed the SCAQMD regional thresholds of significance. However, since construction of Phase 2 would result in a potentially significant impact due to the exceedance of the VOC threshold, Project construction

may result in a cumulative impact. The SCAB is classified as a nonattainment area for ozone, and VOC is a precursor pollutant to ozone. As such, the Project may contribute to a considerable amount of criteria air pollutant emissions to the region's emissions profile.

As shown in Table 10.1-5, operational emissions are not anticipated to result in any exceedances of the SCAQMD thresholds of significance. However, as shown in Table 10.1-7, the overlapping activities of Phase 2 construction and operation may result in a potentially cumulative impact for VOC emissions. Therefore, mitigation would be required.

10.4 ODORS

The occurrence and severity of other emissions, such as those leading to odor impacts, depend on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress and often generating citizen complaints to local governments and regulatory agencies. Projects with the potential to frequently expose individuals to objectionable odors are deemed to have a significant impact. Typical facilities that generate odors include wastewater treatment facilities, sanitary landfills, composting facilities, petroleum refineries, chemical manufacturing plants, and food processing facilities.

Construction activities associated with the Project could result in short-term odor emissions from diesel exhaust associated with construction equipment. The Project would utilize typical construction techniques, and the odors would be typical of most construction sites and temporary in nature.

Project operations would not include any land uses identified by the CARB as being associated with the generation of objectionable odors. However, the locomotive rail operations on the tracks that access the maintenance facility and locomotive idling and refueling activities may increase the potential for generation of odors from locomotive diesel fuel combustion. However, these odors would be intermittent and of short duration. Any odors resulting from diesel fuel combustion along rail alignment would be intermittent and short-term and not considered a significant odor-generating source (CARB, 2005).

11 GREENHOUSE GAS EMISSIONS IMPACTS

GHG emissions generated during construction and operation of the Project are summarized in Table 11-1. As detailed in Section 7.2 of this Technical Memorandum, on-site idling of trains for storage and maintenance purposes would not result in a regional increase in emissions, as these activities (and related emissions) currently occur at the existing storage and maintenance facilities, and would simply shift these emissions sources to the proposed Project Site. Thus, these emissions are not included in Table 11-1.

Table 10.4-1: Annual GHG Emissions

Source	GHG Emissions (MT CO_2e/year)
Total Construction	2,185
Amortized Construction [1]	73
Yard Equipment	98
Staff and Truck Vehicles	0.13
Natural Gas Consumption	85
Electricity Consumption	329
Water and Wastewater Consumption	24
Solid Waste Generation	279
Operations Subtotal [2]	815
Total (Construction and Operations)	**888**
SCAQMD Threshold	10,000
SCAQMD Threshold (Adjusted for SB 32)	6,000
Exceeds Threshold?	**No**

Notes: MT CO_2e = metric tons carbon dioxide equivalent. GHG = greenhouse gas; SCAQMD = South Coast Air Quality Management District.

[1] Assumed amortization period is 30 years, based on the typically assumed project lifetime (SCAQMD 2008b), which recommends amortizing GHG emissions from construction activities over a project's operational lifetime.

As shown in Table 11-1, GHG emissions would not exceed SCAQMD's adopted significance threshold of 10,000 MT CO_2e per year nor the adjusted SB 32 threshold of 6,000 MT CO_2e per year. Therefore, this impact would be less than cumulatively considerable.

12 MITIGATION MEASURES

12.1 AIR QUALITY MITIGATION MEASURES

As described in Section 10.1.2, Phase 2 construction activities exceed the SCAQMD threshold of significance for VOC emissions. The exceedance of the VOC threshold is primarily related to architectural coating activities of the maintenance building. As such, implementation of Mitigation Measure AQ-1 would be required to reduce VOC emissions below the threshold of significance.

MM-AQ-1. Utilize low VOC paint for architectural coating activities during Phase 2 construction. To reduce VOC emissions during construction, the Project contractor shall utilize water-based or low VOC interior and exterior paints. The VOC content of the architectural coatings shall comply with the VOC content limits in SCAQMD Rule 1113 or not exceed 100 grams per liter, whichever is lower. To ensure that low VOC paint will be used during Project construction, this requirement will be included in applicable bid documents, purchase orders, and contracts. Successful contractor(s) must demonstrate the ability to supply the compliant architectural coatings for use prior to any coating activities. A copy of each proposed architectural coating Material Safety Data Sheet and VOC content shall be

available upon request. Alternatively, the contractor may utilize tilt-up concrete buildings that do not require the use of architectural coatings.

Section 13 below summarizes the Project's impacts after implementation of Mitigation Measure AQ-1.

12.2 GREENHOUSE GAS MITIGATION MEASURES

Impacts related to GHG emissions are less than cumulatively considerable. As such, Mitigation Measures are not proposed.

13 IMPACTS AFTER MITIGATION MEASURES

13.1 AIR QUALITY IMPACTS AFTER MITIGATION

Table 13.1-1 demonstrates the maximum daily emissions associated with construction of Phase 2 with implementation of Mitigation Measure AQ-1.

Table 13.1-13.1-1: Phase 2 Mitigated Construction-Related Maximum Daily Emissions

Description	VOC	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Phase 2 Maximum Daily Emissions (lbs/day)[1]	35.78	57.92	45.32	0.12	14.22	8.02
SCAQMD Threshold (lbs/day)	75	550	100	100	150	55
Exceeds Threshold?	No	No	No	No	No	No

Notes: VOC = volatile organic compounds; SO_X = sulfur oxides; NO_X = nitrogen oxides; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; lbs/day = pounds per day; SCAQMD = South Coast Air Quality Management District.

[1] Phase 2 emissions are based on the overlap of subphases per the anticipated construction schedule. Maximum daily emissions for all pollutants occur during the overlap of site utilities/electric, building, trackwork-direct fixation, and major equipment construction activities.

As shown in Table 13.1-1, with implementation of Mitigation Measure AQ-1, emissions of VOC would no longer exceed the SCAQMD threshold of significance. Since construction of Phase 2 of the Project would overlap with operational activities of Phase 1, overlapping emissions were also identified to be potentially significant.

Table 13.1-13.1-2: Overlapping Mitigated Construction and Operational Maximum Daily Increase in Regional Emissions

Description	VOC (lbs/day)	CO (lbs/day)	NO_X (lbs/day)	SO_X (lbs/day)	PM_{10} (lbs/day)	$PM_{2.5}$ (lbs/day)
Mitigated Phase 2 Construction Emissions	35.78	57.92	45.32	0.12	14.22	8.02
Yard Equipment	0.83	3.48	2.53	0.01	0.11	0.15
Staff and Truck Vehicles	0.06	2.00	1.58	0.02	2.26	0.01
Architectural Coatings	0.13	-	-	-	-	-
Natural Gas Consumption	0.04	0.32	0.39	0.00	0.03	0.03
Train Fueling	0.41	-	-	-	-	-
Sand Silos	-	-	-	-	0.04	0.06
Total Maximum Daily Increase in Regional Emissions (lbs/day)	**37.25**	**63.72**	**49.82**	**0.15**	**16.66**	**8.27**
SCAQMD Threshold	55	550	55	100	150	55
Exceeds Threshold?	**No**	No	No	No	No	No

Notes: VOC = volatile organic compounds; SO_X = sulfur oxides; NO_X = nitrogen oxides; PM_{10} = suspended particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than 2.5 micrometers in diameter; CO = carbon monoxide; lbs/day = pounds per day; SCAQMD = South Coast Air Quality Management District.

As shown in Table 13.1-2, with implementation of Mitigation Measure AQ-1, the maximum daily emissions associated with overlapping activities of Phase 1 operations and Phase 2 construction would also not exceed the SCAQMD threshold of significance. Therefore, this impact would be less than significant with mitigation.

In addition, with implementation of Mitigation Measure AQ-1, the Project is also not anticipated to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment. Further, one of the Project objectives is to provide equipment to inspect, clean, and maintain existing cars and locomotives on a regular and efficient basis. The storage and maintenance activities that would occur operationally at this facility would be a shift in these operations from the existing storage and maintenance facilities to the proposed Project Site. As such, due to the optimal location of the proposed Project Site, the Project is also anticipated to result in reduced locomotive travel in the region and a reduction in the emissions associated with locomotive and rail car travel in the region.

13.2 GREENHOUSE GAS EMISSIONS IMPACTS AFTER MITIGATION

Impacts related to GHG emissions are less than cumulatively considerable. As such, mitigation measures are not proposed.

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Appendix B Attachments
Air Quality and Greenhouse Gases Technical Memorandum

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority

550 S. Main St.
Orange, CA 92868

And

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

AECOM
Kaiser Center
300 S.Grand Ave
Los Angeles, CA 90071

September 2023

Attachm**en**t **A**

Construction and Operational Emission Estimates

Orange County Maintenance Facility - Construction Emissions Summary

Phase 1 - Daily Maximum Off-Road Emissions (lbs/day)						
Phases	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$
Survey, Clear and Grub	1.54	12.00	13.12	0.03	0.54	0.49
Clear and Grub, Site Util/Electric, Demo, Earthwork	6.53	69.20	53.72	0.13	2.17	1.99
Site Util/Electric, Earthwork, Foundations, Bridge, Roadways/Paving	7.30	61.31	63.08	0.15	2.52	2.32
Site Util/Electric, Foundations, Bridge, Roadways/Paving, Buildings	7.84	68.90	63.63	0.16	2.55	2.34
Site Util/Electric, Buildings, Trackwork-Ballasted, Major Equip	6.55	59.15	52.32	0.14	2.05	1.89
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	5.97	52.56	46.05	0.11	1.87	1.72

Trackwork-Ballasted Phase includes emissions associated with the maximum emissions of either the welded rail train or rail delivery options

Phase 1 - Daily Maximum On-Road Emissions (lbs/day)						
Phases	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$
Survey, Clear and Grub	0.02	0.72	0.05	0.00	0.23	0.06
Clear and Grub, Site Util/Electric, Demo, Earthwork	0.18	3.82	11.75	0.09	3.05	0.90
Site Util/Electric, Earthwork, Foundations, Bridge, Roadways/Paving	0.27	6.87	12.12	0.10	4.04	1.17
Site Util/Electric, Foundations, Bridge, Roadways/Paving, Buildings	0.26	8.17	0.72	0.03	2.61	0.72
Site Util/Electric, Buildings, Trackwork-Ballasted, Major Equip	0.24	7.53	0.87	0.03	2.45	0.67
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	0.20	6.40	0.44	0.02	2.03	0.56

Phase 1 - Maximum Daily Emissions (lbs/day)						
Phases	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$
Survey, Clear and Grub	1.56	12.71	13.17	0.03	6.79	3.88
Clear and Grub, Site Util/Electric, Demo, Earthwork	6.70	73.02	65.47	0.22	41.47	22.82
Site Util/Electric, Earthwork, Foundations, Bridge, Roadways/Paving	7.95	68.17	75.20	0.25	39.79	21.76
Site Util/Electric, Foundations, Bridge, Roadways/Paving, Buildings	38.06	77.07	64.35	0.18	14.19	8.04
Site Util/Electric, Buildings, Trackwork-Ballasted, Major Equip	36.37	66.68	53.19	0.16	10.52	5.88
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	35.75	58.96	46.49	0.13	9.93	5.60
Maximum Daily Emissions	38.06	77.07	75.20	0.25	41.47	22.82
SCAQMD Threshold	75	550	100	150	150	55

Phase 1 - Maximum Daily On-Site Emissions (lbs/day)						
Phases	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$
Survey, Clear and Grub	1.54	12.05	13.12	0.03	6.58	3.82
Clear and Grub, Site Util/Electric, Demo, Earthwork	6.54	69.48	54.58	0.13	38.63	21.98
Site Util/Electric, Earthwork, Foundations, Bridge, Roadways/Paving	7.70	61.80	63.96	0.16	36.05	20.68
Site Util/Electric, Foundations, Bridge, Roadways/Paving, Buildings	37.82	69.49	63.68	0.16	11.77	2.39
Site Util/Electric, Buildings, Trackwork-Ballasted, Major Equip	36.15	59.69	52.38	0.16	8.25	5.26
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	35.56	53.03	46.09	0.13	8.04	7.79
Maximum Daily Emissions	37.82	69.49	63.96	0.16	38.63	21.98

Percent on-road emisions on/around project site: 7%

Daily Fugitive Dust Emissions (lbs/day)		
Phase	PM_{10}	$PM_{2.5}$
Clear and Grub	6.022	3.319
Site Utilities	6.022	3.319
Earthwork	24.196	13.290
Roadway Paving	3.011	1.659

Daily VOC Emissions (lbs/day) - Phase 1	
Phase	VOC
Buildings (Interior and Exterior)	29.51
Paved Areas (Painting)	0.07
Paved Areas (Asphalt Paving Off-Gassing)	0.382

GHG Emissions - Phase 1	
Project Component	MT CO2e
Off-Road Emissions	761
On-Road Emissions	943
Total GHG Emissions	1,704

Phase 2 - Daily Maximum Off-Road Emissions (lbs/day)						
Phases	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$
Survey	0.07	0.47	0.51	0.00	0.02	0.02
Site Util/Electric, Demo	3.55	46.70	25.71	0.07	1.04	0.95
Site Util/Electric, Earthwork	3.20	28.58	27.51	0.06	1.20	1.10
Earthwork, Foundations	1.82	16.84	17.25	0.04	0.78	0.71
Foundations, Roadway/Paving	2.11	18.22	18.26	0.05	0.73	0.67
Buildings, Trackwork-Ballasted, Major Equip	3.98	39.92	34.48	0.09	1.29	1.19
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	5.85	51.53	44.88	0.10	1.84	1.69
Major Equip, Commissioning	0.76	6.13	6.05	0.01	0.29	0.26

Phase 2 - Daily Maximum On-Road Emissions (lbs/day)						
Phases	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$
Survey	0.01	0.17	0.01	0.00	0.05	0.01
Site Util/Electric, Demo	0.04	1.43	0.10	0.00	0.46	0.13
Site Util/Electric, Earthwork	0.07	1.95	2.34	0.02	0.97	0.28
Earthwork, Foundations	0.09	2.41	2.77	0.02	1.16	0.33
Foundations, Roadway/Paving	0.07	2.18	0.55	0.01	0.73	0.20
Buildings, Trackwork-Ballasted, Major Equip	0.21	6.63	0.58	0.02	2.13	0.58
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	0.20	6.40	0.44	0.02	2.03	0.56
Major Equip, Commissioning	0.06	1.99	0.14	0.01	0.63	0.17

Phase 2 - Maximum Daily Emissions (lbs/day)						
Phases	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$
Survey	0.08	0.64	0.53	0.00	0.07	0.03
Site Util/Electric, Demo	3.59	48.13	25.81	0.07	7.52	4.40
Site Util/Electric, Earthwork	3.28	30.52	29.85	0.08	14.22	8.02
Earthwork, Foundations	1.91	19.25	20.01	0.06	7.96	4.36
Foundations, Roadway/Paving	2.18	20.40	18.81	0.06	4.47	2.53
Buildings, Trackwork-Ballasted, Major Equip	78.50	46.55	35.05	0.11	3.41	1.78
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	80.36	57.92	45.32	0.12	9.89	5.57
Major Equip, Commissioning	0.82	8.11	6.18	0.02	0.92	0.44
Maximum Daily Emissions	80.36	57.92	45.32	0.12	14.22	8.02
SCAQMD Threshold	75	550	100	150	150	55

Phase 2 - Maximum Daily On-Site Emissions (lbs/day)						
Phases	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$
Survey	0.07	0.48	0.51	0.00	0.02	0.02
Site Util/Electric, Demo	3.55	46.80	25.72	0.07	7.10	4.28
Site Util/Electric, Earthwork	3.21	28.72	27.68	0.06	13.32	7.76
Earthwork, Foundations	1.83	17.01	17.45	0.04	6.88	4.06
Foundations, Roadway/Paving	2.12	18.38	18.30	0.05	3.79	2.35
Buildings, Trackwork-Ballasted, Major Equip	78.31	40.40	34.52	0.09	1.44	1.23
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	80.18	51.99	44.91	0.10	8.01	5.05
Major Equip, Commissioning	0.76	6.27	6.06	0.01	0.33	0.27
Maximum Daily Emissions	80.18	51.99	44.91	0.10	13.32	7.76

Percent on-road emisions on/around project site: 7%

Daily Fugitive Dust Emissions (lbs/day)		
Phase	PM_{10}	$PM_{2.5}$
Site Utilities	6.0221	3.3185
Earthwork	6.0221	3.3185
Roadway Paving	3.0110	1.6593

Unmitigated Daily VOC Emissions (lbs/day) - Phase 2	
Phase	VOC
Buildings (Interior and Exterior)	74.31
Paved Areas (Painting)	-
Paved Areas (Asphalt Paving Off-Gassing)	-

GHG Emissions - Phase 2	
Project Component	MT CO2e
Off-Road Emissions	207
On-Road Emissions	274
Total GHG Emissions	481

Phase 2 - MItigated Maximum Daily Emissions (lbs/day)						
Phases	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$
Survey	0.08	0.64	0.53	0.00	0.07	0.03
Site Util/Electric, Demo	3.59	48.13	25.81	0.07	7.52	4.40
Site Util/Electric, Earthwork	3.28	30.52	29.85	0.08	14.22	8.02
Earthwork, Foundations	1.91	19.25	20.01	0.06	7.96	4.36
Foundations, Roadway/Paving	2.18	20.40	18.81	0.06	4.47	2.53
Buildings, Trackwork-Ballasted, Major Equip	33.91	46.55	35.05	0.11	3.41	1.78
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	35.78	57.92	45.32	0.12	9.89	5.57
Major Equip, Commissioning	0.82	8.11	6.18	0.02	0.92	0.44
Maximum Daily Emissions	35.78	57.92	45.32	0.12	14.22	8.02

Mitigated Daily VOC Emissions (lbs/day) - Phase 2	
Phase	VOC
Buildings (Interior and Exterior)	29.73

ORANGE COUNTY MAINTENANCE FACILITY - Phase 1 Construction Schedule

Phase 1

	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Survey	x	x																												
Clear and grub		x	x	x																										
Site Util/Electric			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
Demo			x	x	x																									
Earthwork				x	x	x	x	x	x																					
Foundations								x	x	x	x																			
Roadways/Paving									x	x	x	x																		
Buildings										x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Bridge						x	x	x	x	x	x																			
Trackwork-Ballasted															x	x	x	x	x	x	x	x	x	x						
Trackwork -DF																									x	x	x			
Major equip																							x	x	x	x	x	x		
Commisioning																													x	x

ORANGE COUNTY MAINTENANCE FACILITY - PHASE 2 Construction Schedule

Phase 2

	Jul-25	Aug-25	Sep-25	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Survey	x																												
Site Util/Electric		x	x																	x	x								
Demo		x																											
Earthwork			x	x																									
Foundations				x	x																								
Roadways/Paving					x	x																							
Buildings							x	x	x	x	x	x	x	x	x	x	x	x	x	x	x								
Trackwork-Ballasted															x	x	x	x											
Trackwork -DF																			x	x	x								
Major equip																		x	x	x	x	x	x						
Commisioning																						x	x						

Off-Road Construction Emissions - Phase 1

Construction Year[1]

2023

									Emissions Factors (g/bhp-hr)							Emission Factor (g/gal)				Emissions (lbs/day)						metric tons/phase			
Project Phase/Equipment	Notes		Number	Hours per Day	Total Days[1]	Horsepower	Total Runtime Hours	Load Factor [2]	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	gal/hp-hr	Total Gallons	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Survey					42															0.19	1.25	1.37	0.01	0.05	0.05	10.41	0.00	0.00	10.42
Impact hammer	electric/hand-held	Other Construction Equipment	1	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Power drill	electric/hand-held	Other Construction Equipment	1	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tool truck		Off-Highway Trucks	1	8	42	402	336	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.000345	47	0.19	1.25	1.37	0.01	0.05	0.05	10.41	0.00	0.00	10.42
Clear and Grub					63															1.35	10.74	11.75	0.02	0.49	0.45	7.10	0.00	0.00	7.23
Brush cutter /Brush hog	assumes skid steer attachment (ht	Skid Steer Loaders	1	8	6	65	50	0.37	0.06	1.20	0.75	0.00	0.03	0.02	194.50	0.57	0.26	0.00	4	0.02	0.51	0.32	0.00	0.01	0.01	0.23	0.00	0.00	0.24
Chain saw	assumes diesel	Concrete/Industrial Saws	1	8	3	81	25	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	697	0.38	3.33	2.90	0.01	0.10	0.09	0.62	0.00	0.00	0.68
D5 Dozer		Rubber Tired Dozers	1	8	13	247	101	0.40	0.18	1.04	1.95	0.00	0.09	0.08	209.04	0.57	0.26	0.03	626	0.31	1.81	3.40	0.00	0.15	0.14	2.08	0.00	0.00	2.14
Excavator-Track hoe		Excavators	1	4	3	158	13	0.38	0.07	1.18	0.56	0.00	0.03	0.03	201.69	0.57	0.26	0.00	2	0.04	0.63	0.30	0.00	0.01	0.01	0.15	0.00	0.00	0.15
Front end loader (rubber)		Rubber Tired Loaders	1	4	32	203	126	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	10	0.05	0.28	0.47	0.00	0.02	0.01	1.76	0.00	0.00	1.76
Prentice / Log Loader	http://s7d2.scene7.com/is/conten	Tractors/Loaders/Backhoes	1	2	3	160	6	0.37	0.07	1.14	0.56	0.00	0.03	0.03	193.81	0.57	0.26	0.00	1	0.02	0.30	0.15	0.00	0.01	0.01	0.07	0.00	0.00	0.07
Stump Grinder	http://www.banditchippers.com/	Other Construction Equipment	1	4	3	74	13	0.42	0.30	1.74	2.93	0.00	0.21	0.19	215.79	0.57	0.26	0.07	64	0.08	0.47	0.80	0.00	0.06	0.05	0.08	0.00	0.00	0.09
Tractor trailer		Off-Highway Trucks	1	8	6	402	50	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	7	0.19	1.25	1.37	0.01	0.05	0.05	1.56	0.00	0.00	1.56
Tree shear	assumes attachment to skid steer	Skid Steer Loaders	1	8	1	65	5	0.37	0.06	1.20	0.75	0.00	0.03	0.02	194.50	0.57	0.26	0.00	0	0.02	0.51	0.32	0.00	0.01	0.01	0.02	0.00	0.00	0.02
Tri-axle Dump Trucks		Off-Highway Trucks	2	4	3	402	10	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	1	0.19	1.25	1.37	0.01	0.05	0.05	0.31	0.00	0.00	0.31
Wood chipper	https://www.stumpcutters.com/w	Other Construction Equipment	1	3	6	116	19	0.42	0.11	1.31	1.13	0.00	0.06	0.05	218.42	0.57	0.26	0.01	19	0.04	0.42	0.36	0.00	0.02	0.02	0.20	0.00	0.00	0.20
Site Utilities		.			504															2.27	19.53	18.19	0.05	0.73	0.68	366.28	0.01	0.01	368.26
Abrasive/demo saw	assumes diesel	Concrete/Industrial Saws	1	2	50	81	101	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	2787	0.10	0.83	0.73	0.00	0.03	0.02	2.47	0.00	0.00	2.73
Backhoe		Tractors/Loaders/Backhoes	1	8	403	97	3226	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	62	0.05	0.81	0.54	0.00	0.03	0.02	22.60	0.00	0.00	22.60
Bucket Truck		Off-Highway Trucks	1	8	126	402	1008	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	140	0.19	1.25	1.37	0.01	0.05	0.05	31.24	0.00	0.00	31.25
Compressor		Air Compressors	1	8	252	78	2016	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	1192	0.20	1.55	1.25	0.00	0.05	0.05	20.59	0.00	0.00	20.70
Concrete mixer		Cement and Mortar Mixers	1	4	50	9	202	0.56	0.31	1.82	2.35	0.00	0.09	0.08	318.42	0.57	0.26	0.10	184	0.01	0.08	0.10	0.00	0.00	0.00	0.32	0.00	0.00	0.34
Concrete pump		Pumps	1	5	202	84	1008	0.74	0.03	1.01	0.53	0.00	0.03	0.03	159.70	0.57	0.26	0.01	853	0.02	0.69	0.36	0.00	0.02	0.02	10.01	0.00	0.00	10.08
Concrete saw		Concrete/Industrial Saws	1	8	50	81	403	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	11147	0.38	3.33	2.90	0.01	0.10	0.09	9.88	0.01	0.00	10.90
Concrete truck		Off-Highway Trucks	1	5	202	402	1008	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	140	0.12	0.78	0.86	0.00	0.03	0.03	31.24	0.00	0.00	31.25
Concrete vibrator	https://www.indiamart.com/prod	Other Construction Equipment	1	5	202	5.5	1008	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	297	0.01	0.05	0.07	0.00	0.00	0.00	0.81	0.00	0.00	0.84
Excavator-Track hoe		Excavators	1	8	252	158	2016	0.38	0.07	1.18	0.56	0.00	0.03	0.03	201.69	0.57	0.26	0.00	332	0.07	1.25	0.60	0.00	0.03	0.03	24.53	0.00	0.00	24.56
Front end loader (rubber)		Tractors/Loaders/Backhoes	1	8	252	97	2016	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	39	0.05	0.81	0.54	0.00	0.03	0.02	14.12	0.00	0.00	14.13
Generator		Generator Sets	1	8	302	84	2419	0.74	0.06	1.17	0.48	0.00	0.04	0.04	420.53	0.57	0.26	0.01	1317	0.06	1.29	0.53	0.00	0.04	0.04	63.24	0.00	0.00	63.36
Gradall		Graders	1	8	126	187	1008	0.41	0.12	0.53	1.32	0.00	0.04	0.04	215.93	0.57	0.26	0.00	179	0.16	0.71	1.78	0.00	0.06	0.05	16.63	0.00	0.00	16.65
Grinder	https://www.essexequipment.com	Other Construction Equipment	1	2	252	11	504	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	297	0.01	0.04	0.05	0.00	0.00	0.00	0.81	0.00	0.00	0.84
Horizontal Boring /Jacking machine		Bore/Drill Rigs	1	8	25	221	202	0.50	0.06	0.53	0.60	0.00	0.02	0.02	263.10	0.57	0.26	0.02	821	0.12	1.04	1.17	0.00	0.04	0.03	5.89	0.00	0.00	5.97
Roller-vibratory		Rollers	1	2	101	80	202	0.38	0.10	1.28	1.09	0.00	0.06	0.05	198.12	0.57	0.26	0.00	51	0.01	0.17	0.14	0.00	0.01	0.01	1.20	0.00	0.00	1.20
Tractor trailer		Off-Highway Trucks	1	2	403	402	806	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	112	0.05	0.31	0.34	0.00	0.01	0.01	24.99	0.00	0.00	25.00
Trenching machine (Ditch witch)		Trenchers	1	4	151	78	605	0.50	0.24	1.86	2.26	0.00	0.16	0.14	265.84	0.57	0.26	0.03	1204	0.08	0.64	0.78	0.00	0.05	0.05	6.30	0.00	0.00	6.41
Tri-axle Dump Trucks		Off-Highway Trucks	2	8	252	402	2016	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	280	0.38	2.50	2.74	0.01	0.10	0.09	62.48	0.00	0.00	62.50
Vacuum excavator truck		Off-Highway Trucks	1	4	50	402	202	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	28	0.10	0.63	0.69	0.00	0.02	0.02	6.25	0.00	0.00	6.25
Welder		Welders	1	8	252	46	2016	0.45	0.26	2.06	1.74	0.00	0.07	0.06	255.73	0.57	0.26	0.00	134	0.09	0.75	0.64	0.00	0.02	0.02	10.67	0.00	0.00	10.68
Demolition					63															1.40	28.21	8.70	0.02	0.35	0.31	26.21	0.01	0.00	27.28
Abrasive/demo saw		Concrete/Industrial Saws	1	4	13	81	50	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	1393	0.19	1.66	1.45	0.00	0.05	0.05	1.23	0.00	0.00	1.36
Asphalt/Concrete crusher		Crushing/Proc. Equipment	1	6	21	85	125	0.78	0.53	21.52	1.66	0.01	0.05	0.03	655.82	0.57	0.26	0.94	9927	0.46	18.88	1.46	0.01	0.04	0.03	5.42	0.01	0.00	6.33
Backhoe		Tractors/Loaders/Backhoes	1	8	21	97	166	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	3	0.05	0.81	0.54	0.00	0.03	0.02	1.17	0.00	0.00	1.17
Compressor		Air Compressors	1	8	32	78	252	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	149	0.20	1.55	1.25	0.00	0.05	0.05	2.57	0.00	0.00	2.59
Excavator-Track hoe		Excavators	1	8	32	158	252	0.38	0.07	1.18	0.56	0.00	0.03	0.03	201.69	0.57	0.26	0.00	42	0.07	1.25	0.60	0.00	0.03	0.03	3.07	0.00	0.00	3.07
Front end loader (rubber)		Rubber Tired Loaders	1	4	50	203	202	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	16	0.05	0.28	0.47	0.00	0.02	0.01	2.82	0.00	0.00	2.82
Generator		Generator Sets	1	8	32	84	252	0.74	0.06	1.17	0.48	0.00	0.04	0.04	159.70	0.57	0.26	0.00	37	0.06	1.29	0.53	0.00	0.04	0.04	2.50	0.00	0.00	2.50
Grinder	https://www.essexequipment.com	Other Construction Equipment	1	2	13	11	25	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	15	0.01	0.04	0.05	0.00	0.00	0.00	0.04	0.00	0.00	0.04
Hoe Ram	attachment to tractor, backhoe	Tractors/Loaders/Backhoes	1	8	9	97	76	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	1	0.05	0.81	0.54	0.00	0.03	0.02	0.53	0.00	0.00	0.53
Jack hammers	https://www.edisons.com.au/bau	Other Construction Equipment	2	5	9	3.5	47	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	9	0.01	0.06	0.08	0.00	0.00	0.00	0.02	0.00	0.00	0.03
Tractor trailer		Off-Highway Trucks	1	2	47	402	95	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	13	0.05	0.31	0.34	0.00	0.01	0.01	2.93	0.00	0.00	2.93
Tri-axle Dump Trucks		Off-Highway Trucks	2	4	32	402	126	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	17	0.19	1.25	1.37	0.01	0.05	0.05	3.90	0.00	0.00	3.91
Earthwork					126															1.51	10.72	15.10	0.03	0.60	0.55	48.43	0.00	0.00	48.74
D5 Dozer		Rubber Tired Dozers	1	8	63	247	504	0.40	0.18	1.04	1.95	0.00	0.09	0.08	209.04	0.57	0.26	0.03	3131	0.31	1.81	3.40	0.00	0.15	0.14	10.41	0.00	0.00	10.70
Excavator-Track hoe		Excavators	1	8	13	158	101	0.38	0.07	1.18	0.56	0.00	0.03	0.03	201.69	0.57	0.26	0.00	17	0.07	1.25	0.60	0.00	0.03	0.03	1.23	0.00	0.00	1.23
Front end loader (rubber)		Rubber Tired Loaders	1	5	101	203	504	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	40	0.06	0.35	0.59	0.00	0.02	0.02	7.05	0.00	0.00	7.05
Gradall		Graders	1	8	42	187	333	0.41	0.12	0.53	1.32	0.00	0.04	0.04	215.93	0.57	0.26	0.00	59	0.16	0.71	1.78	0.00	0.06	0.05	5.49	0.00	0.00	5.49
Pan		Scrapers	1	8	6	367	50	0.48	0.11	0.85	1.19	0.00	0.05	0.04	255.22	0.57	0.26	0.00	7	0.36	2.65	3.73	0.01	0.14	0.13	2.28	0.00	0.00	2.28
Road Grader		Graders	1	8	6	187	50	0.41	0.12	0.53	1.32	0.00	0.04	0.04	215.93	0.57	0.26	0.00	9	0.16	0.71	1.78	0.00	0.06	0.05	0.83	0.00	0.00	0.83
Roller-sheepsfoot		Rollers	1	8	25	80	202	0.38	0.10	1.28	1.09	0.00	0.06	0.05	198.12	0.57	0.26	0.00	51	0.05	0.68	0.58	0.00	0.03	0.03	1.20	0.00	0.00	1.20
Roller-vibratory		Rollers	1	8	25	80	202	0.38	0.10	1.28	1.09	0.00	0.06	0.05	198.12	0.57	0.26	0.00	51	0.05	0.68	0.58	0.00	0.03	0.03	1.20	0.00	0.00	1.20
Tri-axle Dump Trucks		Off-Highway Trucks	2	6	101	402	605	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	84	0.29	1.88	2.06	0.01	0.07	0.07	18.74	0.00	0.00	18.75
Foundations					84															0.77	6.75	6.75	0.02	0.27	0.25	28.19	0.01	0.00	29.32
Backhoe		Tractors/Loaders/Backhoes	1	8	67	97	538	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	10	0.05	0.81	0.54	0.00	0.03	0.02	3.77	0.00	0.00	3.77
Concrete mixer		Cement and Mortar Mixers	1	8	8	9	67	0.56	0.31	1.82	2.35	0.00	0.09	0.08	318.42	0.57	0.26	0.10	61	0.03	0.16	0.21	0.00	0.01	0.01	0.11	0.00	0.00	0.11
Concrete pump		Pumps	1	4	42	84	168	0.74	0.03	1.01	0.53	0.00	0.03	0.03	159.70	0.57	0.26	0.01	142	0.02	0.55	0.29	0.00	0.02	0.02	1.67	0.00	0.00	1.68
Concrete truck		Off-Highway Trucks	1	4	42	402	168	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	23	0.10	0.63	0.69	0.00	0.02	0.02	5.21	0.00	0.00	5.21
Concrete vibrator	https://www.indiamart.com/prod	Other Construction Equipment	1	4	42	5.5	168	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	49	0.01	0.04	0.05	0.00	0.00	0.00	0.14	0.00	0.00	0.14
Crane		Cranes	1	8	8	231	67	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	27	0.11	0.61	1.17	0.00	0.05	0.05	0.68	0.00	0.00	0.68
Excavator-Track hoe		Excavators	1	8	21	158	168	0.38	0.07	1.18	0.56	0.00	0.03	0.03	201.69	0.57	0.26	0.00	28	0.07	1.25	0.60	0.00	0.03	0.03	2.04	0.00	0.00	2.05
Front end loader (rubber)		Rubber Tired Loaders	1	8	67	203	538	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	43	0.10	0.56	0.95	0.00	0.03	0.03	7.52	0.00	0.00	7.53
Pile driver		Bore/Drill Rigs	1	6	8	221	50	0.50	0.06	0.53	0.60	0.00	0.02	0.02	263.10	0.57	0.26	0.02	205	0.09	0.78	0.88	0.00	0.03	0.03	1.47	0.00	0.00	1.49
Roller-vibratory-walk behind	https://www.doosanportablepow	Rollers	1	2	25	6	50	0.38	1.51	4.14	2.87	0.00	0.39	0.36	220.05	0.57	0.26	38.63	11681	0.01	0.04	0.03	0.00	0.00	0.00	0.02	0.01	0.00	1.10
Tractor Trailer		Off-Highway Trucks	1	2	42	402	84	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	12	0.05	0.31	0.34	0.00	0.01	0.01	2.60	0.00	0.00	2.60
Tri-axle Dump Trucks		Off-Highway Trucks	2	2	42	402	84	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	12	0.10	0.63	0.69	0.00	0.02	0.02	2.60	0.00	0.00	2.60
Welder		Welders	1	4	17	46	67	0.45	0.26	2.06	1.74	0.00	0.07	0.06	255.73	0.57	0.26	0.00	4	0.05	0.38	0.32	0.00	0.01	0.01	0.36	0.00	0.00	0.36
Roadway Paving					84															1.34	11.47	11.51	0.03	0.46	0.42	17.62	0.00	0.00	17.70
Asphalt Pavers		Pavers	2	6	13	130	81	0.42	0.08	1.25	0.83	0.00	0.04	0.04	219.72	0.57	0.26	0.01	98	0.12	1.78	1.18	0.00	0.06	0.05	0.96	0.00	0.00	0.97
Backhoe		Tractors/Loaders/Backhoes	1	8	42	97	336	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	6	0.05	0.81	0.54	0.00	0.03	0.02	2.35	0.00	0.00	2.35
Concrete trucks		Off-Highway Trucks	2	4	17	402	67	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	9	0.19	1.25	1.37	0.01	0.05	0.05	2.08	0.00	0.00	2.08
Concrete vibrator	https://www.indiamart.com/prod	Other Construction Equipment	1	4	17	5.5	67	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	20	0.01	0.04	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.06
Core drill machine (testing)		Bore/Drill Rigs	1	4	2	221	7	0.50	0.06	0.53	0.60	0.00	0.02	0.02	263.10	0.57	0.26	0.02	27	0.06	0.52	0.59	0.00	0.02	0.02	0.20	0.00	0.00	0.20
Demo/Concrete saws		Concrete/Industrial Saws	2	4	4	81	17	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	464	0.38	3.33	2.90	0.01	0.10	0.09	0.41	0.00	0.00	0.45
Dozer		Rubber Tired Dozers	1	4	8	247	34	0.40	0.18	1.04	1.95	0.00	0.09	0.08	209.04	0.57	0.26	0.03	209	0.16	0.90	1.70	0.00	0.08	0.07	0.69	0.00	0.00	0.71
Front end loader (rubber)		Rubber Tired Loaders	1	8	25	203	202	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	16	0.10	0.56	0.95	0.00	0.03	0.03	2.82	0.00	0.00	2.82
Roller-smooth drum		Rollers	1	8	25	80	202	0.38	0.10	1.28	1.09	0.00	0.06	0.05	198.12	0.57	0.26	0.00	51	0.05	0.68	0.58	0.00	0.03	0.03	1.20	0.00	0.00	1.20
Rollers-vibratory		Rollers	1	4	25	80	101	0.38	0.10	1.28	1.09	0.00	0.06	0.05	198.12	0.57	0.26	0.00	25	0.03	0.34	0.29	0.00	0.02	0.01	0.60	0.00	0.00	0.60
Tri-axle Dump Trucks		Off-Highway Trucks	2	4	50	402	202	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	28	0.19	1.25	1.37	0.01	0.05	0.05	6.25	0.00	0.00	6.25
Building					399															2.06	18.31	15.65	0.03	0.62	0.57	88.45	0.01	0.01	90.39
Abrasive/demo saw		Concrete/Industrial Saws	1	2	20	81	40	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	1103	0.10	0.83	0.73	0.00	0.03	0.02	0.98	0.00	0.00	1.08
Backhoe		Tractors/Loaders/Backhoes	1	8	200	97	1596	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	31	0.05	0.81	0.54	0.00	0.03	0.02	11.18	0.00	0.00	11.18
Circular saws		Concrete/Industrial Saws	2	4	120	81	479	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	13237	0.38	3.33	2.90	0.01	0.10	0.09	11.73	0.01	0.00	12.95
Compressor		Air Compressors	1	8	200	78	1596	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	944	0.20	1.55	1.25	0.00	0.05	0.05	16.30	0.00	0.00	16.39
Concrete finisher		Paving Equipment	1	4	80	132	319	0.36	0.08	1.10	0.75	0.00	0.04	0.04	187.02	0.57	0.26	0.02	676	0.03	0.46	0.31	0.00	0.02	0.01	2.80	0.00	0.00	2.86
Concrete pump		Pumps	1	4	20	84	80	0.74	0.03	1.01	0.53	0.00	0.03	0.03	159.70	0.57	0.26	0.01	68	0.02	0.55	0.29	0.00	0.02	0.02	0.79	0.00	0.00	0.80
Concrete saw		Concrete/Industrial Saws	1	8	8	81	64	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	1765	0.38	3.33	2.90	0.01	0.10	0.09	1.56	0.00	0.00	1.73
Concrete truck		Off-Highway Trucks	1	4	20	402	80	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	11	0.10	0.63	0.69	0.00	0.02	0.02	2.47	0.00	0.00	2.47
Concrete vibrator	https://www.indiamart.com/prod	Other Construction Equipment	1	4	20	5.5	80	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	23	0.01	0.04	0.05	0.00	0.00	0.00	0.06	0.00	0.00	0.07
Crane		Cranes	1	6	8	231	48	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	20	0.08	0.46	0.88	0.00	0.04	0.03	0.48	0.00	0.00	0.49
Front end loader (rubber)		Rubber Tired Loaders	1	4	200	203	798	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	63	0.05	0.28	0.47	0.00	0.02	0.01	11.16	0.00	0.00	11.17
Generator		Generator Sets	1	8	200	84	1596	0.74	0.06	1.17	0.48	0.00	0.04	0.04	159.70	0.57	0.26	0.00	235	0.06	1.29	0.53	0.00	0.04	0.04	15.84	0.00	0.00	15.86
Grinder	https://www.essexequipment.com	Other Construction Equipment	1	4	80	11	319	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	188	0.01	0.08	0.10	0.00	0.00	0.00	0.51	0.00	0.00	0.53
Jack hammers	https://www.edisons.com.au/bau	Other Construction Equipment	2	4	8	3.5	32	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	6	0.01	0.05	0.07	0.00	0.00	0.00	0.02	0.00	0.00	0.02
Lull		Forklifts	1	4	120	89	479	0.20	0.06	0.73	0.60	0.00	0.04	0.03	105.95	0.57	0.26	0.00	4	0.01	0.12	0.09	0.00	0.01	0.01	0.91	0.00	0.00	0.91
Mortar mixer		Cement and Mortar Mixers	1	4	120	9	479	0.56	0.31	1.82	2.35	0.00	0.09	0.08	318.42	0.57	0.26	0.10	438	0.01	0.08	0.10	0.00	0.00	0.00	0.77	0.00	0.00	0.81
Nail guns	electric/hand-held	Other Construction Equipment	2	4	80	0	319	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paint sprayers	assumes powered by air compress	Air Compressors	2	8	8	78	64	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	38	0.39	3.10	2.51	0.00	0.10	0.09	0.65	0.00	0.00	0.66
Table saw		Concrete/Industrial Saws	1	2	40	81	80	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	2206	0.10	0.83	0.73	0.00	0.03	0.02	1.96	0.00	0.00	2.16
Tractor trailer		Off-Highway Trucks	1	2	120	402	239	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	33	0.05	0.31	0.34	0.00	0.01	0.01	7.42	0.00	0.00	7.42
Welder		Welders	1	2	80	46	160	0.45	0.26	2.06	1.74	0.00	0.07	0.06	255.73	0.57	0.26	0.00	11	0.02	0.19	0.16	0.00	0.01	0.01	0.84	0.00	0.00	0.85
Bridge(assume precast)					126															1.40	12.84	11.54	0.03	0.46	0.42	37.88	0.00	0.00	38.22
Abrasive/demo saw		Concrete/Industrial Saws	1	4	6	81	25	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	697	0.19	1.66	1.45	0.00	0.05	0.05	0.62	0.00	0.00	0.68
Backhoe		Tractors/Loaders/Backhoes	1	8	63	97	504	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	10	0.05	0.81	0.54	0.00	0.03	0.02	3.53	0.00	0.00	3.53
Circular saws		Concrete/Industrial Saws	2	2	25	81	50	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	1393	0.19	1.66	1.45	0.00	0.05	0.05	1.23	0.00	0.00	1.36
Compressor		Air Compressors	1	6	63	78	378	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	224	0.15	1.16	0.94	0.00	0.04	0.03	3.86	0.00	0.00	3.88
Concrete drill	assumes powered by air compress	Air Compressors	1	4	6	78	25	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	15	0.10	0.78	0.63	0.00	0.02	0.02	0.26	0.00	0.00	0.26
Concrete finisher		Paving Equipment	1	4	13	132	50	0.36	0.08	1.10	0.75	0.00	0.04	0.04	187.02	0.57	0.26	0.02	107	0.03	0.46	0.31	0.00	0.02	0.01	0.44	0.00	0.00	0.45
Concrete mixer		Cement and Mortar Mixers	1	4	13	9	50	0.56	0.31	1.82	2.35	0.00	0.09	0.08	318.42	0.57	0.26	0.10	46	0.01	0.08	0.10	0.00	0.00	0.00	0.08	0.00	0.00	0.09
Concrete pump		Pumps	1	4	25	84	101	0.74	0.03	1.01	0.53	0.00	0.03	0.03	159.70	0.57	0.26	0.01	85	0.02	0.55	0.29	0.00	0.02	0.02	1.00	0.00	0.00	1.01
Concrete saw		Concrete/Industrial Saws	1	0	0	81	0	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete truck		Off-Highway Trucks	1	4	25	402	101	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	14	0.10	0.63	0.69	0.00	0.02	0.02	3.12	0.00	0.00	3.13
Concrete vibrator	https://www.indiamart.com/prod	Other Construction Equipment	1	4	25	5.5	101	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	30	0.01	0.04	0.05	0.00	0.00	0.00	0.08	0.00	0.00	0.08
Crane		Cranes	1	8	25	231	202	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	82	0.11	0.61	1.17	0.00	0.05	0.05	2.04	0.00	0.00	2.05
Excavator		Excavators	1	8	25	158	202	0.38	0.07	1.18	0.56	0.00	0.03	0.03	201.69	0.57	0.26	0.00	33	0.07	1.25	0.60	0.00	0.03	0.03	2.45	0.00	0.00	2.46
Front end loader (rubber)		Rubber Tired Loaders	1	8	50	203	403	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	32	0.10	0.56	0.95	0.00	0.03	0.03	5.64	0.00	0.00	5.64
Generator		Generator Sets	1	4	101	84	403	0.74	0.06	1.17	0.48	0.00	0.04	0.04	159.70	0.57	0.26	0.00	59	0.03	0.64	0.27	0.00	0.02	0.02	4.00	0.00	0.00	4.01
Grinder	https://www.essexequipment.com	Other Construction Equipment	1	8	25	11	202	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	119	0.03	0.16	0.21	0.00	0.01	0.01	0.32	0.00	0.00	0.34
Jack hammers	https://www.edisons.com.au/bau	Other Construction Equipment	2	2	6	3.5	13	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	2	0.00	0.03	0.03	0.00	0.00	0.00	0.01	0.00	0.00	0.01
Nail guns	electric/hand-held	Other Construction Equipment	2	4	25	0	101	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Driver		Bore/Drill Rigs	1	8	19	221	151	0.50	0.06	0.53	0.60	0.00	0.02	0.02	263.10	0.57	0.26	0.02	616	0.12	1.04	1.17	0.00	0.04	0.03	4.42	0.00	0.00	4.47
Tractor trailer		Off-Highway Trucks	1	2	63	402	126	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	17	0.05	0.31	0.34	0.00	0.01	0.01	3.90	0.00	0.00	3.91
Vibratory Plate tamper		Plate Compactors	1	2	38	8	76	0.43	0.24	1.49	1.78	0.00	0.07	0.06	244.37	0.57	0.26	0.09	53	0.00	0.02	0.03	0.00	0.00	0.00	0.06	0.00	0.00	0.07
Welder		Welders	1	4	38	46	151	0.45	0.26	2.06	1.74	0.00	0.07	0.06	255.73	0.57	0.26	0.00	10	0.05	0.38	0.32	0.00	0.01	0.01	0.80	0.00	0.00	0.80
Trackwork- Ballasted- (top of sub ballast up)					210															1.10	9.19	8.71	0.02	0.37	0.34	81.18	0.00	0.00	81.78
Air Compressor		Air Compressors	1	8	168	78	1344	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	795	0.20	1.55	1.25	0.00	0.05	0.05	13.73	0.00	0.00	13.80
Backhoe		Tractors/Loaders/Backhoes	1	8	168	97	1344	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	26	0.05	0.81	0.54	0.00	0.03	0.02	9.42	0.00	0.00	9.42
Ballast cars (dump)	assumes no separate engine	Other Material Handling Equipment	2	6	42	0	252	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ballast Compactor		Plate Compactors	1	4	42	8	168	0.43	0.24	1.49	1.78	0.00	0.07	0.06	244.37	0.57	0.26	0.09	117	0.01	0.05	0.05	0.00	0.00	0.00	0.14	0.00	0.00	0.15
Ballast Regulator	https://www.progressrail.com/en/	Other General Industrial Equipment	1	4	42	250	168	0.34	0.07	0.40	0.67	0.00	0.02	0.02	180.73	0.57	0.26	0.00	187	0.05	0.30	0.51	0.00	0.02	0.01	2.59	0.00	0.00	2.61
Front end loader (rubber)		Rubber Tired Loaders	1	4	168	203	672	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	53	0.05	0.28	0.47	0.00	0.02	0.01	9.40	0.00	0.00	9.41
Generator		Generator Sets	1	4	52.5	84	210	0.74	0.06	1.17	0.48	0.00	0.04	0.04	159.70	0.57	0.26	0.00	31	0.03	0.64	0.27	0.00	0.02	0.02	2.08	0.00	0.00	2.09
Power wrench	assumes powered by air compress	Air Compressors	1	4	21	78	84	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	50	0.10	0.78	0.63	0.00	0.02	0.02	0.86	0.00	0.00	0.86
Prentice Loader (hi rail log loader)	http://s7d2.scene7.com/is/conten	Tractors/Loaders/Backhoes	1	4	63	160	252	0.37	0.07	1.14	0.56	0.00	0.03	0.03	193.81	0.57	0.26	0.00	45	0.04	0.59	0.29	0.00	0.01	0.01	2.89	0.00	0.00	2.90
Rail drill	assumes powered by air compress	Other Construction Equipment	1	2	42	78	84	0.42	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	50	0.04	0.34	0.27	0.00	0.01	0.01	0.74	0.00	0.00	0.75
Rail Profile Grinder	https://www.pandrol.com/us/pro	Other Construction Equipment	1	4	21	6.4	84	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	29	0.01	0.05	0.06	0.00	0.00	0.00	0.08	0.00	0.00	0.08
Rail saw		Concrete/Industrial Saws	1	1	157.5	81	158	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	4354	0.05	0.42	0.36	0.00	0.01	0.01	3.86	0.00	0.00	4.26
Rail Train **	modeled in deliveries tab	Other General Industrial Equipment	1	8	10.5	0	84	0.34											0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ral heater/vibrator	assumes to be powered by air com	Air Compressors	1	2	126	78	252	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	149	0.05	0.39	0.31	0.00	0.01	0.01	2.57	0.00	0.00	2.59
Speedswing (360 on track crane)		Cranes	1	8	168	231	1344	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	549	0.11	0.61	1.17	0.00	0.05	0.05	13.59	0.00	0.00	13.64
Spiking gun*	assumes to not be used per notes	Other Construction Equipment	0	0	126	171	0	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tamper/Liner	assumes max 100 hp	Other Construction Equipment	1	6	42	100	252	0.42	0.16	1.49	1.47	0.00	0.10	0.09	219.44	0.57	0.26	0.01	130	0.09	0.82	0.81	0.00	0.05	0.05	2.30	0.00	0.00	2.31
Tie Drill	electric/hand-held	Other Construction Equipment	1	6	126	0	756	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractor Trailer		Off-Highway Trucks	1	2	21	402	42	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	6	0.05	0.31	0.34	0.00	0.01	0.01	1.30	0.00	0.00	1.30
Tri Axle dump trucks		Off-Highway Trucks	2	4	126	402	504	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	70	0.19	1.25	1.37	0.01	0.05	0.05	15.62	0.00	0.00	15.63
Trackwork- Direct Fixation					63															1.09	9.92	8.17	0.02	0.34	0.32	15.63	0.00	0.00	15.91
Air Compressor		Air Compressors	1	8	32	78	252	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	149	0.20	1.55	1.25	0.00	0.05	0.05	2.57	0.00	0.00	2.59
Backhoe		Tractors/Loaders/Backhoes	1	8	13	97	101	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	2	0.05	0.81	0.54	0.00	0.03	0.02	0.71	0.00	0.00	0.71
Circular / Table saw		Concrete/Industrial Saws	1	2	6	81	13	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	348	0.10	0.83	0.73	0.00	0.03	0.02	0.31	0.00	0.00	0.34
Concrete drill	assumes powered by air compress	Air Compressors	1	4	32	78	126	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	75	0.10	0.78	0.63	0.00	0.02	0.02	1.29	0.00	0.00	1.29
Concrete grinder	https://hupshenghardware.com/p	Other Construction Equipment	1	2	32	6	63	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	20	0.00	0.02	0.03	0.00	0.00	0.00	0.06	0.00	0.00	0.06
Concrete mixer		Cement and Mortar Mixers	1	4	32	9	126	0.56	0.31	1.82	2.35	0.00	0.09	0.08	318.42	0.57	0.26	0.10	115	0.01	0.08	0.10	0.00	0.00	0.00	0.20	0.00	0.00	0.21
Concrete pump		Pumps	1	2	6	84	13	0.74	0.03	1.01	0.53	0.00	0.03	0.03	159.70	0.57	0.26	0.01	11	0.01	0.28	0.15	0.00	0.01	0.01	0.13	0.00	0.00	0.13
Concrete truck		Off-Highway Trucks	1	2	6	402	13	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	2	0.05	0.31	0.34	0.00	0.01	0.01	0.39	0.00	0.00	0.39
Concrete vibrator	https://www.indiamart.com/prod	Other Construction Equipment	1	2	6	5.5	13	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	4	0.00	0.02	0.03	0.00	0.00	0.00	0.01	0.00	0.00	0.01
Front end loader (rubber)		Rubber Tired Loaders	1	4	32	203	126	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	10	0.05	0.28	0.47	0.00	0.02	0.01	1.76	0.00	0.00	1.76
Generator		Generator Sets	1	8	32	84	252	0.74	0.06	1.17	0.48	0.00	0.04	0.04	159.70	0.57	0.26	0.00	37	0.06	1.29	0.53	0.00	0.04	0.04	2.50	0.00	0.00	2.50
Nail guns (air)	assumes powered by air compress	Air Compressors	1	2	6	78	13	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	7	0.05	0.39	0.31	0.00	0.01	0.01	0.13	0.00	0.00	0.13
Power wrench	assumes powered by air compress	Air Compressors	1	2	3	78	6	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	4	0.05	0.39	0.31	0.00	0.01	0.01	0.06	0.00	0.00	0.06
Prentice Loader (hi rail log loader)	http://s7d2.scene7.com/is/conten	Tractors/Loaders/Backhoes	1	2	32	160	63	0.37	0.07	1.14	0.56	0.00	0.03	0.03	193.81	0.57	0.26	0.00	11	0.02	0.30	0.15	0.00	0.01	0.01	0.72	0.00	0.00	0.72
Pressure washer	http://www.ultimatewasher.com/	Other Construction Equipment	1	1	32	10	32	0.42	0.16	0.97	1.31	0.00	0.06	0.05	170.09	0.57	0.26	0.22	70	0.00	0.01	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.03
Rail drill	assumes powered by air compress	Other Construction Equipment	1	2	38	78	76	0.42	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.00	0	0.04	0.34	0.27	0.00	0.01	0.01	0.67	0.00	0.00	0.67
Rail Profile Grinder	https://www.pandrol.com/us/pro	Other Construction Equipment	1	2	38	6.4	76	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	26	0.00	0.02	0.03	0.00	0.00	0.00	0.07	0.00	0.00	0.07
Rail saw		Concrete/Industrial Saws	1	2	38	81	76	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	2090	0.10	0.83	0.73	0.00	0.03	0.02	1.85	0.00	0.00	2.04
Ral heater/vibrator	assumes to be powered by air com	Air Compressors	1	4	13	78	50	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	30	0.10	0.78	0.63	0.00	0.02	0.02	0.51	0.00	0.00	0.52
Speedswing (360 on track crane)		Cranes	1	4	32	231	126	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	52	0.05	0.30	0.59	0.00	0.02	0.02	1.27	0.00	0.00	1.28
Tractor Trailer		Off-Highway Trucks	1	2	6	402	13	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	2	0.05	0.31	0.34	0.00	0.01	0.01	0.39	0.00	0.00	0.39
Major Equipment					126															0.55	4.81	4.06	0.01	0.17	0.16	7.51	0.00	0.00	7.52
Concrete drill	assumes powered by air compress	Air Compressors	1	3	13	78	38	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	22	0.07	0.58	0.47	0.00	0.02	0.02	0.39	0.00	0.00	0.39
Concrete grinder	https://hupshenghardware.com/p	Other Construction Equipment	1	3	13	6	38	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	12	0.01	0.03	0.04	0.00	0.00	0.00	0.03	0.00	0.00	0.03
Crane		Cranes	1	4	13	231	50	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	21	0.05	0.30	0.59	0.00	0.02	0.02	0.51	0.00	0.00	0.51
Fork lift		Forklifts	1	4	63	89	252	0.20	0.06	0.73	0.60	0.00	0.04	0.03	105.95	0.57	0.26	0.00	2	0.01	0.12	0.09	0.00	0.01	0.01	0.48	0.00	0.00	0.48
Front end loader		Tractors/Loaders/Backhoes	1	4	63	97	252	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	5	0.03	0.41	0.27	0.00	0.01	0.01	1.77	0.00	0.00	1.77
Generator		Generator Sets	1	4	76	84	302	0.74	0.06	1.17	0.48	0.00	0.04	0.04	159.70	0.57	0.26	0.00	45	0.03	0.64	0.27	0.00	0.02	0.02	3.00	0.00	0.00	3.01
Impact guns	assumes powered by air compress	Air Compressors	2	4	6	78	25	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	15	0.20	1.55	1.25	0.00	0.05	0.05	0.26	0.00	0.00	0.26
Steel drill	assumes to be powered by air com	Air Compressors	1	4	6	78	25	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	15	0.10	0.78	0.63	0.00	0.02	0.02	0.26	0.00	0.00	0.26
Steel grinder	https://www.essexequipment.com	Other Construction Equipment	1	4	6	11	25	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	15	0.01	0.08	0.10	0.00	0.00	0.00	0.04	0.00	0.00	0.04
Tractor Trailer		Off-Highway Trucks	1	2	13	402	25	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	3	0.05	0.31	0.34	0.00	0.01	0.01	0.78	0.00	0.00	0.78
Commissioning					42															0.21	1.32	1.99	0.00	0.11	0.10	5.23	0.00	0.00	5.27
Car Wash	Assumes no diesel engine	Air Compressors	0	8	42	78	336	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drop Table	Assumes no diesel engine	Forklifts	0	8	42	89	336	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Overhead Crane		Cranes	1	8	42	231	336	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	137	0.11	0.61	1.17	0.00	0.05	0.05	3.40	0.00	0.00	3.41
Wheel Truing Machine		Other General Industrial Equipment	1	8	42	88	336	0.34	0.19	1.34	1.55	0.00	0.12	0.11	181.11	0.57	0.26	0.01	365	0.10	0.71	0.82	0.00	0.06	0.06	1.83	0.00	0.00	1.86

	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Maximum Daily Scenarios - Off-Road Equipment Emissions	lbs/day					
Survey, Clear and Grub	1.54	12.00	13.12	0.03	0.54	0.49
Clear and Grub, Site Util/Electric, Demo, Earthwork	6.53	69.20	53.72	0.13	2.17	1.99
Site Util/Electric, Earthwork, Foundations, Bridge, Roadways/Paving	7.30	61.31	63.08	0.15	2.52	2.32
Site Util/Electric, Foundations, Bridge, Roadways/Paving, Buildings	7.84	68.90	63.63	0.16	2.55	2.34
Site Util/Electric, Buildings, Trackwork-Ballasted, Major Equip	5.98	51.83	46.60	0.11	1.90	1.75
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	5.97	52.56	46.05	0.11	1.87	1.72

On-Road Construction Emissions - Phase 1

Project Component/On-Road Vehicles	Days	Daily Trips	Trip Distance (One-way)	Total VMT	Emissions Factors (g/mi for RunEx, BW, TW and g/trip for StartEx)																			
					ROG RunEx	ROG StartEx	CO RunEx	CO StartEX	NOx RunEx	NOx StartEx	SOx RunEx	SOx StartEx	PM$_{10}$ RunEx	PM$_{10}$ StartEx	PM$_{10}$ BW, TW	PM$_{2.5}$ RunEx	PM$_{2.5}$ StartEx	PM$_{2.5}$ BW, TW	CO$_2$ RunEx	CO$_2$ StartEx	CH$_4$ RunEx	CH$_4$ StartEx	N$_2$O RunEx	N$_2$O StartEx
Survey																								
Concrete Trucks	42	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	42	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	42	6	14.7	88	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Clear and Grub																								
Concrete Trucks	63	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	63	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	63	20	14.7	294	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Site Utilities																								
Concrete Trucks	504	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	504	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	504	32	14.7	470	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Demolition																								
Concrete Trucks	63	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	63	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	63	20	14.7	294	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Earthwork																								
Concrete Trucks	126	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	126	119	20.0	2,381	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Haul Trucks - Ballast Delivery (Occurs over 80 days months 4 through 6 and 9)	80	27	20.0	540	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	126	32	14.7	470	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Foundations																								
Concrete Trucks (conservatively included during foundations phase [shorter than building phase])	84	4	6.9	27	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	84	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	84	48	14.7	706	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Roadway Paving																								
Concrete Trucks	84	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	84	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	84	30	14.7	441	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Building																								
Concrete Trucks	399		6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	399		20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	399	114	14.7	1,676	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Bridge(assume precast)																								
Concrete Trucks	126	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	126	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	126	72	14.7	1,058	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Trackwork- Ballasted- (top of sub ballast up)																								
Concrete Trucks	210	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	63	5	20.0	91	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	210	60	14.7	882	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Trackwork- Direct Fixation																								
Concrete Trucks	63	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	63	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	63	20	14.7	294	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Major Equipment																								
Concrete Trucks	126	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	126	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	126	66	14.7	970	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Commissioning																								
Concrete Trucks	42	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	42	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	42	6	14.7	88	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261

Project Component/On-Road Vehicles	Emissions (lbs/day)																				Emissions (MT/phase)			MT
	ROG RunEx	ROG StartEx	CO RunEx	CO StartEX	NOx RunEx	NOx StartEx	SOx RunEx	SOx StartEx	PM$_{10}$ RunEx	PM$_{10}$ StartEx	PM$_{10}$ BW, TW	PM$_{2.5}$ RunEx	PM$_{2.5}$ StartEx	PM$_{2.5}$ BW, TW	CO$_2$ RunEx	CO$_2$ StartEx	CH$_4$ RunEx	CH$_4$ StartEx	N$_2$O RunEx	N$_2$O StartEx	CO$_2$	CH$_4$	N$_2$O	CO$_2$e
Survey	0.0021	0.0031	0.1359	0.0296	0.0086	0.0027	0.0005	0.0000	0.0003	0.0000	0.0522	0.0003	0.0000	0.0141	55.4330	0.7895	0.0005	0.0007	0.0010	0.0003	1.0711	0.0000	0.0000	1.0792
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0021	0.0031	0.1359	0.0296	0.0086	0.0027	0.0005	0.0000	0.0003	0.0000	0.0522	0.0003	0.0000	0.0141	55.4330	0.7895	0.0005	0.0007	0.0010	0.0003	1.07	0.00	0.00	1.079223
Clear and Grub	0.0070	0.0103	0.4531	0.0985	0.0288	0.0089	0.0018	0.0000	0.0010	0.0001	0.1741	0.0009	0.0001	0.0471	184.7766	2.6316	0.0018	0.0023	0.0033	0.0012	5.3554	0.0001	0.0001	5.3961
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0070	0.0103	0.4531	0.0985	0.0288	0.0089	0.0018	0.0000	0.0010	0.0001	0.1741	0.0009	0.0001	0.0471	184.7766	2.6316	0.0018	0.0023	0.0033	0.0012	5.36	0.00	0.00	5.396116
Site Utilities	0.0111	0.0166	0.7250	0.1576	0.0461	0.0143	0.0029	0.0000	0.0016	0.0001	0.2786	0.0015	0.0001	0.0754	295.6426	4.2106	0.0029	0.0037	0.0053	0.0018	68.5496	0.0015	0.0016	69.0703
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0111	0.0166	0.7250	0.1576	0.0461	0.0143	0.0029	0.0000	0.0016	0.0001	0.2786	0.0015	0.0001	0.0754	295.6426	4.2106	0.0029	0.0037	0.0053	0.0018	68.55	0.00	0.00	69.07029
Demolition	0.0070	0.0103	0.4531	0.0985	0.0288	0.0089	0.0018	0.0000	0.0010	0.0001	0.1741	0.0009	0.0001	0.0471	184.7766	2.6316	0.0018	0.0023	0.0033	0.0012	5.3554	0.0001	0.0001	5.3961
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0070	0.0103	0.4531	0.0985	0.0288	0.0089	0.0018	0.0000	0.0010	0.0001	0.1741	0.0009	0.0001	0.0471	184.7766	2.6316	0.0018	0.0023	0.0033	0.0012	5.36	0.00	0.00	5.396116
Earthwork	0.0989	0.0166	1.6805	0.1576	10.4418	1.1710	0.0835	0.0000	0.0742	0.0001	2.3495	0.0710	0.0001	0.6576	8823.7771	4.2106	0.0069	0.0037	1.3458	0.0018	471.6464	0.0006	0.0718	493.0719
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0715	0.0000	0.7789	0.0000	8.4739	0.9429	0.0657	0.0000	0.0592	0.0000	1.6881	0.0566	0.0000	0.4745	6951.5279	0.0000	0.0033	0.0000	1.0927	0.0000	397.30	0.00	0.06	415.9129
Haul Trucks - Ballast Delivery (Occurs over 80 days months 4 through 6 and 9)	0.0162	0.0000	0.1766	0.0000	1.9219	0.2139	0.0149	0.0000	0.0134	0.0000	0.3829	0.0128	0.0000	0.1076	1576.6065	0.0000	0.0008	0.0000	0.2478	0.0000	57.21	0.00	0.01	59.89145
Workers	0.0111	0.0166	0.7250	0.1576	0.0461	0.0143	0.0029	0.0000	0.0016	0.0001	0.2786	0.0015	0.0001	0.0754	295.6426	4.2106	0.0029	0.0037	0.0053	0.0018	17.14	0.00	0.00	17.26757
Foundations	0.0178	0.0248	1.0973	0.2364	0.1916	0.0593	0.0051	0.0001	0.0033	0.0002	0.4368	0.0030	0.0002	0.1184	522.5593	6.3160	0.0043	0.0055	0.0203	0.0028	20.1511	0.0004	0.0009	20.4225
Concrete Trucks (conservatively included during foundations phase [shorter than building phase])	0.0011	0.0000	0.0099	0.0000	0.1225	0.0379	0.0007	0.0000	0.0008	0.0000	0.0190	0.0008	0.0000	0.0053	79.0954	0.0000	0.0001	0.0000	0.0124	0.0000	3.01	0.00	0.00	3.154887
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0167	0.0248	1.0874	0.2364	0.0691	0.0214	0.0044	0.0001	0.0024	0.0002	0.4178	0.0022	0.0002	0.1131	443.4639	6.3160	0.0043	0.0055	0.0079	0.0028	17.14	0.00	0.00	17.26757
Roadway Paving	0.0104	0.0155	0.6797	0.1478	0.0432	0.0134	0.0027	0.0000	0.0015	0.0001	0.2611	0.0014	0.0001	0.0707	277.1650	3.9475	0.0027	0.0034	0.0049	0.0017	10.7109	0.0002	0.0003	10.7922
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0104	0.0155	0.6797	0.1478	0.0432	0.0134	0.0027	0.0000	0.0015	0.0001	0.2611	0.0014	0.0001	0.0707	277.1650	3.9475	0.0027	0.0034	0.0049	0.0017	10.71	0.00	0.00	10.79223
Building	0.0397	0.0590	2.5827	0.5615	0.1642	0.0509	0.0104	0.0001	0.0057	0.0004	0.9923	0.0053	0.0004	0.2686	1053.2268	15.0004	0.0102	0.0131	0.0187	0.0066	193.3313	0.0042	0.0046	194.7998
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0397	0.0590	2.5827	0.5615	0.1642	0.0509	0.0104	0.0001	0.0057	0.0004	0.9923	0.0053	0.0004	0.2686	1053.2268	15.0004	0.0102	0.0131	0.0187	0.0066	193.33	0.00	0.00	194.7998
Bridge(assume precast)	0.0251	0.0372	1.6312	0.3547	0.1037	0.0322	0.0066	0.0001	0.0036	0.0003	0.6267	0.0033	0.0003	0.1696	665.1959	9.4739	0.0064	0.0083	0.0118	0.0041	38.5592	0.0008	0.0009	38.8520
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0251	0.0372	1.6312	0.3547	0.1037	0.0322	0.0066	0.0001	0.0036	0.0003	0.6267	0.0033	0.0003	0.1696	665.1959	9.4739	0.0064	0.0083	0.0118	0.0041	38.56	0.00	0.00	38.85204
Trackwork- Ballasted- (top of sub ballast up)	0.0236	0.0310	1.3892	0.2955	0.4118	0.0630	0.0080	0.0001	0.0053	0.0002	0.5871	0.0050	0.0002	0.1596	821.2686	7.8949	0.0055	0.0069	0.0518	0.0035	61.1825	0.0012	0.0025	61.9467
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0027	0.0000	0.0299	0.0000	0.3254	0.0362	0.0025	0.0000	0.0023	0.0000	0.0648	0.0022	0.0000	0.0182	266.9387	0.0000	0.0001	0.0000	0.0420	0.0000	7.63	0.00	0.00	7.985527
Workers	0.0209	0.0310	1.3593	0.2955	0.0864	0.0268	0.0055	0.0001	0.0030	0.0002	0.5223	0.0028	0.0002	0.1414	554.3299	7.8949	0.0054	0.0069	0.0098	0.0035	53.55	0.00	0.00	53.96116
Trackwork- Direct Fixation	0.0070	0.0103	0.4531	0.0985	0.0288	0.0089	0.0018	0.0000	0.0010	0.0001	0.1741	0.0009	0.0001	0.0471	184.7766	2.6316	0.0018	0.0023	0.0033	0.0012	5.3554	0.0001	0.0001	5.3961
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0070	0.0103	0.4531	0.0985	0.0288	0.0089	0.0018	0.0000	0.0010	0.0001	0.1741	0.0009	0.0001	0.0471	184.7766	2.6316	0.0018	0.0023	0.0033	0.0012	5.36	0.00	0.00	5.396116
Major Equipment	0.0230	0.0341	1.4952	0.3251	0.0950	0.0295	0.0060	0.0001	0.0033	0.0003	0.5745	0.0031	0.0002	0.1555	609.7629	8.6844	0.0059	0.0076	0.0108	0.0038	35.3459	0.0008	0.0008	35.6144
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0230	0.0341	1.4952	0.3251	0.0950	0.0295	0.0060	0.0001	0.0033	0.0003	0.5745	0.0031	0.0002	0.1555	609.7629	8.6844	0.0059	0.0076	0.0108	0.0038	35.35	0.00	0.00	35.61437
Commissioning	0.0021	0.0031	0.1359	0.0296	0.0086	0.0027	0.0005	0.0000	0.0003	0.0000	0.0522	0.0003	0.0000	0.0141	55.4330	0.7895	0.0005	0.0007	0.0010	0.0003	1.0711	0.0000	0.0000	1.0792
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0021	0.0031	0.1359	0.0296	0.0086	0.0027	0.0005	0.0000	0.0003	0.0000	0.0522	0.0003	0.0000	0.0141	55.4330	0.7895	0.0005	0.0007	0.0010	0.0003	1.07	0.00	0.00	1.079223
																								942.92

Maximum Daily Scenarios - On-Road Equipment Emissions
Survey, Clear and Grub
Clear and Grub, Site Util/Electric, Demo, Earthwork
Site Util/Electric, Earthwork, Foundations, Bridge, Roadways/Paving
Site Util/Electric, Foundations, Bridge, Roadways/Paving, Buildings
Site Util/Electric, Buildings, Trackwork-Ballasted, Major Equip
Site Util/Electric, Buildings, Trackwork-DF, Major Equip

Maximum Daily Scenarios - On-Road Equipment Emissions	ROG RunEx	ROG StartEx	CO RunEx	CO StartEX	NOx RunEx	NOx StartEx	SOx RunEx	SOx StartEx	PM$_{10}$ RunEx	PM$_{10}$ StartEx	PM$_{10}$ BW, TW	PM$_{2.5}$ RunEx	PM$_{2.5}$ StartEx	PM$_{2.5}$ BW, TW
Survey, Clear and Grub	0.0091	0.0134	0.5890	0.1281	0.0374	0.0116	0.0024	0.0000	0.0013	0.0001	0.2263	0.0012	0.0001	0.0613
Clear and Grub, Site Util/Electric, Demo, Earthwork	0.1240	0.0538	3.3117	0.5123	10.5455	1.2032	0.0901	0.0001	0.0779	0.0004	2.9762	0.0743	0.0004	0.8272
Site Util/Electric, Earthwork, Foundations, Bridge, Roadways/Paving	0.1634	0.1107	5.8136	1.0541	10.8264	1.2902	0.1009	0.0003	0.0843	0.0008	3.9527	0.0802	0.0008	1.0917
Site Util/Electric, Foundations, Bridge, Roadways/Paving, Buildings	0.1042	0.1531	6.7158	1.4580	0.5487	0.1700	0.0278	0.0004	0.0158	0.0012	2.5956	0.0145	0.0011	0.7027
Site Util/Electric, Buildings, Trackwork-Ballasted, Major Equip	0.0974	0.1407	6.1921	1.3398	0.7171	0.1577	0.0274	0.0003	0.0160	0.0011	2.4325	0.0148	0.0010	0.6590
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	0.0808	0.1200	5.2560	1.1428	0.3341	0.1036	0.0212	0.0003	0.0117	0.0009	2.0195	0.0108	0.0008	0.5466

Maximum Daily Scenarios - On-Road Equipment Emissions
Survey, Clear and Grub
Clear and Grub, Site Util/Electric, Demo, Earthwork
Site Util/Electric, Earthwork, Foundations, Bridge, Roadways/Paving
Site Util/Electric, Foundations, Bridge, Roadways/Paving, Buildings
Site Util/Electric, Buildings, Trackwork-Ballasted, Major Equip
Site Util/Electric, Buildings, Trackwork-DF, Major Equip

Maximum Daily Scenarios - On-Road Equipment Emissions	ROG	CO	NO$_X$	SO$_X$	PM$_{10}$	PM$_{2.5}$
Survey, Clear and Grub	0.0225	0.7171	0.0490	0.0024	0.2277	0.0626
Clear and Grub, Site Util/Electric, Demo, Earthwork	0.1777	3.8239	11.7487	0.0902	3.0545	0.9019
Site Util/Electric, Earthwork, Foundations, Bridge, Roadways/Paving	0.2741	6.8677	12.1166	0.1011	4.0378	1.1727
Site Util/Electric, Foundations, Bridge, Roadways/Paving, Buildings	0.2573	8.1738	0.7187	0.0282	2.6125	0.7183
Site Util/Electric, Buildings, Trackwork-Ballasted, Major Equip	0.2381	7.5319	0.8747	0.0277	2.4496	0.6748
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	0.2008	6.3988	0.4377	0.0215	2.0321	0.5582

Maximum Daily Scenarios - On-Road and Off-Road Equipment Emissions
Survey, Clear and Grub
Clear and Grub, Site Util/Electric, Demo, Earthwork
Site Util/Electric, Earthwork, Foundations, Bridge, Roadways/Paving
Site Util/Electric, Foundations, Bridge, Roadways/Paving, Buildings
Site Util/Electric, Buildings, Trackwork-Ballasted, Major Equip
Site Util/Electric, Buildings, Trackwork-DF, Major Equip

Maximum Daily Scenarios - On-Road and Off-Road Equipment Emissions	ROG	CO	NO$_X$	SO$_X$	PM$_{10}$	PM$_{2.5}$
Survey, Clear and Grub	1.5624	12.7128	13.1662	0.0318	0.7655	0.5573
Clear and Grub, Site Util/Electric, Demo, Earthwork	6.7043	73.0223	65.4729	0.2163	5.2252	2.8923
Site Util/Electric, Earthwork, Foundations, Bridge, Roadways/Paving	7.5704	68.1739	75.1981	0.2531	6.5621	3.4950
Site Util/Electric, Foundations, Bridge, Roadways/Paving, Buildings	8.0948	77.0711	64.3515	0.1836	5.1590	3.0611
Site Util/Electric, Buildings, Trackwork-Ballasted, Major Equip	6.2162	59.3638	47.4754	0.1369	4.3545	2.4273
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	6.1661	58.9623	46.4912	0.1284	3.9070	2.2830
Maximum Daily Emissions	8.0948	77.0711	75.1981	0.2531	6.5621	3.4950

Constants		
lb		grams
1		453.59237
ton		lbs
1		2000
metric ton		grams
1		1000000
GWP CO2e		CH4
25		1
GWP CO2e		N2O
298		1
ton		lbs
1		2000
metric ton		lbs
1		2204.623
metric ton		ton
0.907185		1

Trip Length Assumptions - CalEEMod		miles	Source	
				0.5
Workers		14.7	CalEEMod default for Orange County	3%
Vendor		6.9	CalEEMod default for Orange County	7%
Haul Trucks		20	CalEEMod default	3%

Sources:

1 Start year assumed to be 2023 based on completion year of 2028 and 4.5-year total construction period for Phases 1 and 2
2 Equipment types, quantities, usage from Orange County Maintenance Facility- Activities and equipment--Phase 1-with hours=06JAN21 Workbook
3 HP and Load factors from CalEEMod default tables (Appendix D), unless indicated otherwise.

Work Days Per Month		21

Off-Road Construction Emissions - Phase 2

Construction Year[1]

2026									Emissions Factors (g/bhp-hr)							Emission Factor (g/gal)				Emissions (lbs/day)						metric tons/phase			
Project Phase/Equipment	Notes		Number	Hours per Day	Total Days[1]	Horsepower	Total Runtime Hours	Load Factor [2]	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	gal/hp-hr	Total Gallons	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e
Survey					21															0.07	0.47	0.51	0.00	0.02	0.02	1.95	0.00	0.00	1.95
Impact hammer	electric/hand-held	Other Construction Equipment	1	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Power drill	electric/hand-held	Other Construction Equipment	1	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tool truck		Off-Highway Trucks	1	3	21	402	63	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	9	0.07	0.47	0.51	0.00	0.02	0.02	1.95	0.00	0.00	1.95
Site Utilities/Electric		.			84															2.15	18.49	17.02	0.04	0.70	0.64	27.25	0.00	0.00	27.44
Abrasive/demo saw	assumes diesel	Concrete/Industrial Saws	1	2	8	81	17	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	464	0.10	0.83	0.73	0.00	0.03	0.02	0.41	0.00	0.00	0.45
Backhoe		Tractors/Loaders/Backhoes	1	8	17	97	134	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	3	0.05	0.81	0.54	0.00	0.03	0.02	0.94	0.00	0.00	0.94
Bucket Truck		Off-Highway Trucks	1	8	21	402	168	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	23	0.19	1.25	1.37	0.01	0.05	0.05	5.21	0.00	0.00	5.21
Compressor		Air Compressors	1	8	42	78	336	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	199	0.20	1.55	1.25	0.00	0.05	0.05	3.43	0.00	0.00	3.45
Concrete mixer		Cement and Mortar Mixers	1	4	8	9	34	0.56	0.31	1.82	2.35	0.00	0.09	0.08	318.42	0.57	0.26	0.10	31	0.01	0.08	0.10	0.00	0.00	0.00	0.05	0.00	0.00	0.06
Concrete pump		Pumps	1	5	17	84	84	0.74	0.03	1.01	0.53	0.00	0.03	0.03	159.70	0.57	0.26	0.01	71	0.02	0.69	0.36	0.00	0.02	0.02	0.83	0.00	0.00	0.84
Concrete saw		Concrete/Industrial Saws	1	8	4	81	34	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	929	0.38	3.33	2.90	0.01	0.10	0.09	0.82	0.00	0.00	0.91
Concrete truck		Off-Highway Trucks	1	5	17	402	84	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	12	0.12	0.78	0.86	0.00	0.03	0.03	2.60	0.00	0.00	2.60
Concrete vibrator	https://www.indiamart	Other Construction Equipment	1	5	17	5.5	84	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	25	0.01	0.05	0.07	0.00	0.00	0.00	0.07	0.00	0.00	0.07
Excavator-Track hoe		Excavators	1	8	8	158	67	0.38	0.07	1.18	0.56	0.00	0.03	0.03	201.69	0.57	0.26	0.00	11	0.07	1.25	0.60	0.00	0.03	0.03	0.82	0.00	0.00	0.82
Front end loader (rubber)		Tractors/Loaders/Backhoes	1	8	8	97	67	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	1	0.05	0.81	0.54	0.00	0.03	0.02	0.47	0.00	0.00	0.47
Generator		Generator Sets	1	8	17	84	134	0.74	0.06	1.17	0.48	0.00	0.04	0.04	420.53	0.57	0.26	0.01	73	0.06	1.29	0.53	0.00	0.04	0.04	3.51	0.00	0.00	3.52
Gradall		Graders	1	8	4	187	34	0.41	0.12	0.53	1.32	0.00	0.04	0.04	215.93	0.57	0.26	0.00	6	0.16	0.71	1.78	0.00	0.06	0.05	0.55	0.00	0.00	0.56
Grinder	https://www.essexequi	Other Construction Equipment	1	2	42	11	84	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	49	0.01	0.04	0.05	0.00	0.00	0.00	0.14	0.00	0.00	0.14
Horizontal Boring /Jacking machine		Bore/Drill Rigs	1	0	0	221	0	0.50	0.06	0.53	0.60	0.00	0.02	0.02	263.10	0.57	0.26	0.02	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller-vibratory		Rollers	1	2	17	80	34	0.38	0.10	1.28	1.09	0.00	0.06	0.05	198.12	0.57	0.26	0.00	8	0.01	0.17	0.14	0.00	0.01	0.01	0.20	0.00	0.00	0.20
Tractor trailer		Off-Highway Trucks	1	2	17	402	34	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	5	0.05	0.31	0.34	0.00	0.01	0.01	1.04	0.00	0.00	1.04
Trenching machine (Ditch witch)		Trenchers	1	4	17	78	67	0.50	0.24	1.86	2.26	0.00	0.16	0.14	265.84	0.57	0.26	0.03	134	0.08	0.64	0.78	0.00	0.05	0.05	0.70	0.00	0.00	0.71
Tri-axle Dump Trucks		Off-Highway Trucks	2	8	17	402	134	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	19	0.38	2.50	2.74	0.01	0.10	0.09	4.17	0.00	0.00	4.17
Vacuum excavator truck		Off-Highway Trucks	1	4	2	402	7	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	1	0.10	0.63	0.69	0.00	0.02	0.02	0.21	0.00	0.00	0.21
Welder		Welders	1	8	25	46	202	0.45	0.26	2.06	1.74	0.00	0.07	0.06	255.73	0.57	0.26	0.00	13	0.09	0.75	0.64	0.00	0.02	0.02	1.07	0.00	0.00	1.07
Demolition					21															1.40	28.21	8.70	0.02	0.35	0.31	8.74	0.00	0.00	9.09
Abrasive/demo saw		Concrete/Industrial Saws	1	4	4	81	17	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	464	0.19	1.66	1.45	0.00	0.05	0.05	0.41	0.00	0.00	0.45
Asphalt/Concrete crusher		Crushing/Proc. Equipment	1	6	7	85	42	0.78	0.53	21.52	1.66	0.01	0.05	0.03	655.82	0.57	0.26	0.94	3309	0.46	18.88	1.46	0.01	0.04	0.03	1.81	0.00	0.00	2.11
Backhoe		Tractors/Loaders/Backhoes	1	8	7	97	55	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	1	0.05	0.81	0.54	0.00	0.03	0.02	0.39	0.00	0.00	0.39
Compressor		Air Compressors	1	8	11	78	84	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	50	0.20	1.55	1.25	0.00	0.05	0.05	0.86	0.00	0.00	0.86
Excavator-Track hoe		Excavators	1	8	11	158	84	0.38	0.07	1.18	0.56	0.00	0.03	0.03	201.69	0.57	0.26	0.00	14	0.07	1.25	0.60	0.00	0.03	0.03	1.02	0.00	0.00	1.02
Front end loader (rubber)		Rubber Tired Loaders	1	4	17	203	67	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	5	0.05	0.28	0.47	0.00	0.02	0.01	0.94	0.00	0.00	0.94
Generator		Generator Sets	1	8	11	84	84	0.74	0.06	1.17	0.48	0.00	0.04	0.04	159.70	0.57	0.26	0.00	12	0.06	1.29	0.53	0.00	0.04	0.04	0.83	0.00	0.00	0.83
Grinder	https://www.essexequi	Other Construction Equipment	1	2	4	11	8	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	5	0.01	0.04	0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.01
Hoe Ram	attachment to tractor,	Tractors/Loaders/Backhoes	1	8	3	97	25	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	0	0.05	0.81	0.54	0.00	0.03	0.02	0.18	0.00	0.00	0.18
Jack hammers	https://www.edisons.c	Other Construction Equipment	2	5	3	3.5	16	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	3	0.01	0.06	0.08	0.00	0.00	0.00	0.01	0.00	0.00	0.01
Tractor trailer		Off-Highway Trucks	1	2	16	402	32	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	4	0.05	0.31	0.34	0.00	0.01	0.01	0.98	0.00	0.00	0.98
Tri-axle Dump Trucks		Off-Highway Trucks	2	4	11	402	42	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	6	0.19	1.25	1.37	0.01	0.05	0.05	1.30	0.00	0.00	1.30
Earthwork					42															1.05	10.09	10.49	0.02	0.50	0.46	10.77	0.00	0.00	10.88
D5 Dozer		Rubber Tired Dozers	1	8	21	247	168	0.40	0.18	1.04	1.95	0.00	0.09	0.08	209.04	0.57	0.26	0.03	1044	0.31	1.81	3.40	0.00	0.15	0.14	3.47	0.00	0.00	3.57
Excavator-Track hoe		Excavators	1	8	4	158	34	0.38	0.07	1.18	0.56	0.00	0.03	0.03	201.69	0.57	0.26	0.00	6	0.07	1.25	0.60	0.00	0.03	0.03	0.41	0.00	0.00	0.41
Front end loader (rubber)		Rubber Tired Loaders	1	5	34	203	168	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	13	0.06	0.35	0.59	0.00	0.02	0.02	2.35	0.00	0.00	2.35
Roller-sheepsfoot		Graders	1	8	8	187	67	0.41	0.10	1.28	1.09	0.00	0.06	0.05	198.12	0.57	0.26	0.00	40	0.14	1.73	1.47	0.00	0.08	0.07	1.02	0.00	0.00	1.02
Roller-vibratory		Scrapers	1	8	8	367	67	0.48	0.10	1.28	1.09	0.00	0.06	0.05	198.12	0.57	0.26	0.00	78	0.32	4.01	3.41	0.01	0.19	0.17	2.36	0.00	0.00	2.36
Tri-axle Dump Trucks		Graders	2	6	13	187	76	0.41	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	5	0.14	0.93	1.02	0.00	0.04	0.03	1.17	0.00	0.00	1.17
Foundations					42															0.77	6.75	6.75	0.02	0.27	0.25	14.09	0.00	0.00	14.66
Backhoe		Tractors/Loaders/Backhoes	1	8	34	97	269	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	5	0.05	0.81	0.54	0.00	0.03	0.02	1.88	0.00	0.00	1.88
Concrete mixer		Cement and Mortar Mixers	1	8	4	9	34	0.56	0.31	1.82	2.35	0.00	0.09	0.08	318.42	0.57	0.26	0.10	31	0.03	0.16	0.21	0.00	0.01	0.01	0.05	0.00	0.00	0.06
Concrete pump		Pumps	1	4	21	84	84	0.74	0.03	1.01	0.53	0.00	0.03	0.03	159.70	0.57	0.26	0.01	71	0.02	0.55	0.29	0.00	0.02	0.02	0.83	0.00	0.00	0.84
Concrete truck		Off-Highway Trucks	1	4	21	402	84	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	12	0.10	0.63	0.69	0.00	0.02	0.02	2.60	0.00	0.00	2.60
Concrete vibrator	https://www.indiamart	Other Construction Equipment	1	4	21	5.5	84	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	25	0.01	0.04	0.05	0.00	0.00	0.00	0.07	0.00	0.00	0.07
Crane		Cranes	1	8	4	231	34	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	14	0.11	0.61	1.17	0.00	0.05	0.05	0.34	0.00	0.00	0.34
Excavator-Track hoe		Excavators	1	8	11	158	84	0.38	0.07	1.18	0.56	0.00	0.03	0.03	201.69	0.57	0.26	0.00	14	0.07	1.25	0.60	0.00	0.03	0.03	1.02	0.00	0.00	1.02
Front end loader (rubber)		Rubber Tired Loaders	1	8	34	203	269	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	21	0.10	0.56	0.95	0.00	0.03	0.03	3.76	0.00	0.00	3.76
Pile driver		Bore/Drill Rigs	1	6	4	221	25	0.50	0.06	0.53	0.60	0.00	0.02	0.02	263.10	0.57	0.26	0.02	103	0.09	0.78	0.88	0.00	0.03	0.03	0.74	0.00	0.00	0.75
Roller-vibratory-walk behind	https://www.doosanpo	Rollers	1	2	13	6	25	0.38	1.51	4.14	2.87	0.00	0.39	0.36	220.05	0.57	0.26	38.63	5841	0.01	0.04	0.03	0.00	0.00	0.00	0.01	0.00	0.00	0.55
Tractor Trailer		Off-Highway Trucks	1	2	21	402	42	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	6	0.05	0.31	0.34	0.00	0.01	0.01	1.30	0.00	0.00	1.30
Tri-axle Dump Trucks		Off-Highway Trucks	2	2	21	402	42	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	6	0.10	0.63	0.69	0.00	0.02	0.02	1.30	0.00	0.00	1.30
Welder		Welders	1	4	8	46	34	0.45	0.26	2.06	1.74	0.00	0.07	0.06	255.73	0.57	0.26	0.00	2	0.05	0.38	0.32	0.00	0.01	0.01	0.18	0.00	0.00	0.18
Roadway Paving					42															1.34	11.47	11.51	0.03	0.46	0.42	8.81	0.00	0.00	8.85
Asphalt Pavers		Pavers	2	6	7	130	40	0.42	0.08	1.25	0.83	0.00	0.04	0.04	219.72	0.57	0.26	0.01	49	0.12	1.78	1.18	0.00	0.06	0.05	0.48	0.00	0.00	0.48
Backhoe		Tractors/Loaders/Backhoes	1	8	21	97	168	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	3	0.05	0.81	0.54	0.00	0.03	0.02	1.18	0.00	0.00	1.18
Concrete trucks		Off-Highway Trucks	2	4	8	402	34	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	5	0.19	1.25	1.37	0.01	0.05	0.05	1.04	0.00	0.00	1.04
Concrete vibrator	https://www.indiamart	Other Construction Equipment	1	4	8	5.5	34	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	10	0.01	0.04	0.05	0.00	0.00	0.00	0.03	0.00	0.00	0.03
Core drill machine (testing)		Bore/Drill Rigs	1	4	1	221	3	0.50	0.06	0.53	0.60	0.00	0.02	0.02	263.10	0.57	0.26	0.02	14	0.06	0.52	0.59	0.00	0.02	0.02	0.10	0.00	0.00	0.10
Demo/Concrete saws		Concrete/Industrial Saws	2	4	2	81	8	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	232	0.38	3.33	2.90	0.01	0.10	0.09	0.21	0.00	0.00	0.23
Dozer		Rubber Tired Dozers	1	4	4	247	17	0.40	0.18	1.04	1.95	0.00	0.09	0.08	209.04	0.57	0.26	0.03	104	0.16	0.90	1.70	0.00	0.08	0.07	0.35	0.00	0.00	0.36
Front end loader (rubber)		Rubber Tired Loaders	1	8	13	203	101	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	8	0.10	0.56	0.95	0.00	0.03	0.03	1.41	0.00	0.00	1.41
Roller-smooth drum		Rollers	1	8	13	80	101	0.38	0.10	1.28	1.09	0.00	0.06	0.05	198.12	0.57	0.26	0.00	25	0.05	0.68	0.58	0.00	0.03	0.03	0.60	0.00	0.00	0.60
Rollers-vibratory		Rollers	1	4	13	80	50	0.38	0.10	1.28	1.09	0.00	0.06	0.05	198.12	0.57	0.26	0.00	13	0.03	0.34	0.29	0.00	0.02	0.01	0.30	0.00	0.00	0.30
Tri-axle Dump Trucks		Off-Highway Trucks	2	4	25	402	101	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	14	0.19	1.25	1.37	0.01	0.05	0.05	3.12	0.00	0.00	3.13
Building					315															2.06	18.31	15.65	0.03	0.62	0.57	69.83	0.01	0.00	71.36
Abrasive/demo saw		Concrete/Industrial Saws	1	2	16	81	32	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	871	0.10	0.83	0.73	0.00	0.03	0.02	0.77	0.00	0.00	0.85
Backhoe		Tractors/Loaders/Backhoes	1	8	158	97	1260	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	24	0.05	0.81	0.54	0.00	0.03	0.02	8.83	0.00	0.00	8.83
Circular saws		Concrete/Industrial Saws	2	4	95	81	378	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	10450	0.38	3.33	2.90	0.01	0.10	0.09	9.26	0.01	0.00	10.22
Compressor		Air Compressors	1	8	158	78	1260	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	745	0.20	1.55	1.25	0.00	0.05	0.05	12.87	0.00	0.00	12.94
Concrete finisher		Paving Equipment	1	4	63	132	252	0.36	0.08	1.10	0.75	0.00	0.04	0.04	187.02	0.57	0.26	0.02	533	0.03	0.46	0.31	0.00	0.02	0.01	2.21	0.00	0.00	2.26
Concrete pump		Pumps	1	4	16	84	63	0.74	0.03	1.01	0.53	0.00	0.03	0.03	159.70	0.57	0.26	0.01	53	0.02	0.55	0.29	0.00	0.02	0.02	0.63	0.00	0.00	0.63
Concrete saw		Concrete/Industrial Saws	1	8	6	81	50	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	1393	0.38	3.33	2.90	0.01	0.10	0.09	1.23	0.00	0.00	1.36
Concrete truck		Off-Highway Trucks	1	4	16	402	63	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	9	0.10	0.63	0.69	0.00	0.02	0.02	1.95	0.00	0.00	1.95
Concrete vibrator	https://www.indiamart	Other Construction Equipment	1	4	16	5.5	63	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	19	0.01	0.04	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.05
Crane		Cranes	1	6	6	231	38	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	15	0.08	0.46	0.88	0.00	0.04	0.03	0.38	0.00	0.00	0.38
Front end loader (rubber)		Rubber Tired Loaders	1	4	158	203	630	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	50	0.05	0.28	0.47	0.00	0.02	0.01	8.81	0.00	0.00	8.82
Generator		Generator Sets	1	8	158	84	1260	0.74	0.06	1.17	0.48	0.00	0.04	0.04	159.70	0.57	0.26	0.00	186	0.06	1.29	0.53	0.00	0.04	0.04	12.51	0.00	0.00	12.52
Grinder	https://www.essexequi	Other Construction Equipment	1	4	63	11	252	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	148	0.01	0.08	0.10	0.00	0.00	0.00	0.41	0.00	0.00	0.42
Jack hammers	https://www.edisons.c	Other Construction Equipment	2	4	6	3.5	25	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	5	0.01	0.05	0.07	0.00	0.00	0.00	0.01	0.00	0.00	0.01
Lull		Forklifts	1	4	95	89	378	0.20	0.06	0.73	0.60	0.00	0.04	0.03	105.95	0.57	0.26	0.00	3	0.01	0.12	0.09	0.00	0.01	0.01	0.72	0.00	0.00	0.72
Mortar mixer		Cement and Mortar Mixers	1	4	95	9	378	0.56	0.31	1.82	2.35	0.00	0.09	0.08	318.42	0.57	0.26	0.10	346	0.01	0.08	0.10	0.00	0.00	0.00	0.61	0.00	0.00	0.64
Nail guns	electric/hand-held	Other Construction Equipment	2	4	63	0	252	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paint sprayers	assumes powered by ai	Air Compressors	2	8	6	78	50	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	30	0.39	3.10	2.51	0.00	0.10	0.09	0.51	0.00	0.00	0.52
Table saw		Concrete/Industrial Saws	1	2	32	81	63	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	1742	0.10	0.83	0.73	0.00	0.03	0.02	1.54	0.00	0.00	1.70
Tractor trailer		Off-Highway Trucks	1	2	95	402	189	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	26	0.05	0.31	0.34	0.00	0.01	0.01	5.86	0.00	0.00	5.86
Welder		Welders	1	2	63	46	126	0.45	0.26	2.06	1.74	0.00	0.07	0.06	255.73	0.57	0.26	0.00	8	0.02	0.19	0.16	0.00	0.01	0.01	0.67	0.00	0.00	0.67
Trackwork- Ballasted- (top of sub ballast up)					84															1.13	9.49	9.06	0.02	0.40	0.37	33.00	0.00	0.00	33.25
Air Compressor		Air Compressors	1	8	67	78	538	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	318	0.20	1.55	1.25	0.00	0.05	0.05	5.49	0.00	0.00	5.52
Backhoe		Tractors/Loaders/Backhoes	1	8	67	97	538	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	10	0.05	0.81	0.54	0.00	0.03	0.02	3.77	0.00	0.00	3.77
Ballast cars (dump)	assumes no separate er	Other Material Handling Equipment	2	6	17	0	101	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ballast Compactor		Plate Compactors	1	4	17	8	67	0.43	0.24	1.49	1.78	0.00	0.07	0.06	244.37	0.57	0.26	0.09	47	0.01	0.05	0.05	0.00	0.00	0.00	0.06	0.00	0.00	0.06
Ballast Regulator	https://www.progressr	Other General Industrial Equipment	1	4	17	250	67	0.34	0.07	0.40	0.67	0.00	0.02	0.02	180.73	0.57	0.26	0.00	75	0.05	0.30	0.51	0.00	0.02	0.01	1.04	0.00	0.00	1.04
Front end loader (rubber)		Rubber Tired Loaders	1	4	67	203	269	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	21	0.05	0.28	0.47	0.00	0.02	0.01	3.76	0.00	0.00	3.76
Generator		Generator Sets	1	4	21	84	84	0.74	0.06	1.17	0.48	0.00	0.04	0.04	159.70	0.57	0.26	0.00	12	0.03	0.64	0.27	0.00	0.02	0.02	0.83	0.00	0.00	0.83
Power wrench	assumes powered by ai	Aerial Lifts	1	4	8	78	34	0.31	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	20	0.06	0.50	0.40	0.00	0.02	0.01	0.22	0.00	0.00	0.22
Prentice Loader (hi rail log loader)	http://s7d2.scene7.con	Tractors/Loaders/Backhoes	1	4	25	160	101	0.37	0.07	1.14	0.56	0.00	0.03	0.03	193.81	0.57	0.26	0.00	18	0.04	0.59	0.29	0.00	0.01	0.01	1.16	0.00	0.00	1.16
Rail drill	assumes powered by ai	Other Construction Equipment	1	2	17	78	34	0.42	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	20	0.04	0.34	0.27	0.00	0.01	0.01	0.30	0.00	0.00	0.30
Rail Profile Grinder	https://www.pandrol.c	Other Construction Equipment	1	4	8	6.4	34	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	12	0.01	0.05	0.06	0.00	0.00	0.00	0.03	0.00	0.00	0.03
Rail saw		Concrete/Industrial Saws	1	1	63	81	63	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	1742	0.05	0.42	0.36	0.00	0.01	0.01	1.54	0.00	0.00	1.70
Rail Train**	modeled in deliveries ta	Other General Industrial Equipment	1	8	4	0	34	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ral heater/vibrator	assumes to be powered	Air Compressors	1	2	50	78	101	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	60	0.05	0.39	0.31	0.00	0.01	0.01	1.03	0.00	0.00	1.03
Speedswing (360 on track crane)		Cranes	1	8	67	231	538	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	220	0.11	0.61	1.17	0.00	0.05	0.05	5.44	0.00	0.00	5.46
Spiking gun *	assumes to not be used	Other Construction Equipment	0	6	50	171	302	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tamper/Liner	assumes max 100 hp	Other Construction Equipment	1	6	17	171	101	0.42	0.16	1.49	1.47	0.00	0.10	0.09	219.44	0.57	0.26	0.01	89	0.15	1.40	1.38	0.00	0.09	0.09	1.57	0.00	0.00	1.58
Tie Drill	electric/hand-held	Other Construction Equipment	1	6	50	0	302	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractor Trailer		Off-Highway Trucks	1	2	8	402	17	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	2	0.05	0.31	0.34	0.00	0.01	0.01	0.52	0.00	0.00	0.52
Tri Axle dump trucks		Off-Highway Trucks	2	4	50	402	202	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	28	0.19	1.25	1.37	0.01	0.05	0.05	6.25	0.00	0.00	6.25
Trackwork- Direct Fixation					63															1.09	9.92	8.17	0.02	0.34	0.32	15.63	0.00	0.00	15.91
Air Compressor		Air Compressors	1	8	32	78	252	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	149	0.20	1.55	1.25	0.00	0.05	0.05	2.57	0.00	0.00	2.59
Backhoe		Tractors/Loaders/Backhoes	1	8	13	97	101	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	2	0.05	0.81	0.54	0.00	0.03	0.02	0.71	0.00	0.00	0.71
Circular / Table saw		Concrete/Industrial Saws	1	2	6	81	13	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	348	0.10	0.83	0.73	0.00	0.03	0.02	0.31	0.00	0.00	0.34
Concrete drill	assumes powered by ai	Air Compressors	1	4	32	78	126	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	75	0.10	0.78	0.63	0.00	0.02	0.02	1.29	0.00	0.00	1.29
Concrete grinder	https://hupshenghardv	Other Construction Equipment	1	2	32	6	63	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	20	0.00	0.02	0.03	0.00	0.00	0.00	0.06	0.00	0.00	0.06
Concrete mixer		Cement and Mortar Mixers	1	4	32	9	126	0.56	0.31	1.82	2.35	0.00	0.09	0.08	318.42	0.57	0.26	0.10	115	0.01	0.08	0.10	0.00	0.00	0.00	0.20	0.00	0.00	0.21
Concrete pump		Pumps	1	2	6	84	13	0.74	0.03	1.01	0.53	0.00	0.03	0.03	159.70	0.57	0.26	0.01	11	0.01	0.28	0.15	0.00	0.01	0.01	0.13	0.00	0.00	0.13
Concrete truck		Off-Highway Trucks	1	2	6	402	13	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	2	0.05	0.31	0.34	0.00	0.01	0.01	0.39	0.00	0.00	0.39
Concrete vibrator	https://www.indiamart	Other Construction Equipment	1	2	6	5.5	13	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	4	0.00	0.02	0.03	0.00	0.00	0.00	0.01	0.00	0.00	0.01
Front end loader (rubber)		Rubber Tired Loaders	1	4	32	203	126	0.36	0.08	0.43	0.73	0.00	0.02	0.02	190.49	0.57	0.26	0.00	10	0.05	0.28	0.47	0.00	0.02	0.01	1.76	0.00	0.00	1.76
Generator		Generator Sets	1	8	32	84	252	0.74	0.06	1.17	0.48	0.00	0.04	0.04	159.70	0.57	0.26	0.00	37	0.06	1.29	0.53	0.00	0.04	0.04	2.50	0.00	0.00	2.50
Nail guns (air)	electric/hand-held	Air Compressors	1	2	6	78	13	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	7	0.05	0.39	0.31	0.00	0.01	0.01	0.13	0.00	0.00	0.13
Power wrench	electric/hand-held	Air Compressors	1	2	3	78	6	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	4	0.05	0.39	0.31	0.00	0.01	0.01	0.06	0.00	0.00	0.06
Prentice Loader (hi rail log loader)	http://s7d2.scene7.con	Tractors/Loaders/Backhoes	1	2	32	160	63	0.37	0.07	1.14	0.56	0.00	0.03	0.03	193.81	0.57	0.26	0.00	11	0.02	0.30	0.15	0.00	0.01	0.01	0.72	0.00	0.00	0.72
Pressure washer	http://www.ultimatewa	Other Construction Equipment	1	1	32	10	32	0.42	0.16	0.97	1.31	0.00	0.06	0.05	170.09	0.57	0.26	0.22	70	0.00	0.01	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.03
Rail drill	electric/hand-held	Other Construction Equipment	1	2	38	78	76	0.42	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.00	0	0.04	0.34	0.27	0.00	0.01	0.01	0.67	0.00	0.00	0.67
Rail Profile Grinder	https://www.pandrol.c	Other Construction Equipment	1	2	38	6.4	76	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	26	0.00	0.02	0.03	0.00	0.00	0.00	0.07	0.00	0.00	0.07
Rail saw		Concrete/Industrial Saws	1	2	38	81	76	0.73	0.37	3.19	2.78	0.01	0.10	0.09	414.36	0.57	0.26	0.34	2090	0.10	0.83	0.73	0.00	0.03	0.02	1.85	0.00	0.00	2.04
Ral heater/vibrator	assumes to be powered	Air Compressors	1	4	13	78	50	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	30	0.10	0.78	0.63	0.00	0.02	0.02	0.51	0.00	0.00	0.52
Speedswing (360 on track crane)		Cranes	1	4	32	231	126	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	52	0.05	0.30	0.59	0.00	0.02	0.02	1.27	0.00	0.00	1.28
Tractor Trailer		Off-Highway Trucks	1	2	6	402	13	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	2	0.05	0.31	0.34	0.00	0.01	0.01	0.39	0.00	0.00	0.39
Major Equipment					126															0.55	4.81	4.06	0.01	0.17	0.16	7.51	0.00	0.00	7.52
Concrete drill	assumes powered by ai	Air Compressors	1	3	13	78	38	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	22	0.07	0.58	0.47	0.00	0.02	0.02	0.39	0.00	0.00	0.39
Concrete grinder	https://hupshenghardv	Other Construction Equipment	1	3	13	6	38	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	12	0.01	0.03	0.04	0.00	0.00	0.00	0.03	0.00	0.00	0.03
Crane		Cranes	1	4	13	231	50	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	21	0.05	0.30	0.59	0.00	0.02	0.02	0.51	0.00	0.00	0.51
Fork lift		Forklifts	1	4	63	89	252	0.20	0.06	0.73	0.60	0.00	0.04	0.03	105.95	0.57	0.26	0.00	2	0.01	0.12	0.09	0.00	0.01	0.01	0.48	0.00	0.00	0.48
Front end loader		Tractors/Loaders/Backhoes	1	4	63	97	252	0.37	0.08	1.29	0.85	0.00	0.04	0.04	195.21	0.57	0.26	0.00	5	0.03	0.41	0.27	0.00	0.01	0.01	1.77	0.00	0.00	1.77
Generator		Generator Sets	1	4	76	84	302	0.74	0.06	1.17	0.48	0.00	0.04	0.04	159.70	0.57	0.26	0.00	45	0.03	0.64	0.27	0.00	0.02	0.02	3.00	0.00	0.00	3.01
Impact guns	assumes powered by ai	Air Compressors	2	4	6	78	25	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	15	0.20	1.55	1.25	0.00	0.05	0.05	0.26	0.00	0.00	0.26
Steel drill	assumes to be powered	Air Compressors	1	4	6	78	25	0.48	0.30	2.35	1.90	0.00	0.07	0.07	272.77	0.57	0.26	0.01	15	0.10	0.78	0.63	0.00	0.02	0.02	0.26	0.00	0.00	0.26
Steel grinder	https://www.essexequi	Other Construction Equipment	1	4	6	11	25	0.42	0.34	2.02	2.59	0.01	0.10	0.09	352.40	0.57	0.26	0.05	15	0.01	0.08	0.10	0.00	0.00	0.00	0.04	0.00	0.00	0.04
Tractor Trailer		Off-Highway Trucks	1	2	13	402	25	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.00	3	0.05	0.31	0.34	0.00	0.01	0.01	0.78	0.00	0.00	0.78
Commissioning					42															0.21	1.32	1.99	0.00	0.11	0.10	5.23	0.00	0.00	5.27
Car Wash	Assumes no diesel engi	Air Compressors	0	8	42	78	336	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drop Table	Assumes no diesel engi	Forklifts	1	8	42	89	336	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.26	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Overhead Crane		Cranes	1	8	42	231	336	0.29	0.09	0.52	1.00	0.00	0.04	0.04	151.96	0.57	0.26	0.00	137	0.11	0.61	1.17	0.00	0.05	0.05	3.40	0.00	0.00	3.41
Wheel Truing Machine		Other General Industrial Equipment	1	8	42	88	336	0.34	0.19	1.34	1.55	0.00	0.12	0.11	181.11	0.57	0.26	0.01	365	0.10	0.71	0.82	0.00	0.06	0.06	1.83	0.00	0.00	1.86

	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Maximum Daily Scenarios - Off-Road Equipment Emissions	lbs/day					
Survey	0.07	0.47	0.51	0.00	0.02	0.02
Site Util/Electric, Demo	3.55	46.70	25.71	0.07	1.04	0.95
Site Util/Electric, Earthwork	3.20	28.58	27.51	0.06	1.20	1.10
Earthwork, Foundations	1.82	16.84	17.25	0.04	0.78	0.71
Foundations, Roadway/Paving	2.11	18.22	18.26	0.05	0.73	0.67
Buildings, Trackwork-Ballasted, Major Equip	3.74	32.61	28.76	0.06	1.20	1.10
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	5.85	51.53	44.88	0.10	1.84	1.69
Major Equip, Commissioning	0.76	6.13	6.05	0.01	0.29	0.26

On-Road Construction Emissions - Phase 2

					Emissions Factors (g/mi for RunEx, BW, TW and g/trip for StartEx)																			
Project Component/On-Road Vehicles	Days	Daily Trips	Trip Distance (One-way)	Total VMT	ROG RunEx	ROG StartEx	CO RunEx	CO StartEX	NOx RunEx	NOx StartEx	SOx RunEx	SOx StartEx	PM_{10} RunEx	PM_{10} StartEx	PM_{10} BW, TW	$PM_{2.5}$ RunEx	$PM_{2.5}$ StartEx	$PM_{2.5}$ BW, TW	CO_2 RunEx	CO_2 StartEx	CH_4 RunEx	CH_4 StartEx	N_2O RunEx	N_2O StartEx
Survey																								
Concrete Trucks	21	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	21	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	21	6	14.7	88	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Site Utilities/Electric																								
Concrete Trucks	84	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	84	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	84	32	14.7	470	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Demolition																								
Concrete Trucks	21	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	21	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	21	20	14.7	294	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Earthwork																								
Concrete Trucks	42	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	42	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Haul Trucks - Ballast Delivery (Occurs over over 21 days months 2 through 3 and 4)	21	28	20.0	560	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0261
Workers	42	32	14.7	470	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0000
Foundations																								
Concrete Trucks (conservatively included during foundations phase [shorter than building phase])	42	10	6.9	67	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	42	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	42	48	14.7	706	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Roadway Paving																								
Concrete Trucks	42	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	42	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	42	30	14.7	441	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Building																								
Concrete Trucks	315		6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	315		20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	315	114	14.7	1,676	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Trackwork- Ballasted- (top of sub ballast up)																								
Concrete Trucks	84	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks (occurs during first two months of track construction	42	2	20.0	31	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	84	60	14.7	882	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Trackwork- Direct Fixation																								
Concrete Trucks	63	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	63	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	63	20	14.7	294	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Major Equipment																								
Concrete Trucks	126	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	126	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	126	66	14.7	970	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261
Commissioning																								
Concrete Trucks	42	-	6.9	-	0.0191	0.0000	0.1675	0.0000	2.0777	4.4297	0.0127	0.0000	0.0144	0.0000	0.3216	0.0137	0.0000	0.0904	1341.5330	0.0000	0.0009	0.0000	0.2109	0.0000
Haul Trucks	42	-	20.0	-	0.0136	0.0000	0.1484	0.0000	1.6143	3.5926	0.0125	0.0000	0.0113	0.0000	0.3216	0.0108	0.0000	0.0904	1324.3272	0.0000	0.0006	0.0000	0.2082	0.0000
Workers	42	6	14.7	88	0.0107	0.2346	0.6991	2.2343	0.0444	0.2026	0.0028	0.0006	0.0016	0.0018	0.2686	0.0014	0.0016	0.0727	285.0792	59.6848	0.0028	0.0520	0.0051	0.0261

	Emissions (lbs/day)																				Emissions (MT/phase)			MT
Project Component/On-Road Vehicles	ROG RunEx	ROG StartEx	CO RunEx	CO StartEX	NOx RunEx	NOx StartEx	SOx RunEx	SOx StartEx	PM_{10} RunEx	PM_{10} StartEx	PM_{10} BW, TW	$PM_{2.5}$ RunEx	$PM_{2.5}$ StartEx	$PM_{2.5}$ BW, TW	CO_2 RunEx	CO_2 StartEx	CH_4 RunEx	CH_4 StartEx	N_2O RunEx	N_2O StartEx	CO_2	CH_4	N_2O	CO_2e
Survey	0.0021	0.0031	0.1359	0.0296	0.0086	0.0027	0.0005	0.0000	0.0003	0.0000	0.0522	0.0003	0.0000	0.0141	55.4330	0.7895	0.0005	0.0007	0.0010	0.0003	0.5355	0.0000	0.0000	0.5396
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0021	0.0031	0.1359	0.0296	0.0086	0.0027	0.0005	0.0000	0.0003	0.0000	0.0522	0.0003	0.0000	0.0141	55.4330	0.7895	0.0005	0.0007	0.0010	0.0003	0.54	0.00	0.00	0.539612
Site Utilities/Electric	0.0111	0.0166	0.7250	0.1576	0.0461	0.0143	0.0029	0.0000	0.0016	0.0001	0.2786	0.0015	0.0001	0.0754	295.6426	4.2106	0.0029	0.0037	0.0053	0.0018	11.4249	0.0002	0.0003	11.5117
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0111	0.0166	0.7250	0.1576	0.0461	0.0143	0.0029	0.0000	0.0016	0.0001	0.2786	0.0015	0.0001	0.0754	295.6426	4.2106	0.0029	0.0037	0.0053	0.0018	11.42	0.00	0.00	11.51171
Demolition	0.0070	0.0103	0.4531	0.0985	0.0288	0.0089	0.0018	0.0000	0.0010	0.0001	0.1741	0.0009	0.0001	0.0471	184.7766	2.6316	0.0018	0.0023	0.0033	0.0012	1.7851	0.0000	0.0000	1.7987
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0070	0.0103	0.4531	0.0985	0.0288	0.0089	0.0018	0.0000	0.0010	0.0001	0.1741	0.0009	0.0001	0.0471	184.7766	2.6316	0.0018	0.0023	0.0033	0.0012	1.79	0.00	0.00	1.798705
Earthwork	0.0280	0.0166	0.9082	0.1576	2.0391	0.2361	0.0184	0.0000	0.0155	0.0001	0.6756	0.0148	0.0001	0.1870	1930.6420	4.2106	0.0036	0.0037	0.2623	0.0016	21.6044	0.0001	0.0026	22.3866
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks - Ballast Delivery (Occurs over over 21 days months 2 through 3 and 4)	0.0168	0.0000	0.1832	0.0000	1.9931	0.2218	0.0154	0.0000	0.0139	0.0000	0.3970	0.0133	0.0000	0.1116	1634.9994	0.0000	0.0008	0.0000	0.2570	0.0016	15.89	0.00	0.00	16.64119
Workers	0.0111	0.0166	0.7250	0.1576	0.0461	0.0143	0.0029	0.0000	0.0016	0.0001	0.2786	0.0015	0.0001	0.0754	295.6426	4.2106	0.0029	0.0037	0.0053	0.0000	5.71	0.00	0.00	5.745393
Foundations	0.0195	0.0248	1.1123	0.2364	0.3769	0.1165	0.0063	0.0001	0.0045	0.0002	0.4655	0.0043	0.0002	0.1265	642.1791	6.3160	0.0044	0.0055	0.0391	0.0028	12.3544	0.0002	0.0008	12.5969
Concrete Trucks (conservatively included during foundations phase [shorter than building phase])	0.0028	0.0000	0.0248	0.0000	0.3078	0.0951	0.0019	0.0000	0.0021	0.0000	0.0476	0.0020	0.0000	0.0134	198.7151	0.0000	0.0001	0.0000	0.0312	0.0000	3.79	0.00	0.00	3.963088
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0167	0.0248	1.0874	0.2364	0.0691	0.0214	0.0044	0.0001	0.0024	0.0002	0.4178	0.0022	0.0002	0.1131	443.4639	6.3160	0.0043	0.0055	0.0079	0.0028	8.57	0.00	0.00	8.633786
Roadway Paving	0.0104	0.0155	0.6797	0.1478	0.0432	0.0134	0.0027	0.0000	0.0015	0.0001	0.2611	0.0014	0.0001	0.0707	277.1650	3.9475	0.0027	0.0034	0.0049	0.0017	5.3554	0.0001	0.0001	5.3961
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0104	0.0155	0.6797	0.1478	0.0432	0.0134	0.0027	0.0000	0.0015	0.0001	0.2611	0.0014	0.0001	0.0707	277.1650	3.9475	0.0027	0.0034	0.0049	0.0017	5.36	0.00	0.00	5.396116
Building	0.0397	0.0590	2.5827	0.5615	0.1642	0.0509	0.0104	0.0001	0.0057	0.0004	0.9923	0.0053	0.0004	0.2686	1053.2268	15.0004	0.0102	0.0131	0.0187	0.0066	152.6300	0.0033	0.0036	153.7893
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0397	0.0590	2.5827	0.5615	0.1642	0.0509	0.0104	0.0001	0.0057	0.0004	0.9923	0.0053	0.0004	0.2686	1053.2268	15.0004	0.0102	0.0131	0.0187	0.0066	152.63	0.00	0.00	153.7893
Trackwork- Ballasted- (top of sub ballast up)	0.0218	0.0310	1.3695	0.2955	0.1977	0.0392	0.0063	0.0001	0.0038	0.0002	0.5445	0.0035	0.0002	0.1476	645.6267	7.8949	0.0054	0.0069	0.0242	0.0035	23.1610	0.0005	0.0008	23.4052
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks (occurs during first two months of track construction	0.0009	0.0000	0.0102	0.0000	0.1113	0.0124	0.0009	0.0000	0.0008	0.0000	0.0222	0.0007	0.0000	0.0062	91.2967	0.0000	0.0000	0.0000	0.0144	0.0000	1.74	0.00	0.00	1.820774
Workers	0.0209	0.0310	1.3593	0.2955	0.0864	0.0268	0.0055	0.0001	0.0030	0.0002	0.5223	0.0028	0.0002	0.1414	554.3299	7.8949	0.0054	0.0069	0.0098	0.0035	21.42	0.00	0.00	21.58447
Trackwork- Direct Fixation	0.0070	0.0103	0.4531	0.0985	0.0288	0.0089	0.0018	0.0000	0.0010	0.0001	0.1741	0.0009	0.0001	0.0471	184.7766	2.6316	0.0018	0.0023	0.0033	0.0012	5.3554	0.0001	0.0001	5.3961
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0070	0.0103	0.4531	0.0985	0.0288	0.0089	0.0018	0.0000	0.0010	0.0001	0.1741	0.0009	0.0001	0.0471	184.7766	2.6316	0.0018	0.0023	0.0033	0.0012	5.36	0.00	0.00	5.396116
Major Equipment	0.0230	0.0341	1.4952	0.3251	0.0950	0.0295	0.0060	0.0001	0.0033	0.0003	0.5745	0.0031	0.0002	0.1555	609.7629	8.6844	0.0059	0.0076	0.0108	0.0038	35.3459	0.0008	0.0008	35.6144
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0230	0.0341	1.4952	0.3251	0.0950	0.0295	0.0060	0.0001	0.0033	0.0003	0.5745	0.0031	0.0002	0.1555	609.7629	8.6844	0.0059	0.0076	0.0108	0.0038	35.35	0.00	0.00	35.61437
Commissioning	0.0021	0.0031	0.1359	0.0296	0.0086	0.0027	0.0005	0.0000	0.0003	0.0000	0.0522	0.0003	0.0000	0.0141	55.4330	0.7895	0.0005	0.0007	0.0010	0.0003	1.0711	0.0000	0.0000	1.0792
Concrete Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Haul Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0
Workers	0.0021	0.0031	0.1359	0.0296	0.0086	0.0027	0.0005	0.0000	0.0003	0.0000	0.0522	0.0003	0.0000	0.0141	55.4330	0.7895	0.0005	0.0007	0.0010	0.0003	1.07	0.00	0.00	1.079223
																								273.51

Maximum Daily Scenarios - On-Road Equipment Emissions	ROG RunEx	ROG StartEx	CO RunEx	CO StartEX	NOx RunEx	NOx StartEx	SOx RunEx	SOx StartEx	PM_{10} RunEx	PM_{10} StartEx	PM_{10} BW, TW	$PM_{2.5}$ RunEx	$PM_{2.5}$ StartEx	$PM_{2.5}$ BW, TW
Survey	0.0021	0.0031	0.1359	0.0296	0.0086	0.0027	0.0005	0.0000	0.0003	0.0000	0.0522	0.0003	0.0000	0.0141
Site Util/Electric, Demo	0.0181	0.0269	1.1781	0.2561	0.0749	0.0232	0.0048	0.0001	0.0026	0.0002	0.4527	0.0024	0.0002	0.1225
Site Util/Electric, Earthwork	0.0391	0.0331	1.6331	0.3152	2.0852	0.2504	0.0213	0.0001	0.0171	0.0003	0.9541	0.0163	0.0002	0.2624
Earthwork, Foundations	0.0475	0.0414	2.0204	0.3941	2.4160	0.3526	0.0246	0.0001	0.0201	0.0003	1.1411	0.0191	0.0003	0.3135
Foundations, Roadway/Paving	0.0300	0.0403	1.7919	0.3842	0.4201	0.1299	0.0090	0.0001	0.0061	0.0003	0.7266	0.0057	0.0003	0.1972
Buildings, Trackwork-Ballasted, Major Equip	0.0845	0.1241	5.4475	1.1822	0.4569	0.1196	0.0228	0.0003	0.0129	0.0009	2.1113	0.0119	0.0009	0.5716
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	0.0808	0.1200	5.2560	1.1428	0.3341	0.1036	0.0212	0.0003	0.0117	0.0009	2.0195	0.0108	0.0008	0.5466
Major Equip, Commissioning	0.0251	0.0372	1.6312	0.3547	0.1037	0.0322	0.0066	0.0001	0.0036	0.0003	0.6267	0.0033	0.0003	0.1696

Maximum Daily Scenarios - On-Road Equipment Emissions	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Survey	0.0052	0.1655	0.0113	0.0006	0.0526	0.0144
Site Util/Electric, Demo	0.0450	1.4342	0.0981	0.0048	0.4555	0.1251
Site Util/Electric, Earthwork	0.0722	1.9484	2.3356	0.0214	0.9715	0.2789
Earthwork, Foundations	0.0889	2.4145	2.7686	0.0247	1.1614	0.3328
Foundations, Roadway/Paving	0.0703	2.1761	0.5500	0.0091	0.7330	0.2031
Buildings, Trackwork-Ballasted, Major Equip	0.2086	6.6296	0.5764	0.0231	2.1251	0.5844
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	0.2008	6.3988	0.4377	0.0215	2.0321	0.5582
Major Equip, Commissioning	0.0623	1.9858	0.1358	0.0067	0.6307	0.1732

Maximum Daily Scenarios - On-Road and Off-Road Equipment Emissions	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Survey	0.0774	0.6350	0.5252	0.0024	0.0711	0.0315
Site Util/Electric, Demo	3.5939	48.1311	25.8100	0.0728	1.5002	1.0796
Site Util/Electric, Earthwork	3.2761	30.5238	29.8461	0.0838	2.1720	1.3833
Earthwork, Foundations	1.9114	19.2530	20.0136	0.0623	1.9365	1.0459
Foundations, Roadway/Paving	2.1820	20.3969	18.8137	0.0556	1.4631	0.8748
Buildings, Trackwork-Ballasted, Major Equip	3.9444	39.2387	29.3401	0.0841	3.3262	1.6893
Site Util/Electric, Buildings, Trackwork-DF, Major Equip	6.0502	57.9246	45.3209	0.1237	3.8695	2.2486
Major Equip, Commissioning	0.8218	8.1117	6.1846	0.0175	0.9158	0.4355
Maximum Daily Emissions	6.0502	57.9246	45.3209	0.1237	3.8695	2.2486

Constants		
lb		grams
1		453.59237
ton		lbs
1		2000
metric ton		grams
1		1000000
GWP CO2e		CH4
25		1
GWP CO2e		N2O
298		1
ton		lbs
1		2000
metric ton		lbs
1		2204.623
metric ton		ton
0.907185		1

0.5
3%
7%
3%

Trip Length Assumptions - CalEEMod		miles	Source
Workers		14.7	CalEEMod default for Orange County
Vendor		6.9	CalEEMod default for Orange County
Haul Trucks		20	CalEEMod default

Sources:

1 Start year assumed to be 2026 based on completion year of 2028 and 4.5-year total construction period for Phases 1 and 2
2 Equipment types, quantities, usage from Orange County Maintenance Facility- Activities and equipment--Phase 2-with hours=06JAN21 Workbook
3 HP and Load factors from CalEEMod default tables (Appendix D), unless indicated otherwise.

Work Days Per Month		21

Phase 1 Deliveries

Rail, OTM and Turnouts-Ballasted Track	Assume 144 truckloads delivered evenly spread over first three months of track construction
Ballast	Assume 1080 loads ballast delivered (14/day) evenly over 80 days months 4 through 6 and month 9
Options	
	Car Loads @ 100 tn/car
Rail deliver by railcar (100 tons/ car) **	8 Assume 4 round trips trips with 2 cars each. (Yard type locomotive (4000 HP +/-, Type EMD SD40-2) in and out four two times each)

*** Quantity could be delivred on a welded rail train with one delivery if sufficient storage available. Assume 2 road engines (5000 HP) in at start of day, running all day while unloading and out at end of day for two days*

	Rail Delivery Options	Days	Quantity	Horsepower	Hrs Per Day	Load Factor	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	ROG	CO	NOX	SO2	PM10	PM2.5	ROG	CO	NOX	SO2	PM10	PM2.5
							g/bhp-hr									lb/day						total lbs					
1	Onsite Idling During Rail Delivery	4	1	4000	1	0.4	0.04212	1.28	1	0.004615	0.015	0.01455	490.6731	0.038462	0.0125	0.148574	4.515067	3.527396	0.01628	0.052911	0.051324	0.594296	18.06027	14.10958	0.065121	0.211644	0.205294
1	In Transit Rail Delivery	4	1	4000	1	0.248	0.04212	1.28	1	0.004615	0.015	0.01455	490.6731	0.038462	0.0125	0.092116	2.799342	2.186986	0.010094	0.032805	0.031821	0.368463	11.19737	8.747943	0.040375	0.131219	0.127283
	In transit rail delivery includes emissions associated with delivery within the basin.														Total	0.24069	7.314409	5.714382	0.026374	0.085716	0.083144	0.962759	29.25763	22.85753	0.105496	0.342863	0.332577
	Assumes 4 days of deliveries.																										

							ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	ROG	CO	NOX	SO2	PM10	PM2.5	ROG	CO	NOX	SO2	PM10	PM2.5
							g/bhp-hr							g/gal		lbs/day						total lbs					
2	Welded Rail Train(Off-Highway Truck)	2	2	599	8	0.38	0.07	0.46	0.51	0.00	0.02	0.02	201.86	0.57	0.26	0.57359	3.731253	4.08353	0.015045	0.147056	0.135292	1.147179	7.462507	8.16706	0.030091	0.294112	0.270583

Assumptions:
Off-highway truck (gal/hp-hr) 0.000345475 6.622065852 Total Gallons
Assumes truck engine horsepower is 599 HP per http://www.plasseramerican.com/en/machines-systems/mobile-rail-rectification-apt-1500-rl.html (flash-butt welding in truck design)
Welding machinery assumptions determined to be electric per 17Feb21 email from Jason N. (https://kzeso.com/en/k920-1/). Flash butt welding machines on road-rail vehicles.

Locomotives	Emission Factors (g/bhp-hr)*				Emission Factors (g/bhp-hr)									
	PM10	HC	NOx	CO	HC	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O
Tier 4	0.015	0.04	1	1.28	0.04	0.04212	1.28	1	0.004615	0.015	0.01455	490.6731	0.038462	0.0125

Assumes Tier 4 work train is performing the local delivery.

Constants		
lb		grams
1		453.59237
ton		lbs
1		2000
metric ton		grams
1		1000000
GWP CO2e		CH4
25		1
GWP CO2e		N2O
298		1
ton		lbs
1		2000
metric ton		lbs
1		2204.623
metric ton		ton
0.907185		1

Phase 2 Deliveries

Rail, OTM and Turnouts-Ballasted Track	Assume 33 truckloads delivered evenly spread over first two months of track construction			
Ballast	Assume 300 loads ballast delivered (14/day) evenly over 21 days months 2 through 3 and 4			
Options				
	Car Loads @ 100 tn/car			
Rail deliver by railcar (100 tons/ car) **	2	Assume 1 round trips trips with 2 cars each.	(Yard type locomotive (4000 HP +/-, Type EMD SD40-2) in and out one time)	
*** Rail delivery would be more economical if purchased with Phase 1 material.*				

	Rail Delivery Options	Days	Quantity	Horsepower	Hrs Per Da	Load Facto	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
							g/bhp-hr									lb/day						Total Metric Tons			MT
1	Onsite Idling During Rail Delivery	1	1	4000	1	0.4	0.04212	1.28	1	0.004615	0.015	0.01455	490.6731	0.038462	0.0125	0.148574	4.515067	3.527396	0.01628	0.052911	0.051324	0.785077	6.15385E-05	2E-05	0.792575
1	In Transit Rail Delivery	1	1	4000	1	0.248	0.04212	1.28	1	0.004615	0.015	0.01455	490.6731	0.038462	0.0125	0.092116	2.799342	2.186986	0.010094	0.032805	0.031821	0.486748	3.81538E-05	1.24E-05	0.491397
															Total	0.24069	7.314409	5.714382	0.026374	0.085716	0.083144	1.271824	9.96923E-05	3.24E-05	1.283972

Locomotives	Emission Factors (g/bhp-hr)*				Emission Factors (g/bhp-hr)									
	PM10	HC	NOx	CO	HC	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O
Tier 4	0.015	0.04	1	1.28	0.04	0.04212	1.28	1	0.004615	0.015	0.01455	490.6731	0.038462	0.0125

*Source: EPA Emission Factors for Locomotives - Technical Highlights (EPA-420-F-09-025)

Constants		
lb		grams
1		453.59237
ton		lbs
1		2000
metric ton		grams
1		1000000
GWP CO2e		CH4
25		1
GWP CO2e		N2O
298		1
ton		lbs
1		2000
metric ton		lbs
1		2204.623
metric ton		ton
0.907185		1

EMFAC2017 (v1.0.2) Emission Rates
Region Type: County
Region: ORANGE
Calendar Year: 2023
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN. Note 'day' in the unit is operation day.

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	VMT	%VMT	Trips	%Trips	ROG_RUNEX	ROG_STREX	CO_RUNEX	CO_STREX	NOx_RUNEX	NOx_STREX	SOx_RUNEX	SOx_STREX	PM10_RUNEX	PM10_STREX	PM10_PMTW	PM10_PMBW	PM2.5_RUNEX	PM2.5_STREX	PM2.5_PMTW	PM2.5_PMBW	CO2_RUNEX	CO2_STREX	CH4_RUNEX	CH4_STREX	N2O_RUNEX	N2O_STREX
ORANGE	2023	LDA	Aggregated	Aggregated	GAS	1317264	4996579.94	58.22%	6248383.008	58%	0.007743836	0.197501239	0.606543885	2.06671228	0.030489814	0.166590934	0.002540209	0.000523211	0.00149995	0.001817693	0.008000002	0.036750011	0.001379154	0.001671339	0.002000001	0.015750005	256.6954233	53.53810958	0.002122662	0.045450547	0.003904294	0.024384848
ORANGE	2023	LDA	Aggregated	Aggregated	DSL	13431.01	521944.8541	0.61%	63854.3682	1%	0.013569946	0	0.227182921	0	0.048567852	0	0.001682379	0	0.005609463	0	0.008000002	0.036750011	0.0053668	0	0.002000001	0.015750005	199.117743	0	0.000830298	0	0.031298536	0
ORANGE	2023	LDA	Aggregated	Aggregated	ELEC	33012.03	1363745.619	1.59%	164035.8627	2%	0	0	0	0	0	0	0	0	0	0	0.008000002	0.036750011	0	0	0.002000001	0.015750005	0	0	0	0	0	0
ORANGE	2023	LDT1	Aggregated	Aggregated	GAS	145926	5324604.48	6.20%	676933.8582	6%	0.020442622	0.299527348	1.037043845	2.191511003	0.077597393	0.228974772	0.002962779	0.000615855	0.001978943	0.00233687	0.008000002	0.036750011	0.001819608	0.002148737	0.002000001	0.015750005	299.3973221	63.01801694	0.004787653	0.06188013	0.006505475	0.027172949
ORANGE	2023	LDT1	Aggregated	Aggregated	DSL	46.29888	970.2407912	0.00%	157.1623518	0%	0.173929598	0	0.970366346	0	0.850017124	0	0.003757056	0	0.136007381	0	0.008000002	0.036750011	0.130123762	0	0.002000001	0.015750005	397.420837	0	0.008078697	0	0.062460821	0
ORANGE	2023	LDT1	Aggregated	Aggregated	ELEC	1366.204	58816.77113	0.07%	6870.769993	0%	0	0	0	0	0	0	0	0	0	0	0.008000002	0.036750011	0	0	0.002000001	0.015750005	0	0	0	0	0	0
ORANGE	2023	LDT2	Aggregated	Aggregated	GAS	459126.1	16860833.77	19.65%	2151241.261	20%	0.013032857	0.276732518	0.803616066	2.57497945	0.057855547	0.24813429	0.003178729	0.000671197	0.001502955	0.001736807	0.008000002	0.036750011	0.001381922	0.001596948	0.002000001	0.015750005	321.2197143	68.68610073	0.003349111	0.061292995	0.005421704	0.03012684
ORANGE	2023	LDT2	Aggregated	Aggregated	DSL	3171.576	133714.3685	0.15%	15530.20474	0%	0.017675285	0	0.157636726	0	0.038163309	0	0.002584973	0	0.009489816	0	0.008000002	0.036750011	0.004724973	0	0.002000001	0.015750005	273.4380282	0	0.008203683	0	0.04298065	0
ORANGE	2023	LDT2	Aggregated	Aggregated	ELEC	5547.578	177681.564	0.21%	27961.08308	0%	0	0	0	0	0	0	0	0	0	0	0.008000002	0.036750011	0	0	0.002000001	0.015750005	0	0	0	0	0	0
ORANGE	2023	MDV	Aggregated	Aggregated	GAS	313407.7	11014472.81	12.84%	1450734.231	13%	0.017533478	0.353870453	0.929801761	2.934181699	0.077597328	0.309678252	0.003936807	0.000829199	0.001559099	0.00186252	0.008000002	0.036750011	0.001432615	0.001712642	0.002000001	0.015750005	397.8255985	84.84868518	0.004357919	0.073940782	0.006786742	0.033157254
ORANGE	2023	MDV	Aggregated	Aggregated	DSL	7459.366	293854.6559	0.34%	36276.35582	0%	0.012459134	0	0.235878169	0	0.041879477	0	0.003405794	0	0.004379732	0	0.008000002	0.036750011	0.004190267	0	0.002000001	0.015750005	360.2643448	0	0.005767073	0	0.056628538	0
ORANGE	2023	MDV	Aggregated	Aggregated	ELEC	3044.279	101132.5162	0.12%	15528.53705	0%	0	0	0	0	0	0	0	0	0	0	0.008000002	0.036750011	0	0	0.002000001	0.015750005	0	0	0	0	0	0
							85,815,565.29		10,857,506.70																							
							Worker Vehicle Weighted Average Emission Factors (accounts for SAFE Rule)				0.010743	0.254811	0.699061	2.234266	0.044431	0.202527	0.002820	0.000583	0.001555	0.001790	0.008000	0.036750	0.001432	0.001646	0.002000	0.015750	285.079182	59.684785	0.002758	0.052038	0.005064	0.026127

EMFAC2017 Off-Model Adjustment Factors for Gasoline Light Duty Vehicle Emissions

Year	NOx Exhaust	TOG Exhaust	PM Exhaust	CO Exhaust	CO2 Exhaust
2023	1.0007	1.0087	1.0038	1.0027	1.0126

Applied to gas powered LDA, LDT1, and LDT2 vehicles
Source: Table 2 in ARB 2019 EMFAC Off-Model Adjustment Factors to Account for the SAFE Vehicle Rule Part One
https://ww3.arb.ca.gov/msei/emfac_off_model_adjustment_factors_final_draft.pdf
https://ww3.arb.ca.gov/msei/emfac_off_model_co2_adjustment_factors_06262020-final.pdf

Haul Truck Emission Factor

ORANGE	2023	T7 Single	Aggregated	Aggregated	DSL	3446.304	171547.3811	100%	28230.00459		0.01362657	0	0.148382097	0	1.614349314	3.592637291	0.012511587	0	0.011277582	0	0.03600001	0.061740018	0.010789719	0	0.009000003	0.026460008	1324.327211	0	0.000832919	0	0.208165795	0

Concrete Truck Emission Factor

ORANGE	2023	T7 single construction	Aggregated	Aggregated	DSL	722.5048	50137.83549	100%	3266.415007		0.019116717	0	0.167473405	0	2.077703851	4.429731006	0.012674139	0	0.014351546	0	0.03600001	0.061740018	0.013730705	0	0.009000003	0.026460008	1341.533024	0	0.000887922	0	0.210870309	0

Assumed to be T7 single construction vehicle category (based on CARB 2019 Presentation, slide 51 https://ww2.arb.ca.gov/sites/default/files/2019-10/oct19emfac202x.pdf)

Fugitive Dust Emissions

Truck Loading and Stockpiling
Material Import/Excavation Quantities

Assumptions	Excavation (CY)	Excavation (tons)	Import (CY)	Import (tons)
Material Import during Phase 1		-	120,000	151,700

	Earthwork		Earthwork	
Total Emissions from Stockpiling and Truck Loading Soils	PM10 (lbs/day)	PM2.5 (lbs/day)	PM10 (total lbs)	PM2.5 (total lbs)
Import	0.11	0.02	13.55	2.05

Fugitive Dust Emission Factors

Storage Pile and Truck Loading Fugitive Dust Emission Factors
$EF_E = k \times (0.0032) \times ((U/5)^{1.3})/((M/2)^{1.4})$

Variable	Amount	Units	Notes
EF (PM_{10}) for soil	0.000089	lb/ton	
EF ($PM_{2.5}$) for soil	0.000014	lb/ton	
k (PM_{10})	0.35	factor	
k ($PM_{2.5}$)	0.053	factor	
U (mean wind speed)	4.92	miles/hr	Based on CalEEMod Default Data for Orange County 2.2 m/s
M (moisture content) of saturated soil	12.00	percent	Based on default moisture content in CalEEMod User's Guide (Appendix A)
Soil density (CalEEMod default)	1.26	tons/cy	
M (moisture content) of demolition debris	2.00	percent	Based on CalEEMod default using MRI report (Appendix A)

E (lbs) = EF (lb/ton) x TP (tons)

						Unmitigated Emissions (lbs/day)		Controlled Emissions (lbs/day)		Unmitigated Emissions (total lbs)	
Phase 1 - Subphase	Equipment	Number of Earthworking Equipment	Daily Activity Level	Total Activity Level	Days	**PM10**	**PM2.5**	**PM10**	**PM2.5**	**PM10**	**PM2.5**
Clear and Grub	D5 Dozer	1	8	8	13	6.02209	3.31852	2.70994	1.49334	75.87828	18.81603
Site Utilities	Gradall	1	8	8	126	6.02209	3.31852	2.70994	1.49334	758.78285	188.16030
Earthwork	D5 Dozer	1	8	8	63	6.02209	3.31852	2.70994	1.49334	379.39142	94.08015
	Gradall	1	8	8	42	6.02209	3.31852	2.70994	1.49334	250.39834	62.09290
	Pan	1	8	8	6	6.02209	3.31852	2.70994	1.49334	37.93914	9.40801
	Road Grader	1	8	8	6	6.02209	3.31852	2.70994	1.49334	37.93914	9.40801
Roadway Paving	Dozer	1	4	4	8	3.01104	1.65926	1.35497	0.74667	25.29276	6.27201
Daily and Total Fugitive Dust Emissions from Bulldozing, Scraping, and Grading						39.14356	21.57040	17.61460	9.70668	1565.62194	388.23741

Phase 2 - Subphase	Equipment	Number of Earthworking Equipment	Daily Activity Level	Total Activity Level	Days	**PM10**	**PM2.5**	**PM10**	**PM2.5**	**PM10**	**PM2.5**
Site Utilities/Electric	Gradall	1	8	8	4	6.02209	3.31852	2.70994	1.49334	25.2927615	13.9377997
Earthwork	D5 Dozer	1	8	8	21	6.02209	3.31852	2.70994	1.49334	126.4638076	69.6889983
Roadway Paving	Dozer	1	4	4	4	3.01104	1.65926	1.35497	0.74667	12.6463808	6.9688998
Daily and Total Fugitive Dust Emissions from Bulldozing, Scraping, and Grading						15.05522	8.29631	6.77485	3.73334	164.40295	90.59570

Bulldozing, Scraping and Grading Emission Factors

PM10 Emission Factor [lb/hr] = 0.75 x (silt content [%])$^{1.5}$ / (moisture)$^{1.4}$
PM2.5 Emission Factor [lb/hr] = 0.60 x (silt content [%])$^{1.5}$ / (moisture)$^{1.3}$
Reference: AP-42, Table 11.9-1, July 1998

Parameter	**Value**	**Basis**
Silt Content	6.9	USEPA, AP-42, July 1998, Table 11.9-3 Typical Values for Correction Factors Applicable to the Predictive Emission
Moisture	7.9	USEPA, AP-42, July 1998, Table 11.9-3 Typical Values for Correction Factors Applicable to the Predictive Emission

PM10 Emission Factor 0.75 lb/hr
PM2.5 Emission Factor 0.41 lb/hr

Emissions [pounds per day] = Controlled emission factor [pounds per hour] x Bulldozing, scraping or grading time [hours/day]

Paved Roads Fugitive Dust Emissions

Paved Roads	100%

Paved Road Dust

$EF_{DUST} = [(k(sL)^{0.91} \times (W)^{1.02}](1 - P/4N))$

Source: AP-42 Section 13.2.1 (Paved Roads) - http://www.epa.gov/ttnchie1/ap42/ch13/final/c13s0201.pdf

Variable	Value	Description
k (PM10)	0.0022	particle size multiplier for particle size range and units of interest (lb/VMT)
k (PM2.5)	0.00054	particle size multiplier for particle size range and units of interest (lb/VMT)
sL	0.032	road surface silt loading (g/m^2) based on EPA 2011 default for collector streets (https://ww
W	5.20	average weight of all vehicles based on weighted average of trip types
W	5.20	haul truck tons
P	64	number of "wet" days with at least 0.254 mm of precipitation during the averaging period
N	365	number of days in averaging period

All Vehicle Trip Types

EF (PM10)	0.000494	lb/VMT
EF (PM2.5)	0.000121	lb/VMT

Conversion Units	
lbs	tons
2000	1

Vehicle Type	Total Trips	Percent	Weight (tons)
Worker	526	77.3%	2.4
Trucks	154	22.7%	14.75
Total	680	Average Weight	5.20

Architectural Coatings

Phase 1 Total Arch Coating and Parking Related VOC Emissions (lbs)	239.62
Phase 2 Total Arch Coating and Parking Related VOC Emissions (lbs)	187.27
Phase 1 Max Daily Arch Coating and Parking Related VOC Emissions (lbs)	29.58
Phase 2 Max Daily Arch Coating and Parking Related VOC Emissions (lbs)	74.31

Mitigated Emissions

Phase 2 Max Daily Arch Coating and Parking Related VOC Emissions (lbs)	29.73

Phase 1	Total Sq. Ft.	Source/Note
Train Wash	11,110	
S&I (Pump House)	750	
Utility Building	961	1
Transportation Building	7,495	
Total	20,316	

Phase 2	Total Sq. Ft.	Source/Note
Maintenance Building	40,392	1

		Architectural Coatings	
		Total VOC Emissions (lbs)	VOC Emissions (lbs/day)
Phase 1 Buildings - Exterior Surface Area (A)		58.87	7.38
Phase 1 Buildings - Interior Surface Area (A)		176.61	22.13
Phase 2 Buildings - Exterior Surface Area (A)		117.04	18.58
Phase 2 Buildings - Interior Surface Area (A)		351.13	55.74
MITIGATED 2 Buildings - Exterior Surface Area (A)		46.82	7.43
MITIGATED Phase 2 Buildings - Interior Surface Area (A)		140.45	22.29

Assumptions: Default value based on SCAQMD methods used in coating rules are 25% for exterior shell and 75% for interior surfaces.
Assumes architectural coating occurs for 2% of the Building Phase duration (consistent with paint sprayers estimated duration)

CalEEMod Default Assumptions	Unmitigated	Mitigated	Unit	Sources/Notes:
NonResidential Interior	250	100	g/L	CalEEMod Appendix D
NonResidential Exterior	250	100	g/L	CalEEMod Appendix D

	Unmitigated	Mitigated
Interior EF $_{AC}$ (lb/sq.ft)	0.011590844	0.004636337
Exterior EF $_{AC}$ (lb/sq.ft)	0.011590844	0.004636337

Painting of Stripes, Handicap Symbols, Directional Arrows, etc.

Total	14869	square feet	Qty	Sq. Ft. per qty.	Sources/Notes
ADA Parking Spaces	418	square feet	2	209	1
Parking Spaces	13851	square feet	81	171	1
Golf Cart Spaces	600	square feet	12	50	1

		Parking-Related Paint	
	square feet	VOC Emissions (lbs)	VOC Emissions (lbs/day)
A $_{Paint}$	892	4.14	0.07

Assumes paint sprayers during building construction also paint the paved areas.
CalEEMod Default Assumptions
Parking Lot Paint 100 g/L

Parking EF AC (lb/sq.ft) 0.004636337

Conversion Factors	
tons	pounds
1	2000
sq. ft.	acre
43560	1
grams	lb
453.592	1
L	gal
3.78541	1
L	oz
1	33.814

Asphalt Paving Off-Gassing Emissions

	lbs VOC	lbs/day
Asphalt Paving Off-Gassing	5.128668	0.381597

Assumes asphalt paving occurs for 16% of the roadway paving phase (consistent with estimated usage of pavers)

Project Information				Source/Notes
Paved Area Total	85269	sq. ft.	1.958	1

Note: Includes parking lot paved area and Ridge Valley Road paving, assuming 1,600 feet by 44 feet wide

CalEEMod Assumption (lb VOC/acre) 2.62

Source: CalEEMod User's Guide Appendix A

Conversion Factors	
tons	pounds
1	2000
sq. ft.	acre
43560	1

CalEEMod
Equipment HP and Load Factors

OFFROAD Equipment Type	Horsepower	Load Factor
Aerial Lifts	63	0.31
Air Compressors	78	0.48
Bore/Drill Rigs	221	0.50
Cement and Mortar Mixers	9	0.56
Concrete/Industrial Saws	81	0.73
Cranes	231	0.29
Crawler Tractors	212	0.43
Crushing/Proc. Equipment	85	0.78
Dumpers/Tenders	16	0.38
Excavators	158	0.38
Forklifts	89	0.201
Generator Sets	84	0.74
Graders	187	0.41
Off-Highway Tractors	124	0.44
Off-Highway Trucks	402	0.38
Other Construction Equipment	171	0.42
Other General Industrial Equipmen	88	0.34
Other Material Handling Equipmen	168	0.40
Pavers	130	0.42
Paving Equipment	132	0.36
Plate Compactors	8	0.43
Pressure Washers	13	0.3
Pumps	84	0.74
Rollers	80	0.38
Rough Terrain Forklifts	100	0.40
Rubber Tired Dozers	247	0.4
Rubber Tired Loaders	203	0.36
Scrapers	367	0.48
Signal Boards	6	0.82
Skid Steer Loaders	65	0.37
Surfacing Equipment	263	0.30
Sweepers/Scrubbers	64	0.46
Tractors/Loaders/Backhoes	97	0.37
Trenchers	78	0.50
Welders	46	0.45

Operational Emissions Summary

Project Operational Emissions:

	Daily Emissions (lb/day)						Total Emissions (metric tons)
	ROG	CO	NOX	SO2	PM10	PM2.5	CO2e
On-Site Equipment + Backup Generator	0.83	3.48	2.53	0.01	0.11	0.15	98
On-site Fueling	0.41	-	-	-	-	-	-
On-site Sand Silo	-	-	-	-	0.04	0.064	-
On-Road Vehicles	0.06	2.00	1.58	0.02	2.26	0.01	0.13
Architectural Coatings	0.13	-	-	-	-	-	-
Facility Natural Gas	0.04	0.32	0.39	0.002	0.03	0.03	85
Facility Electricity	-	-	-	-	-	-	329
Facility Water	-	-	-	-	-	-	24
Facility Waste	-	-	-	-	-	-	279
Total	**1.48**	**5.80**	**4.50**	**0.03**	**2.44**	**0.25**	**815**
Air District Threshold	55.00	550.00	55.00	150.00	150.00	55.00	10,000
Exceed Threshold?	No	No	No	No	No	No	No

On-Site Emissions Sources	**ROG**	**CO**	**NOX**	**SO2**	**PM10**	**PM2.5**
Locomotive Operations (On-site)	4.45	101.85	98.30	0.37	1.98	1.92
On-Site Equipment + Backup Generator	0.83	3.48	2.53	0.01	0.11	0.15
On-Road Vehicles	0.004	0.14	0.11	0.00	0.16	0.00
Architectural Coatings	0.13	-	-	-	-	-
On-site Fueling	0.41	-	-	-	-	-
Facility Natural Gas	0.04	0.32	0.39	0.00	0.03	0.03
On-site Sand Silo	-	-	-	-	0.04	0.06
Total	**5.88**	**105.80**	**101.34**	**0.38**	**2.32**	**2.16**

Locomotive Operational Emissions

Daily Locomotive Operational Emissions

	Daily In-Transit Emissions (lbs/day)										MT/Year
Operational Activity	**ROG**	**CO**	**NOX**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**	**CO2e**	**CO2e**
On-site	4.45	101.85	98.30	0.37	1.98	1.92	38943.59	3.06	0.99	39316.50	6509.29

Maintenance Facility On-Site Emissions				Daily Idling Emissions (lbs/day)									
	Daily Idling Hours	*HP*	*Load Factor*	**ROG**	**CO**	**NOX**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**	**CO2e**
Arrival and Departure Idling Emissions per Tier 2 train per day	0.166666667	3000	0.40	0.1207	0.5644	2.1826	0.0020	0.0794	0.0770	215.7986	0.0170	0.0055	218
Arrival and Departure Idling Emissions per Tier 4 train per day	0.166666667	4000	0.40	0.0248	0.7525	0.5879	0.0027	0.0088	0.0086	287.7315	0.0226	0.0073	290
Other on-site engines operations per Tier 2 train per day	1	3000	0.70	1.2679	5.9277	22.9236	0.0214	0.8336	0.8086	2266.5331	0.1781	0.0579	2288
Other on-site engines operations per Tier 4 train per day	1	4000	0.70	0.2601	7.9036	6.1747	0.0285	0.0926	0.0898	3022.0441	0.2375	0.0772	3051

*Daily idling time estimated as up to 5 minutes upon arrival and departure (10 minutes total) per train per day.
Additional on-site engine operations for movement, maintenance, testing bsaed upon project engineer input.

Emission Factors

	Emission Factors (g/bhp-hr)*				Emission Factors (g/bhp-hr)									
Locomotives	**PM10**	**HC**	**NOx**	**CO**	**HC**	**ROG**	**CO**	**NO_x**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**
Tier 2	**0.18**	**0.26**	**4.95**	**1.28**	0.26	0.27378	1.28	4.95	0.004615385	0.18	0.1746	489.4230769	0.038461538	0.0125
Tier 4	0.015	0.04	1	1.28	0.04	0.04212	1.28	1	0.004615385	0.015	0.01455	489.4230769	0.038461538	0.0125

*Source: EPA Emission Factors for Locomotives - Technical Highlights (EPA-420-F-09-025)

Notes:
Assumes Line-Haul Locomotives with Tier 4 Engines

Emission Factors Calculations:	Conversion Factor
ROG is estimated as 1.053 times the EF for HC	1.053
PM10 = PM	
PM2.5 as a 97% of PM10	97%
SO2 Emission Factor (g/gal) = (fuel density) * (64 g SO2 / 32 g S) * (S content of fuel)	
Fuel density	3200
2281)	15
SO2 EF (g/gal)	0.096

CO2 is defined by U.S. EPA as 10,180 g CO2/gal diesel fuel (https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references#:~:text=of%20diesel%20consumed-,In%20the%20preamble%20to%20the%20joint%20EPA%2FDepartment%20of%20Transportation,emissions%20per%20gallon%20of%20diesel) 10180

CO2 (g/gal) = (fuel density) * (44 g CO2/12 g C) * (C content of fuel)

CH4 and N2O Emission Factors per EPA: Table 5 in https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

Carbon content of renewable diesel =
density of fuel 3200 g/gal

CH4 g/gal	0.8
N20 g/gal	0.26

39.33 gCO2e/MJ

Conversion for g/gal to g/hp-hr (divide by) per EPA 2009 Technical Highlights

Line Haul and Passenger	20.8
Switch	15.2

Operational Variables	
Operational Days per Year	365
Number of Trains Serviced at Facility Daily	12
Engine Tier	2
Engine HP	3000
Engine Tier	4
Engine HP	4000

**Per Metrolink Ops excel table, average operational hours are about 15 hours per train.*
***Per project-specific data inputs, 15 existing engines are Tier 2 and 40 engines are Tier 4*

Locomotive Engine Mix

	2026	2021	2028
Percent Tier 2	8%	27%	0.00%
Percent Tier 4	92%	73%	100%

Horsepower and Load Factor Calculations

Notch	*Percent Operating Time at Each Notch Power Level*[1]	Reweighted time (split idle and moving time)	Notch Power Level as a Percent of Rated Power[2]
Normal Idle	*47.40%*	100.00%	0.40%
Dynamic Break	*6.20%*	11.79%	2.10%
Notch 1	*7.00%*	13.31%	4.50%
Notch 2	*5.10%*	9.70%	11.50%
Notch 3	*5.70%*	10.84%	23.50%
Notch 4	*4.70%*	8.94%	35.00%
Notch 5	*4.00%*	7.60%	48.50%
Notch 6	*2.90%*	5.51%	64.00%
Notch 7	*1.40%*	2.66%	85.00%
Notch 8	*15.60%*	29.66%	100.00%

1. Per EPA 1998 Locomotive Emission Standards Regulatory Support Document , Table 4-5 https://nepis.epa.gov/Exe/ZyPDF.cgi/P100F9QT.PDF?Dockey=P100F9QT.PDF
2. Per EPA 1998 Locomotive Emission Standards Regulatory Support Document , Table 5-2 https://nepis.epa.gov/Exe/ZyPDF.cgi/P100F9QT.PDF?Dockey=P100F9QT.PDF

Time-weighted engine Load Factor

Idle	0.40%
In-transit	46.8%
Idling and In-Transit	24.8%
Idling and In-Transit	70.0%

Conversion Factors (per EPA 2009 Emission Factors for Locomotives Technical Highlights - Table 3)

Locomotive Application	**Conversion Factor (bhp-hr/gal)**
Large Line-Haul and Passenger	20.8
Small Line-Haul	18.2
Switching	15.2

Conversion Factors	
grams per pound	453.59237
pounds per ton	2000
pounds per metric ton	2204.62262
Global Warming Potential	
CO2	1
Ch4	25
N20	298

Note: GWP are the 100-year GWPs from the IPCC fourth assessment report (AR4), consistent with the California Air Resources Board 2019 GHG emissions inventory.

On-Site Equipment Exhaust Emissions

Project-Specific Equipment (CalEEMod equivalent) [1]	# / Day	Operational hours / day	Horsepower [2]	Load Factor	Emission Factors (g/hp-hr) [3]							Emission Factors (g/gal)		gal/hp-hr	Daily Emissions (lb/day)									Annual Emissions (metric tons/year)
					ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e
Crane	4	6	231	0.29	0.035984	0.23724301	0.1553145	0.0009742	0.002854	0.0026	105	0.57	0.26	7.22227E-05	0.13	0.84	0.55	0.00	0.01	0.01	374	0.0001	0.0001	61.90
Forklift	4	6	89	0.2	0.0475337	1.014356664	0.1487462	0.0015081	0.00548	0.005	163	0.57	0.26	0.002415779	0.04	0.96	0.14	0.00	0.01	0.00	154	0.0013	0.0006	25.49
Total															**0.17**	**1.80**	**0.69**	**0.00**	**0.02**	**0.01**	**528**	**0.00**	**0.00**	**87.39**

1. Equipment types is based on project-specific list of anticipated equipment requirements provided by project engineers.
2. Used CalEEMod default horsepower and loadfactors of off-road equipment.
3. Emission factors based on CARB OFFROAD2017 emissions database for year 2028.

Conversion Factors

grams per pound	453.59237
pounds per metric ton	2204.62262

Global Warming Potential

CO2	1
Ch4	25
N20	298

Note: GWP are the 100-year GWPs from the IPCC fourth assessment report (AR4), consistent with the California Air Resources Board 2019 GHG emissions inventory.

Average Operational Days per Year:	365

On-Site Emergency Generator Exhaust Emissions

						Emissions (lbs/day)									Emissions (tons/year)									
Equipment Type	Horsepower	Load Factor	Hours of Operation per Day	Number of Units	Days per Year	ROG	CO	NO_X	SO2	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4	N_2O	ROG	CO	NO_X	SO2	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4	N_2O	CO_2e (MT/year)
300KV Backup Generator	402	0.73	1	1	50	0.660285	1.682118242	1.843860381	0.003196025	0.09704528	0.13293874	462.3	0.06469686	0	0.02	0.04	0.05	0.00	0.00	0.00	11.56	0.00	0.00	10.52

Emission factors and load power based upon CalEEMod modeling factors.

Conversion Factors	
lb	grams
1	453.59237
metric ton	grams
1	1000000
ton	lbs
1	2000
metric ton	lbs
1	2204.623
metric ton	ton
0.907185	1
CO2 grams	gallons diesel
10180	1
CO2 grams	gallons diesel
8890	1
GWP CO2e	CH4
25	1
GWP CO2e	N2O
298	1

Note: GWP are the 100-year GWPs from the IPCC fourth assessment report (AR4), consistent with the California Air Resources Board 2019 GHG emissions inventory.

CalEEMod Emission Factors	Diesel Emergency Generator Emission Factors								
Horsepower Bin	TOG (lb/hp-hr)	ROG (lb/hp-hr)	CO (g/hp-hr)	NOX (g/hp-hr)	SO2 (g/hp-hr)	PM10 (g/hp-hr)	PM2.5 (g/hp-hr)	CO2 (lb/hp-hr)	CH4 (g/hp-hr)
175-300	0.00247	0.00225	2.6	2.85	0.00494	0.15	0.15	1.15	0.073
300-600	0.00247	0.00225	2.6	2.85	0.00494	0.15	0.15	1.15	0.073

Offsite On-Road Vehicle Emissions (Exhaust)

Vehilcle Type	Trips / Day[1]	Miles / Day[2]	Daily Emissions[3] (lb/day) ROG	CO	NOX	SO2	PM10 Fugitive Dust[4]	PM10 Exhaust	PM10 Total	PM2.5 Fugitive Dust[4]	PM2.5 Exhaust	PM2.5 Total	CO2	CH4	N2O	Daily Emissions (metric tons/day) CO2e	Annual Emissions (metric tons) CO2e
Fuel Trucks	2	33.2	0.001	0.011	0.134	0.001	0.117	0.001	0.117	0.029	0.001	0.030	91.236	0.000	0.014	0.041	0.007
Delivery Haul Trucks	20	332	0.010	0.112	1.341	0.009	1.165	0.009	1.175	0.294	0.007	0.301	912.362	0.000	0.143	0.414	0.068
Worker Trips	80	1328	0.044	1.877	0.105	0.007	0.978	0.0	0.986	0.260	0.003	0.267	718.540	0.011	0.015	0.326	0.054
Total On-Road Emissions			0.056	2.001	1.580	0.017	2.260	0.014	2.278	0.584	0.011	0.598	1722	0.012	0.173	0.781	0.129

1.Trips per day reflects estiamted maximum daily workers, delivery trucks, and fuel trucks. Trips are one-way trips.
2. Miles per day based on trip length data from CalEEMod for Orange County for commercial-worker (C-W) and commericial-nonworker (C-NW) trips.
3. Emission factors based on EMFAC2017 aggregate fleet for year 2028 (anticipated construction completion / operational year), and gasoline light duty vehicle (LDA, LDT1, LDT2 and MDV) emission factors were adjusted using the CARB Off-Model Adjustment Factors for the same year.
4. Includes emission factor for fugitive re-entrained road dust emissions for paved roads (AP-42,Section 13.2.1)

Assumptions	
Fuel Truck Trip length (miles) (CalEEMod default C-NW for Orange County Urban)	6.9
Delivery Truck Trip length (miles) (CalEEMod default C-NW for Orange County Urban)	6.9
Worker Trip length (miles) (CalEEMod default C-W for Orange County Urban)	16.6
Conversion Factors	
grams per pound	453.59237
pounds per ton	2000
pounds per metric ton	2204.62262
Global Warming Potential	
CO2	1
Ch4	25
N20	298

Note: GWP are the 100-year GWPs from the IPCC fourth assessment report (AR4), consistent with the California Air Resources Board 2020 GHG emissions inventory.

Operational Days per Year:	385

Vehilcle Type	Emission Factors (g/mile)[3] ROG_ RUNEX	ROG_ STREX	CO_ RUNEX	CO_ STREX	NOX_ RUNEX	NOX_ STREX	SO2_ RUNEX	SO2_ STREX	PM10 Fugitive Dust[4]	PM10_ RUNEX	PM10_ STREX	PM10 Total	PM2.5 Fugitive Dust[4]	PM2.5_ RUNEX	PM2.5_ STREX	PM2.5 Total	CO2_ RUNEX	CO2_ STREX	CH4_ RUNEX	CH4_ STREX	N2O_ RUNEX	N2O_ STREX
Fuel Trucks	0.014	0.000	0.154	0.000	1.614	3.606	0.012	0.000	1.592	0.013	0.000	1.605	0.402	0.009	0.000	0.411	1246.507	0.000	0.001	0.000	0.196	0.000
Delivery Haul Trucks	0.014	0.000	0.154	0.000	1.614	3.606	0.012	0.000	1.592	0.013	0.000	1.605	0.402	0.009	0.000	0.411	1246.507	0.000	0.001	0.000	0.196	0.000
Worker Trips	0.006	0.153	0.530	1.853	0.027	0.146	0.002	0.000	0.334	0.001	0.001	0.337	0.089	0.001	0.001	0.091	242.415	49.957	0.002	0.036	0.004	0.021

Architectural Coatings

Max Daily Arch Coating and Parking Related VOC Emissions (lbs)	0.13

Phase 1	Total Sq. Ft.	Source/Note
Train Wash	11,110	
S&I (Pump House)	750	
Utility Building	961	1
Transportation Building	7,495	
Total (assumes 10% of total area per year)	2,032	

		Architectural Coatings	
		Total VOC Emissions (lbs)	VOC Emissions (lbs/day)
Buildings Exterior Surface Area (A)		5.89	0.03
Buildings - Interior Surface Area (A)		17.66	0.10

Assumptions: Surface for painting is 2 times the nonresidential square footage. Default value based on SCAQMD methods used in coating rules are 25% for exterior shell and 75% for interior surfaces.

Assumes architectural coating occurs for 2% of the Building Phase duration (consistent with paint sprayers estimated duration)

CalEEMod Default Assumptions		Unit	Sources/Notes:
NonResidential Interior	250	g/L	CalEEMod Appendix D
NonResidential Exterior	250	g/L	CalEEMod Appendix D

Interior EF_{AC} (lb/sq.ft) 0.011590844

Exterior EF_{AC} (lb/sq.ft) 0.011590844

Painting of Stripes, Handicap Symbols, Directional Arrows, etc.

Total (assumes 10% of total area per year)	1486.9	square feet	Qty	Sq. Ft. per qty.	Sources/Notes
ADA Parking Spaces	418	square feet	2	209	1
Parking Spaces	13851	square feet	81	171	1
Golf Cart Spaces	600	square feet	12	50	1

		Parking-Related Paint	
	square feet	VOC Emissions (lbs)	VOC Emissions (lbs/day)
A_{Paint}	89	0.41	0.002

Assumes paint sprayers during building construction also paint the paved areas.

CalEEMod Default Assumptions

Parking Lot Paint 100 g/L

Parking EF AC (lb/sq.ft) 0.004636337

Conversion Factors	
tons	pounds
1	2000
sq. ft.	acre
43560	1
grams	lb
453.592	1
L	gal
3.78541	1
L	oz
1	33.814

Sources/Notes

1 Square footages from AQ Request - GF Responses

The emission factor (EF) is based on the VOC content of the surface coatings and is calculated estimated using the equation below:

$$EF_{AC} = C_{VOC} / 454(g/lb) \times 3.785(L/Gal) / 180(sqft)$$

Where:

EF = emission factor (lb/sq. ft.)

C = VOC content (g/L). This varies by location and year.

$$E_{AC} = EF_{AC} \times F \cdot A_{paint}$$

Where:

E = emissions (lb VOC)

EF = emission factor (lb/sq. ft.)

A = building surface area (sq. ft.).

CalEEMod also calculates the VOC emissions from the painting of stripes, handicap symbols, directional arrows and car space descriptions in parking lots. Please refer to Appendix E for the studies conducted to determine a default percent of parking lot square footage that is painted. The equation for striping emission is the same as that for E_{AC} above, but A_{paint} is:

$$A_{paint} = A_{PL} \times P\%$$

Where:

A_{PL} = Parking lot area (sq. ft.)

P% = Default percent of parking lot area that is painted (6%)

The VOC content limit for parking lot area is either provided by local air districts or based on the exterior coating VOC limit of the region where the project is located. If the user has more specific VOC content limit on the coating being applied the default can be overridden but the user is expected to explain and justify the change in the “Remarks” box at the bottom of the screen.

Fuel Tank Emissions

	Total Losses (tpy)	Hexane (-n) tpy	Benzene (tpy)	Toluene (tpy)	Ethylbenzene (tpy)	Xylene (-m) (tpy)	1,2,4-Trimethylbenzene (tpy)
Tank 1-30,000	1.48E-02	0.00E+00	0.00E+00	3.23E-04	3.48E-05	8.81E-04	7.15E-04
Tank 2-30,000	1.48E-02	0.00E+00	0.00E+00	3.23E-04	3.48E-05	8.81E-04	7.15E-04
Tank 3-30,000	1.48E-02	0.00E+00	0.00E+00	3.23E-04	3.48E-05	8.81E-04	7.15E-04
Tank 4-30,000	1.48E-02	0.00E+00	0.00E+00	3.23E-04	3.48E-05	8.81E-04	7.15E-04
Tank 5-10,000	1.44E-02	0.00E+00	0.00E+00	3.14E-04	3.37E-05	8.54E-04	6.92E-04

Speciated TACs from SCAQMD storage tank guidance document for diesel.
http://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/supplemental-instructions-for-liquid-organic-storage-tanks.pdf

APPENDIX 3: Default TAC Profile for Select Petroleum Products

Crude Oil

Chemical Name	CAS Number	Liquid Weight (%)	Molecular Weight
Hexane (-n)	110543	0.40	86.17
Benzene	71432	0.60	78.11
Isooctane	26635643	0.10	114.22
Toluene	108883	1.00	92.13
Ethylbenzene	100414	0.40	106.17
Xylene (-m)	1330207	1.40	106.17
Isopropyl benzene	98828	0.10	120.20
1,2,4-Trimethylbenzene	95636	0.33	120.19
Cyclohexane	110827	0.70	84.16

Distillate Fuel Oil #2 (Diesel)

Chemical Name	CAS Number	Liquid Weight (%)	Molecular Weight
Hexane (-n)	110543	0.00	86.17
Benzene	71432	0.00	78.11
Toluene	108883	0.03	92.13
Ethylbenzene	100414	0.01	106.17
Xylene (-m)	1330207	0.29	106.17
1,2,4-Trimethylbenzene	95636	1.00	120.19

Sand Silo Fugitive Dust

*Note that exhaust emissions assoiated with truck delivery is captured under "On-Road Vehicle Emissions"

Estimated Sand Throughput (tons per year)	Pneumatic Transfer Emission Factor (pounds PM10 per ton)	Gravity Transfer Emission Factor (pounds PM10 per ton)	Pneumatic Transfer Emissions (pounds PM10 per year)	Gravity Transfer Emissions (pounds PM10 per year)	Total PM10 (pounds)
1243	0.00034	0.00099	0.42254	1.23033	1.65287

Notes:
1. Sand throughput based on estimated throughput of reference Los Angeles Commerce Railyard Maintenance Facility sand throughput. Throughput is scaled based on facility operations.
2. Emission factors based on AP-42, Table 11.12-2.

Facility Natural Gas Emissions (Direct)

	Emissions (lbs/day)									Emissions (tons/year)									
kBTU/yr	ROG	CO	NO_x	SO2	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4	N_2O	ROG	CO	NO_x	SO2	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	CO_2	CH_4	N_2O	CO_2e (MT/year)
327	0.042	0.324	0.385	0.002	0.029	0.029	462.111	0.009	0.008	0.008	0.059	0.070	0.000	0.005	0.005	84.335	0.002	0.002	84.86

*Natural gas consumption and daily emissions estimate using CalEEMod General Office Building of the same square footage as the proposed project.

Conversion Factors	
kWh to MWh	0.001
pounds per ton	2000
pounds per metric ton	2204.62262
average days per month	30.5
days per year	365
Global Warming Potential	
CO2	1
Ch4	25
N20	298
Note: GWP are the 100-year GWPs from the IPCC fourth assessment	

Operational Days per Year: 365

Facility Electricity Emissions (Indirect)

		Emissions (lb/day)				Emissions (metric tons per year)			
kWh/month	**Electricity Provider**	**CO2**	**CH4**	**N2O**	**CO2e**	**CO2**	**CH4**	**N2O**	**CO2e**
128,011	SCE	1961.63	0.14	0.08	1989.52	324.77	0.02	0.01	329.39

*Electricity estimate based upon CalEEMod General Office Building of the same square footage as the proposed project (this is a conservative estimate resulting in higher electricity consumption compared to industrial uses).

Emission Factors

	CO2 (MT/MWh)	CH4 (MT/MWh)	N2O (MT/MWh	CO2 (lb/MWh)	CH4 (lb/MWh)	N2O (lb/MWh)
SCE	0.21	-	8.82179E-06	467.38	0.034	0.019

Notes:
Southern California Edison emission factors for CO2 and N2O based upon EEI Metrics produced by Edison International for Southern California Edison (https://www.edison.com/content/dam/eix/documents/sustainability/eix-esg-pilot-quantitative-section-sce.xlsx). Emission factor for CH4 based upon U.S. EPA eGrid for CAMX subregion (https://www.epa.gov/sites/production/files/2020-01/documents/egrid2018_summary_tables.pdf)

Conversion Factors	
kWh to MWh	0.001
pounds per ton	2000
pounds per metric ton	2204.62262
average days per month	30.5
days per year	365
Global Warming Potential	
CO2	1
Ch4	25
N20	298
Note: GWP are the 100-year GWPs from the IPCC fourth assessment report (AR4), consistent with the California Air Resources Board 2019 GHG emissions inventory.	

Operational Days per Year: 365

Facility Waste Emissions (Indirect)

Average Annual Waste Tonnage (tons/1000 sq ft/year)	Average Annual Waste Tonnage (tons/year)	Emissions (metric tons per year)			
		CO2	CH4	N2O	CO2e
3.82	599.2052	124.43	6.17	0.00	278.69

*Anticipated waste based on CalEEMod data for Automobile Care Center (note this is more conservative than data for Heavy Industrial) in Climate Zone 8.

Emission Factors

CO2 (tons/ton waste)	CH4 (tons/ton waste)	N2O (tons/ton waste)
0.23	0.011350894	0

Source: CalEEMod

Conversion Factors	
metric tons per ton	0.907185
Global Warming Potential	
CO2	1
Ch4	25
N20	298

Note: GWP are the 100-year GWPs from the IPCC fourth assessment report (AR4), consistent with the California Air Resources Board 2019 GHG emissions inventory.

Facility Water Emissions (Indirect)

						Emissions (metric tons per year)			
Single Wash Fresh Water Demand (gallons)	**Single Wash Reclaim Water Demand (gallons)**	**Trains Washed per Day**	**Building General Operational Water Demand (per 1,000 sq ft)**	**Annual Fresh Water Demand (mgd)**	**Daily Reclaim Water Demand (mgd)**	**CO2**	**CH4**	**N2O**	**CO2e**
1,101.00	1,220.00	10.00	177,734	31.90	4.45	23.77	0	0.00	24.07

*Anticipated water use provided by project engineering team for train washes; also added typical building water demand for staff and general operations based on CalEEMod default data for a General Office Building.

Energy Demand	kWhr/million gallons	MWh/million gallons
Fresh Water	3500	3.5
Reclaimed Water	111	0.111

Source: CalEEMod energy demand for water supply, treat, and distribute.

Conversion Factors	
pounds per ton	2000
pounds per metric ton	2204.62262
average days per month	30.5
days per year	365
Global Warming Potential	
CO2	1
Ch4	25
N20	298

Note: GWP are the 100-year GWPs from the IPCC fourth assessment report (AR4), consistent with the California Air Resources Board 2019 GHG emissions inventory.

	CO2 (MT/MWh)	CH4 (MT/MWh)	N2O (MT/MWh)
SCE	0.21	0	8.82179E-06

Notes:
Southern California Edison emission factors for CO2 and N2O based upon EEI Metrics produced by Edison International for Southern California Edison (https://www.edison.com/content/dam/eix/documents/sustainability/eix-esg-pilot-quantitative-section-sce.xlsx). Emission factor for CH4 based upon U.S. EPA eGrid for CAMX subregion (https://www.epa.gov/sites/production/files/2020-01/documents/egrid2018_summary_tables.pdf)

EIC Code:

SCC/EIC	YEAR	PM PROFILE NUMBER	PM2.5/TPM	PM10/TPM	OG PROFILE	ROG/TOG	VOC/TOG
43042270780000	0	371	0.075	0.5	600	0.6986	0.6986

https://www.arb.ca.gov/app/emsinv/2017/emseic_query.php?F_YR=2020&F_DIV=-4&F_SEASON=A&SP=SIP105ADJ&SPN=SIP105ADJ&F_AREA=CA&F_EICSUM=430

PM10 (lb/yr)	1.652870894
PM10 (lb/hr)	0.000754736
PM10/PM2.5 (g/s)	

PM PROFILE NUMBER	SAROAD	WEIGHT FRACTION OF PM2.5	WEIGHT FRACTION OF PM10	WEIGHT FRACTION OF TPM	CAS	TAC	lb/yr	lb/hr
371	12114	0.0005	0.0005	0.0005	7440508	Copper	8.26E-04	3.77E-07
371	12126	0.0055	0.0055	0.0055	N/A	Iron	9.09E-03	4.15E-06
371	12136	0.0005	0.0005	0.0005	7440020	Nickel	8.26E-04	3.77E-07
371	12165	0.4	0.4	0.4	1175	Silica, crystln	6.61E-01	3.02E-04
371	12403	0.0055	0.0055	0.0055	9960	Sulfates	9.09E-03	4.15E-06
371	12999	0.588	0.588	0.588	N/A	Other	9.72E-01	4.44E-04

EMFAC2017 (v1.0.2) Emission Rates:
Region Type: County
Region: ORANGE
Calendar Year: 2028
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN. Note 'day' in the unit is operation day.

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	VMT	%VMT	Trips	%Trips	ROG_RUNEX	ROG_STREX	CO_RUNEX	CO_STREX	NOx_RUNEX	NOx_STREX	SOx_RUNEX	SOx_STREX	PM10_RUNEX	PM10_STREX	PM10_PMTW	PM10_PMBW	PM2.5_RUNEX	PM2.5_STREX	PM2.5_PMTW	PM2.5_PMBW	CO2_RUNEX	CO2_STREX	CH4_RUNEX	CH4_STREX	N2O_RUNEX	N2O_STREX
ORANGE		2028 LDA	Aggregated	Aggregated	GAS	1411674.912	50878519.1	57.71%	6683308.947	57%	0.004238235	0.131529841	0.480052086	1.728090108	0.020666771	0.131325118	0.002223683	0.000456419	0.001173899	0.001471991	0.008000002	0.036750011	0.001073557	0.001353441	0.002000001	0.015750005	224.7065449	46.12240883	0.001275336	0.031948574	0.003139936	0.020365464
ORANGE		2028 LDA	Aggregated	Aggregated	DSL	15920.07914	592226.2877	0.67%	76102.48189	1%	0.006496971	0	0.198887456	0	0.020886547	0	0.001665124	0	0.002468205	0	0.008000002	0.036750011	0.002361431	0	0.002000001	0.015750005	176.1365945	0	0.000394761	0	0.027898218	0
ORANGE		2028 LDA	Aggregated	Aggregated	ELEC	59785.95341	2456904.286	2.79%	294218.8335	3%	0	0	0	0	0	0	0	0	0	0	0.008000002	0.036750011	0	0	0.002000001	0.015750005	0	0	0	0	0	0
ORANGE		2028 LDT1	Aggregated	Aggregated	GAS	163763.9552	5651024.535	6.41%	758748.0688	6%	0.010563564	0.188108592	0.695023639	1.832733697	0.044280341	0.168267295	0.002628948	0.00054344	0.001422127	0.001743226	0.008000002	0.036750011	0.001307553	0.001602832	0.002000001	0.015750005	265.4606621	54.91611101	0.002623105	0.041562866	0.004552539	0.022646618
ORANGE		2028 LDT1	Aggregated	Aggregated	DSL	24.64502637	736.2971993	0.00%	102.2031952	0%	0.063453782	0	0.456551042	0	0.247160389	0	0.003139413	0	0.035351113	0	0.008000002	0.036750011	0.033821839	0	0.002000001	0.015750005	337.8745965	0	0.002947307	0	0.053109181	0
ORANGE		2028 LDT1	Aggregated	Aggregated	ELEC	3304.208074	139600.8795	0.16%	16405.8598	0%	0	0	0	0	0	0	0	0	0	0	0.008000002	0.036750011	0	0	0.002000001	0.015750005	0	0	0	0	0	0
ORANGE		2028 LDT2	Aggregated	Aggregated	GAS	479336.0185	16749817.97	19.00%	2240043.251	19%	0.007996905	0.193658875	0.626007517	2.224931153	0.035888226	0.176904177	0.002708463	0.000572968	0.001227962	0.001496389	0.008000002	0.036750011	0.001129066	0.001375884	0.002000001	0.015750005	273.6979072	57.90009413	0.002162847	0.044818303	0.00397436	0.024082926
ORANGE		2028 LDT2	Aggregated	Aggregated	DSL	4143.276594	152305.4468	0.18%	19940.42034	0%	0.017172368	0	0.167659441	0	0.03267758	0	0.000275403	0	0.004338879	0	0.008000002	0.036750011	0.004151181	0	0.002000001	0.015750005	240.6918359	0	0.000797624	0	0.037833405	0
ORANGE		2028 LDT2	Aggregated	Aggregated	ELEC	12010.15439	349262.4991	0.40%	59524.73684	1%	0	0	0	0	0	0	0	0	0	0	0.008000002	0.036750011	0	0	0.002000001	0.015750005	0	0	0	0	0	0
ORANGE		2028 MDV	Aggregated	Aggregated	GAS	315682.2972	10621237.82	12.05%	1460180.383	12%	0.009532677	0.227426582	0.669864182	2.39485248	0.042464551	0.204157737	0.003360921	0.000708409	0.001247783	0.001523548	0.008000002	0.036750011	0.00114729	0.001400846	0.002000001	0.015750005	339.6307051	71.58677008	0.002532832	0.055478075	0.004856793	0.025584364
ORANGE		2028 MDV	Aggregated	Aggregated	DSL	9344.610081	338224.9396	0.38%	44118.51684	0%	0.009497418	0	0.220270272	0	0.023826779	0	0.002998891	0	0.002773437	0	0.008000002	0.036750011	0.002853546	0	0.002000001	0.015750005	316.2702266	0	0.002440672	0	0.040713272	0
ORANGE		2028 MDV	Aggregated	Aggregated	ELEC	7944.433907	236534.5432	0.27%	39689.56194	0%	0	0	0	0	0	0	0	0	0	0	0.008000002	0.036750011	0	0	0.002000001	0.015750005	0	0	0	0	0	0
							88,169,389.59	1.00	11,692,883.05	1.00																						
											Worker Vehicle Weighted Average Emission Factors (accounts for SAFE Rule)																					
											0.005925	0.153312	0.529542	1.852656	0.027081	0.145660	0.002368	0.000494	0.001201	0.001448	0.008000	0.036750	0.001106	0.001331	0.002000	0.015750	242.415353	49.956982	0.001626	0.035847	0.003840	0.029918

EMFAC2017 Off-Model Adjustment Factors for Gasoline Light Duty Vehicle Emissions

Year	NOx Exhaust	TOG Exhaust	PM Exhaust	CO Exhaust
2029	1.0034	1.0028	1.0117	1.012

Applied to gas powered LDA, LDT1, and LDT2 vehicles
Source: Table 2 in ARB 2019 EMFAC Off-Model Adjustment Factors to Account for the SAFE Vehicle Rule Part One
https://ww3.arb.ca.gov/msei/emfac_off_model_adjustment_factors_final_draft.pdf

Haul and Fast Truck Emission Factor

ORANGE		2028 T7 Single	Aggregated	Aggregated	DSL	2663.768192	194675.0856	100%	30739.51582		0.01427489	0	0.153637672	0	1.614349314	3.605728287	0.011776379	0	0.012817379	0	0.03600001	0.061740018	0.008901201	0	0.009000003	0.026460008	1246.506913	0	0.000653032	0	0.195933528	0

Fugitive Dust Emission Factors

Paved Road Dust	$EF_{DUST} = [(k(sL)^{0.91} \times (W)^{1.02}](1 - P/4N))$	
Source: AP-42 Section 13.2.1 (Paved Roads) - http://www.epa.gov/ttnchie1/ap42/ch13/final/c13s0201.pdf		
Variable	Value	Description
k (PM10)	0.0022	particle size multiplier for particle size rangeand units of interest (lb/VMT)
k (PM2.5)	0.00054	particle size multiplier for particle size rangeand units of interest (lb/VMT)
sL	0.1	road surface silt loading (g/m^2)
W	2.4	average weight (tons) of vehicles (2.4 tons)
W	12	haul truck tons
P	51	number of "wet" days with at least 0.254 mm (0.1 inches) of precipitation during the averaging period
N	365	number of days in averaging period
Pickup and Worker		
EF (PM10)	0.000637964	lb/VMT
EF (PM2.5)	0.000156591	lb/VMT
Haul Truck		
EF (PM10)	0.003294168	lb/VMT
EF (PM2.5)	0.000808568	lb/VMT

OFFROAD Tons Per Year and Gallons Per Horsepower-Hour Calculation

Constants	
lbs	grams
1	453.5924
ton	lbs
1	2000

CH4 Emissions Factor (g/gallon diesel): 0.57
N2O Emissions Factor (g/gallon diesel): 0.26

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	HC_g_hp-hr	ROG_g_hp-hr	TOG_g_hp-hr	CO_g_hp-hr	NOx_g_hp-hr	CO2_g_hp-hr	PM10_g_hp-hr	PM2_5_g_hp-hr	PM_g_hp-hr	SOx_g_hp-hr	NH3_g_hp-hr	gal/hp-hr
South Coast AQMD	2028	CHE - Rail RTG Crane	Aggregate	Aggregate	Diesel	0.0297389	0.035984038	0.04282398	0.237243	0.155314526	105.470878	0.002854091	0.002625764	0.00285409	0.00097424	0.00086084	7.22227E-05
South Coast AQMD	2028	CHE - Rail Forklift	Aggregate	Aggregate	Diesel	0.0392841	0.047533723	0.05656906	1.0143567	0.148746164	163.249337	0.005479709	0.005041333	0.00547971	0.00150814	0.00133242	0.002415779
South Coast AQMD	2028	OFF - Industrial - Aerial Lifts	Aggregate	Aggregate	Gasoline	0.6523443	0.600026265	0.71786508	33.779709	0.754440462	335.070377	0.231449201	0.17487273	0.25716578	0.00393045	0.00517929	0.001767678
South Coast AQMD	2028	OFF - Industrial - Aerial Lifts	Aggregate	Aggregate	Diesel	0.2165427	0.257703711	0.31182149	1.2458643	1.965178752	261.426991	0.074904968	0.06891257	0.07490497	0.0035618	0.00218849	0.004997523
South Coast AQMD	2028	OFF - Industrial - Aerial Lifts	Aggregate	Aggregate	Nat Gas	0	0	0.19748075	52.726227	1.4509006	310.335024	0	0	0.15939052	0	0	0.012648857
South Coast AQMD	2028	OFF - Industrial - Forklifts	Aggregate	Aggregate	Gasoline	0.2431377	0.223638068	0.26755822	24.625827	1.018190829	232.291908	0.016210581	0.012247994	0.01801176	0.00232723	0.00360408	2.81879E-05
South Coast AQMD	2028	OFF - Industrial - Forklifts	Aggregate	Aggregate	Nat Gas	0	0	0.01887453	8.2085885	0.886377026	202.398041	0	0	0.01800889	0	0	1.35055E-05
South Coast AQMD	2028	OFF - Industrial - Other General Industrial Ec	Aggregate	Aggregate	Gasoline	0.9981045	0.918056541	1.09835314	69.488677	1.513604764	360.713457	0.055085962	0.041620504	0.06120662	0.00515933	0.00628188	0.00441549
South Coast AQMD	2028	OFF - Industrial - Other General Industrial Ec	Aggregate	Aggregate	Diesel	0.2347298	0.279347844	0.33801089	1.3300849	2.18657337	289.833446	0.082558925	0.075954211	0.08255892	0.00387491	0.00242538	0.00485907
South Coast AQMD	2028	OFF - Industrial - Other Material Handling Ec	Aggregate	Aggregate	Gasoline	0.2823722	0.259725989	0.31073343	18.776703	1.448620842	410.757795	0.028633529	0.021634222	0.03181503	0.00398599	0.00584591	0.019803423
South Coast AQMD	2028	OFF - Industrial - Sweepers/Scrubbers	Aggregate	Aggregate	Gasoline	0.621852	0.571979475	0.6843102	45.428046	1.655059377	532.488381	0.046635848	0.035235974	0.05181761	0.00603441	0.00803572	0.00239064
South Coast AQMD	2028	OFF - Industrial - Sweepers/Scrubbers	Aggregate	Aggregate	Diesel	0.3064518	0.364702928	0.44129054	1.8813037	2.896232509	386.31212	0.110040831	0.101237564	0.11004083	0.00532149	0.00323403	0.042474795

OFFROAD Tons Per Year and Gallons Per Horsepower-Hour Calculation

Constants	
year	days
1	365

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	HC_tpy	ROG_tpy	TOG_tpy	CO_tpy	NOx_tpy	CO2_tpy	PM10_tpy	PM2_5_tpy	PM_tpy	SOx_tpy	NH3_tpy	gal/hp-hr
South Coast AQMD	2028	CHE - Rail RTG Crane	Aggregated	Aggregated	Diesel	4.255279	5.1488876	6.1276017	33.946651	22.22366	15091.627	0.4083865	0.3757156	0.4083865	0.1394019	0.1231758	0.0103342
South Coast AQMD	2028	CHE - Rail Forklift	Aggregated	Aggregated	Diesel	0.2601088	0.3147316	0.3745567	6.7162873	0.9848823	1080.9112	0.0362824	0.0333798	0.0362824	0.0099858	0.0088223	0.0159954
South Coast AQMD	2028	OFF - Industrial - Aerial Lifts	Aggregated	Aggregated	Gasoline	16.477303	15.155824	18.132267	853.22817	19.05611	8463.4087	5.8460829	4.4170404	6.4956476	0.0992776	0.1308217	0.0446491
South Coast AQMD	2028	OFF - Industrial - Aerial Lifts	Aggregated	Aggregated	Diesel	1.1383845	1.3547716	1.6392736	6.5496204	10.331121	1374.3452	0.3937822	0.3622796	0.3937822	0.0187247	0.0115051	0.0262724
South Coast AQMD	2028	OFF - Industrial - Aerial Lifts	Aggregated	Aggregated	Nat Gas	0	0	0.9779558	261.10859	7.1850886	1536.828	0	0	0.789327	0	0	0.0626391
South Coast AQMD	2028	OFF - Industrial - Forklifts	Aggregated	Aggregated	Gasoline	267.99528	246.50206	294.91245	27143.487	1122.2872	256040.63	17.867895	13.500187	19.853216	2.565162	3.9725529	0.0310697
South Coast AQMD	2028	OFF - Industrial - Forklifts	Aggregated	Aggregated	Nat Gas	0	0	47.204143	20529.222	2216.7795	506186.21	0	0	45.039241	0	0	0.0337765
South Coast AQMD	2028	OFF - Industrial - Other General Industrial Eq	Aggregated	Aggregated	Gasoline	12.241324	11.25957	13.470831	852.24885	18.563714	4423.996	0.6756057	0.5104577	0.750673	0.0632769	0.0770445	0.0541541
South Coast AQMD	2028	OFF - Industrial - Other General Industrial Eq	Aggregated	Aggregated	Diesel	1.4065327	1.6738901	2.025407	7.9700489	13.102244	1736.7213	0.4947043	0.4551279	0.4947043	0.023219	0.0145332	0.0291162
South Coast AQMD	2028	OFF - Industrial - Other Material Handling Eq	Aggregated	Aggregated	Gasoline	0.7185806	0.6609505	0.7907542	47.782938	3.6864491	1045.2961	0.0728666	0.0550547	0.0809629	0.0101435	0.0148767	0.0503957
South Coast AQMD	2028	OFF - Industrial - Sweepers/Scrubbers	Aggregated	Aggregated	Gasoline	18.01937	16.574217	19.829218	1316.3659	47.958561	15429.886	1.3513643	1.0210308	1.5015159	0.1748587	0.2328506	0.0692734
South Coast AQMD	2028	OFF - Industrial - Sweepers/Scrubbers	Aggregated	Aggregated	Diesel	0.2801105	0.3333546	0.4033591	1.7195947	2.6472845	353.10635	0.1005822	0.0925356	0.1005822	0.0048641	0.002956	0.0388238

OFFROAD2017 (v1.0.1) Emissions Inventory
Region Type: County
Region: Orange
Calendar Year: 2028
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2017 Equipment Types
Units: Emissions: tons/day, Fuel Consumption: gallons/year, Activity: hours/year, HP-Hours: HP-hours/year

Region	CalYr	VehClass	MdlYr	HP_Bin	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2_5_tpd	PM_tpd	SOx_tpd	NH3_tpd	Fuel_gpy	Total_Activity_hp	Total_Popula	Horsepower_Hours_hhpy
South Coast AQMD	2028	CHE - Rail RTG Crane	Aggregated	Aggregated	Diesel	0.011658	0.014107	0.016788	0.093005	0.060887	41.34692	0.001118867	0.001029358	0.001118867	0.000381923	0.000337468	1341455.424	456416.8269	94.71014	1.3E+08
South Coast AQMD	2028	CHE - Rail Forklift	Aggregated	Aggregated	Diesel	0.000713	0.000862	0.001026	0.018401	0.002698	2.9614	9.94039E-05	9.14516E-05	9.94039E-05	2.73582E-05	2.41706E-05	96079.37611	45140.98014	17.40261	6006678
South Coast AQMD	2028	OFF - Industrial - Aerial Lifts	Aggregated	Aggregated	Gasoline	0.045143	0.041523	0.049677	2.337611	0.052209	23.18742	0.016016665	0.01210148	0.017796295	0.000271993	0.000358416	1023098.65	564939.7	1545.94	22914218
South Coast AQMD	2028	OFF - Industrial - Aerial Lifts	Aggregated	Aggregated	Diesel	0.003119	0.003712	0.004491	0.017944	0.028304	3.765329	0.001078855	0.000992547	0.001078855	5.13005E-05	3.15208E-05	125297.2	272826.55	683.06	4769152
South Coast AQMD	2028	OFF - Industrial - Aerial Lifts	Aggregated	Aggregated	Nat Gas	0	0	0.002679	0.715366	0.019685	4.210488	0	0	0.00216254	0	0	281407.7	238162.5	634.51	4492522
South Coast AQMD	2028	OFF - Industrial - Forklifts	Aggregated	Aggregated	Gasoline	0.734234	0.675348	0.807979	74.36572	3.074759	701.4812	0.048953136	0.036986814	0.054392373	0.007027841	0.010883707	31067580.9	15191471.55	8437.66	1E+09
South Coast AQMD	2028	OFF - Industrial - Forklifts	Aggregated	Aggregated	Nat Gas	0	0	0.129326	56.24444	6.073368	1386.812	0	0	0.123395181	0	0	76632764.7	34458241.1	19128.77	2.27E+09
South Coast AQMD	2028	OFF - Industrial - Other General Industrial Equip	Aggregated	Aggregated	Gasoline	0.033538	0.030848	0.036906	2.334928	0.050859	12.12054	0.001850975	0.001398514	0.002056638	0.000173361	0.000211081	602531.05	499422.2	1088.43	11126233
South Coast AQMD	2028	OFF - Industrial - Other General Industrial Equip	Aggregated	Aggregated	Diesel	0.003854	0.004586	0.005549	0.021836	0.035897	4.75814	0.001355354	0.001246926	0.001355354	6.36137E-05	3.9817E-05	158274.95	301705.35	211.49	5435974
South Coast AQMD	2028	OFF - Industrial - Other Material Handling Equip	Aggregated	Aggregated	Gasoline	0.001969	0.001811	0.002166	0.130912	0.0101	2.863825	0.000199634	0.000150835	0.000221816	2.77905E-05	4.0758E-05	116343.75	42975.1	111.29	2308603
South Coast AQMD	2028	OFF - Industrial - Sweepers/Scrubbers	Aggregated	Aggregated	Gasoline	0.049368	0.045409	0.054327	3.606482	0.131393	42.27366	0.003702368	0.002797345	0.004113742	0.000479065	0.000637947	1821021.5	643301.55	1531.09	26287442
South Coast AQMD	2028	OFF - Industrial - Sweepers/Scrubbers	Aggregated	Aggregated	Diesel	0.000767	0.000913	0.001105	0.004711	0.007253	0.967415	0.000275568	0.000253522	0.000275568	1.33262E-05	8.09875E-06	32193	44822	68.86	829207

Tank ESP Inputs Key

Fixed roof tank type

Column-supported (cone)	A
Horizontal Tank	D
No fixed roof (open top)	C
Self-supporting (dome)	B

Shell/roof finish

aluminum-colored paint (diffuse)	B
aluminum-colored paint (specular)	A
beige/cream-colored paint	C
black	G
brown paint	D
light gray paint	E
medium gray paint	F
mill finish aluminum (unpainted)	L
red primer or dark green paint	H
rust (unpainted iron oxide)	I
tan paint	J
white paint	K

Shell/roof condition

Aged (Ag)	Ag
Average (Av)	Av
New (N)	N

Tank insulation

Fully insulated (shell and roof insulated)	F
Not insulated	N
Partially insulated (Shell only)	P

Inside shell condition

dense rust	D
gunite lined	G
light rust	L

Shell construction

riveted	R
welded	W

Stock data

Name	Abbrv.
Out of Service	OUT
Crude Oil RVP_X	CRUDE_X
Gasoline RVP_X	GAS_X
Jet kerosene	JET
Kerosene	KERO
Diesel	DIESEL
No. 2 Oil	2OIL
No. 6 Oil	6OIL
Vacuum Residual Oil	STR_RESID
Propylene glycol	PROPGLY
Methanol	METHANOL
Triethylene glycol	TRIGLY

Tank ESP Tank Info

Required entry
Not required - can leave blank if N/A
Defaults will be used if unknown

Closest Met Station	USER ID	Start Date	DIAMETER	HEIGHT (Vert tanks) or LENGTH (Horz tanks)	Fixed Roof Type	Shell Finish	Shell Condition	Roof Finish	Roof Condition	Operating Pressure	Min Vent Relieving Pressure PSIG	Max vent relieving pressure PSIG	HEIGHT Max L (ft)	HEIGHT Min L (ft)	Cone Roof SLOPE (in/ft)	Slope of Cone Bottom	Dome Roof_HEIGHT	Dome Roof_Radius	Insulation Condition	Vapor Control Efficiency	Max Pump Rate (gal/hr)	Combo PV Vents	P Vents	V Vents	Open Vents	Inside Shell Condition	Shell Construction	Build Date	Assoc. Source Category	Sump Diameter (ft)	Sump Height (ft)	Tank ID 2 (FIN)	Emission Point No. (EPN)	Is Closed?	Control ID No. (CIN)	Location (coordinates)
Santa Ana, CA	Tank 1-30,000	1/1/2023	10	48	D	K	Av	K	Av	0	-0.03	0.03							N							L	W								N		
Santa Ana, CA	Tank 2-30,000	1/1/2023	10	48	D	K	Av	K	Av	0	-0.03	0.03							N							L	W								N		
Santa Ana, CA	Tank 3-30,000	1/1/2023	10	48	D	K	Av	K	Av	0	-0.03	0.03							N							L	W								N		
Santa Ana, CA	Tank 4-30,000	1/1/2023	10	48	D	K	Av	K	Av	0	-0.03	0.03							N							L	W								N		
Santa Ana, CA	Tank 5-10,000	1/1/2023	10	18	B	K	Av	K	Av										N																	

Tank ESP Tank Service

Tank ID	Start Date	Throughtput	Throughput Unit	Stock	Stock RVP	Bulk Storage Temp (degF)	Comments	Min Heated Temp (F)	Max Heated Temp (F)	Heating Cycle Length (days)	Flash Gas
Tank 1-30,000	1/1/2023	1,186,250	gallons	DIESEL							
Tank 2-30,000	1/1/2023	1,186,250	gallons	DIESEL							
Tank 3-30,000	1/1/2023	1,186,250	gallons	DIESEL							
Tank 4-30,000	1/1/2023	1,186,250	gallons	DIESEL							
Tank 5-10,000	1/1/2023	4,745,000	gallons	DIESEL							

TankSummaries for Every month between Jan and Dec 2023

Site: OCTA,

Equations for this site: After 2019 AP-42 revisions H/D ratio: Default 0.5

Tank ID	Row label	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
Tank 1-30,000													
	Diameter (ft)	10	10	10	10	10	10	10	10	10	10	10	10
	Fixed Roof Type	D	D	D	D	D	D	D	D	D	D	D	D
	Inside Shell Condition	L	L	L	L	L	L	L	L	L	L	L	L
	Shell Condition (post-19)	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	Shell Finish	K	K	K	K	K	K	K	K	K	K	K	K
	Roof Condition (post-19)	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	Roof Finish	K	K	K	K	K	K	K	K	K	K	K	K
	Product	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
	Throughput (gal)	100749.999	91000.0014	100749.999	97500.0012	100749.999	97500.0012	100749.999	100749.999	97500.0012	100749.999	97500.0012	100749.999
	Bulk Liquid Temperature (degF)	57.96184	58.622082	60.736128	63.113753	66.438912	69.363065	72.94733	74.241485	72.714272	68.300468	62.584563	57.439062
	Avg. Liquid Surface Temp. (degF)	58.825504	59.682387	62.206889	64.986839	68.375535	71.412614	75.014948	76.219366	74.347351	69.523393	63.565675	58.235875
	Avg. TVP (psia)	0.006235178	0.00641443	0.006969278	0.007628905	0.008507021	0.009368503	0.010489212	0.010889372	0.010273029	0.008824036	0.007285117	0.006114418
	Estimated standing losses (lbs)	0.2566938	0.2334849	0.30469824	0.35631705	0.37805837	0.40107392	0.47727438	0.50535619	0.43417246	0.35460892	0.30237473	0.2480649
	Estimated working losses (lbs)	1.6610115	1.5403807	1.8428117	1.9406263	2.2216069	2.353754	2.7048025	2.8020802	2.5684975	2.301937	1.8607732	1.6308652
	Total estimated emissions (lbs)	1.9177053	1.7738656	2.1475099	2.2969434	2.5996653	2.7548279	3.1820769	3.3074364	3.0026699	2.6565459	2.1631479	1.8789301
	Benzene	0	0	0	0	0	0	0	0	0	0	0	0
	Benzo(g,h,i)perylene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Biphenyl	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Cumene {isopropylbenzene}	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Cyclohexane	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Ethylbenzene	0.004428053	0.004102685	0.004990159	0.005363312	0.006103533	0.006497218	0.007541971	0.007851198	0.007110506	0.006248035	0.005038611	0.004333516
	Hexane (n-)	0	0	0	0	0	0	0	0	0	0	0	0
	Iso-octane {2,2,4 trimethylpentane	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Total loss components in the "Cho	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	PACs {Chrysene}	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Phenanthrene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Toluene	0.042588038	0.039329299	0.047381077	0.050399213	0.056649331	0.059651286	0.068374507	0.070882616	0.064612509	0.057751305	0.047598342	0.041773586
	Trimethylbenzene (1,2,4)	0.086695928	0.080685409	0.099427399	0.108385786	0.125455255	0.135557802	0.160119039	0.16764468	0.150476398	0.129156483	0.101092537	0.084583452
	Xylene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Xylene (m-)	0.111806969	0.103616533	0.126120261	0.13565817	0.154530188	0.164640472	0.191312307	0.199225282	0.180333023	0.158240565	0.127393865	0.109401809
Tank 2-30,000													
	Diameter (ft)	10	10	10	10	10	10	10	10	10	10	10	10
	Fixed Roof Type	D	D	D	D	D	D	D	D	D	D	D	D
	Inside Shell Condition	L	L	L	L	L	L	L	L	L	L	L	L
	Shell Condition (post-19)	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	Shell Finish	K	K	K	K	K	K	K	K	K	K	K	K
	Roof Condition (post-19)	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	Roof Finish	K	K	K	K	K	K	K	K	K	K	K	K
	Product	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
	Throughput (gal)	100749.999	91000.0014	100749.999	97500.0012	100749.999	97500.0012	100749.999	100749.999	97500.0012	100749.999	97500.0012	100749.999
	Bulk Liquid Temperature (degF)	57.96184	58.622082	60.736128	63.113753	66.438912	69.363065	72.94733	74.241485	72.714272	68.300468	62.584563	57.439062
	Avg. Liquid Surface Temp. (degF)	58.825504	59.682387	62.206889	64.986839	68.375535	71.412614	75.014948	76.219366	74.347351	69.523393	63.565675	58.235875
	Avg. TVP (psia)	0.006235178	0.00641443	0.006969278	0.007628905	0.008507021	0.009368503	0.010489212	0.010889372	0.010273029	0.008824036	0.007285117	0.006114418
	Estimated standing losses (lbs)	0.2566938	0.2334849	0.30469824	0.35631705	0.37805837	0.40107392	0.47727438	0.50535619	0.43417246	0.35460892	0.30237473	0.2480649
	Estimated working losses (lbs)	1.6610115	1.5403807	1.8428117	1.9406263	2.2216069	2.353754	2.7048025	2.8020802	2.5684975	2.301937	1.8607732	1.6308652
	Total estimated emissions (lbs)	1.9177053	1.7738656	2.1475099	2.2969434	2.5996653	2.7548279	3.1820769	3.3074364	3.0026699	2.6565459	2.1631479	1.8789301
	Benzene	0	0	0	0	0	0	0	0	0	0	0	0
	Benzo(g,h,i)perylene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Biphenyl	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Cumene {isopropylbenzene}	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Cyclohexane	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Ethylbenzene	0.004428053	0.004102685	0.004990159	0.005363312	0.006103533	0.006497218	0.007541971	0.007851198	0.007110506	0.006248035	0.005038611	0.004333516
	Hexane (n-)	0	0	0	0	0	0	0	0	0	0	0	0
	Iso-octane {2,2,4 trimethylpentane	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Total loss components in the "Cho	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	PACs {Chrysene}	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Phenanthrene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Toluene	0.042588038	0.039329299	0.047381077	0.050399213	0.056649331	0.059651286	0.068374507	0.070882616	0.064612509	0.057751305	0.047598342	0.041773586
	Trimethylbenzene (1,2,4)	0.086695928	0.080685409	0.099427399	0.108385786	0.125455255	0.135557802	0.160119039	0.16764468	0.150476398	0.129156483	0.101092537	0.084583452
	Xylene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Xylene (m-)	0.111806969	0.103616533	0.126120261	0.13565817	0.154530188	0.164640472	0.191312307	0.199225282	0.180333023	0.158240565	0.127393865	0.109401809
Tank 3-30,000													
	Diameter (ft)	10	10	10	10	10	10	10	10	10	10	10	10
	Fixed Roof Type	D	D	D	D	D	D	D	D	D	D	D	D
	Inside Shell Condition	L	L	L	L	L	L	L	L	L	L	L	L
	Shell Condition (post-19)	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	Shell Finish	K	K	K	K	K	K	K	K	K	K	K	K
	Roof Condition (post-19)	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	Roof Finish	K	K	K	K	K	K	K	K	K	K	K	K
	Product	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
	Throughput (gal)	100749.999	91000.0014	100749.999	97500.0012	100749.999	97500.0012	100749.999	100749.999	97500.0012	100749.999	97500.0012	100749.999
	Bulk Liquid Temperature (degF)	57.96184	58.622082	60.736128	63.113753	66.438912	69.363065	72.94733	74.241485	72.714272	68.300468	62.584563	57.439062
	Avg. Liquid Surface Temp. (degF)	58.825504	59.682387	62.206889	64.986839	68.375535	71.412614	75.014948	76.219366	74.347351	69.523393	63.565675	58.235875
	Avg. TVP (psia)	0.006235178	0.00641443	0.006969278	0.007628905	0.008507021	0.009368503	0.010489212	0.010889372	0.010273029	0.008824036	0.007285117	0.006114418
	Estimated standing losses (lbs)	0.2566938	0.2334849	0.30469824	0.35631705	0.37805837	0.40107392	0.47727438	0.50535619	0.43417246	0.35460892	0.30237473	0.2480649
	Estimated working losses (lbs)	1.6610115	1.5403807	1.8428117	1.9406263	2.2216069	2.353754	2.7048025	2.8020802	2.5684975	2.301937	1.8607732	1.6308652
	Total estimated emissions (lbs)	1.9177053	1.7738656	2.1475099	2.2969434	2.5996653	2.7548279	3.1820769	3.3074364	3.0026699	2.6565459	2.1631479	1.8789301
	Benzene	0	0	0	0	0	0	0	0	0	0	0	0
	Benzo(g,h,i)perylene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Biphenyl	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Cumene {isopropylbenzene}	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Cyclohexane	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Ethylbenzene	0.004428053	0.004102685	0.004990159	0.005363312	0.006103533	0.006497218	0.007541971	0.007851198	0.007110506	0.006248035	0.005038611	0.004333516
	Hexane (n-)	0	0	0	0	0	0	0	0	0	0	0	0
	Iso-octane {2,2,4 trimethylpentane	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Total loss components in the "Cho	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	PACs {Chrysene}	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Phenanthrene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Toluene	0.042588038	0.039329299	0.047381077	0.050399213	0.056649331	0.059651286	0.068374507	0.070882616	0.064612509	0.057751305	0.047598342	0.041773586
	Trimethylbenzene (1,2,4)	0.086695928	0.080685409	0.099427399	0.108385786	0.125455255	0.135557802	0.160119039	0.16764468	0.150476398	0.129156483	0.101092537	0.084583452
	Xylene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Xylene (m-)	0.111806969	0.103616533	0.126120261	0.13565817	0.154530188	0.164640472	0.191312307	0.199225282	0.180333023	0.158240565	0.127393865	0.109401809

TankSummaries for Every month between Jan and Dec 2023

Site: OCTA,

Equations for this site: After 2019 AP-42 revisions H/D ratio: Default 0.5

Tank ID	Row label	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
Tank 4-30,000													
	Diameter (ft)	10	10	10	10	10	10	10	10	10	10	10	10
	Fixed Roof Type	D	D	D	D	D	D	D	D	D	D	D	D
	Inside Shell Condition	L	L	L	L	L	L	L	L	L	L	L	L
	Shell Condition (post-19)	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	Shell Finish	K	K	K	K	K	K	K	K	K	K	K	K
	Roof Condition (post-19)	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	Roof Finish	K	K	K	K	K	K	K	K	K	K	K	K
	Product	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
	Throughput (gal)	100749.999	91000.0014	100749.999	97500.0012	100749.999	97500.0012	100749.999	100749.999	97500.0012	100749.999	97500.0012	100749.999
	Bulk Liquid Temperature (degF)	57.96184	58.622082	60.736128	63.113753	66.438912	69.363065	72.94733	74.241485	72.714272	68.300468	62.584563	57.439062
	Avg. Liquid Surface Temp. (degF)	58.825504	59.682387	62.206889	64.986839	68.375535	71.412614	75.014948	76.219366	74.347351	69.523393	63.565675	58.235875
	Avg. TVP (psia)	0.006235178	0.00641443	0.006969278	0.007628905	0.008507021	0.009368503	0.010489212	0.010889372	0.010273029	0.008824036	0.007285117	0.006114418
	Estimated standing losses (lbs)	0.2566938	0.2334849	0.30469824	0.35631705	0.37805837	0.40107392	0.47727438	0.50535619	0.43417246	0.35460892	0.30237473	0.2480649
	Estimated working losses (lbs)	1.6610115	1.5403807	1.8428117	1.9406263	2.2216069	2.353754	2.7048025	2.8020802	2.5684975	2.301937	1.8607732	1.6308652
	Total estimated emissions (lbs)	1.9177053	1.7738656	2.1475099	2.2969434	2.5996653	2.7548279	3.1820769	3.3074364	3.0026699	2.6565459	2.1631479	1.8789301
	Benzene	0	0	0	0	0	0	0	0	0	0	0	0
	Benzo(g,h,i)perylene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Biphenyl	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Cumene {isopropylbenzene}	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Cyclohexane	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Ethylbenzene	0.004428053	0.004102685	0.004990159	0.005363312	0.006103533	0.006497218	0.007541971	0.007851198	0.007110506	0.006248035	0.005038611	0.004333516
	Hexane (n-)	0	0	0	0	0	0	0	0	0	0	0	0
	Iso-octane {2,2,4 trimethylpentane	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Total loss components in the "Choi	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	PACs {Chrysene}	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Phenanthrene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Toluene	0.042588038	0.039329299	0.047381077	0.050399213	0.056649331	0.059651286	0.068374507	0.070882616	0.064612509	0.057751305	0.047598342	0.041773586
	Trimethylbenzene (1,2,4)	0.086695928	0.080685409	0.099427399	0.108385786	0.125455255	0.135557802	0.160119039	0.16764468	0.150476398	0.129156483	0.101092537	0.084583452
	Xylene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Xylene (m-)	0.111806969	0.103616533	0.126120261	0.13565817	0.154530188	0.164640472	0.191312307	0.199225282	0.180333023	0.158240565	0.127393865	0.109401809
Tank 5-10,000													
	Diameter (ft)	10	10	10	10	10	10	10	10	10	10	10	10
	Fixed Roof Type	B	B	B	B	B	B	B	B	B	B	B	B
	Inside Shell Condition	L	L	L	L	L	L	L	L	L	L	L	L
	Shell Condition (post-19)	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	Shell Finish	K	K	K	K	K	K	K	K	K	K	K	K
	Roof Condition (post-19)	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av	Av
	Roof Finish	K	K	K	K	K	K	K	K	K	K	K	K
	Product	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
	Throughput (gal)	403000.0002	364000.0014	403000.0002	390000.0006	403000.0002	390000.0006	403000.0002	403000.0002	390000.0006	403000.0002	390000.0006	403000.0002
	Bulk Liquid Temperature (degF)	57.96184	58.622082	60.736128	63.113753	66.438912	69.363065	72.94733	74.241485	72.714272	68.300468	62.584563	57.439062
	Avg. Liquid Surface Temp. (degF)	58.825504	59.682387	62.206889	64.986839	68.375535	71.412614	75.014948	76.219366	74.347351	69.523393	63.565675	58.235875
	Avg. TVP (psia)	0.006235178	0.00641443	0.006969278	0.007628905	0.008507021	0.009368503	0.010489212	0.010889372	0.010273029	0.008824036	0.007285117	0.006114418
	Estimated standing losses (lbs)	0.098946289	0.089995337	0.1174249	0.13729116	0.14563061	0.15445724	0.18374224	0.19453039	0.16715937	0.13658499	0.11651864	0.095623557
	Estimated working losses (lbs)	1.7719724	1.6432831	1.9659174	2.0702663	2.3700173	2.5109923	2.8854919	2.9892681	2.7400813	2.4557137	1.9850787	1.7398122
	Total estimated emissions (lbs)	1.8709186	1.7332784	2.0833423	2.2075575	2.5156479	2.6654495	3.0692342	3.1837985	2.9072407	2.5922987	2.1015974	1.8354357
	Benzene	0	0	0	0	0	0	0	0	0	0	0	0
	Benzo(g,h,i)perylene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Biphenyl	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Cumene {isopropylbenzene}	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Cyclohexane	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Ethylbenzene	0.004320021	0.004008813	0.004841053	0.005154598	0.005906276	0.006286421	0.007274518	0.007557706	0.006884524	0.006096929	0.004895242	0.004233202
	Hexane (n-)	0	0	0	0	0	0	0	0	0	0	0	0
	Iso-octane {2,2,4 trimethylpentane	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Total loss components in the "Choi	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	PACs {Chrysene}	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Phenanthrene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Toluene	0.041549009	0.038429419	0.04596533	0.048437921	0.054818508	0.057715943	0.065949813	0.068232897	0.062559028	0.056354619	0.046243973	0.040806591
	Trimethylbenzene (1,2,4)	0.08458079	0.078839274	0.096456506	0.104167939	0.121400727	0.131159727	0.154440903	0.161377822	0.145694037	0.1260329	0.098216036	0.082625475
	Xylene	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	Xylene (m-)	0.109079192	0.101245719	0.122351785	0.130379015	0.149536001	0.159298831	0.184527996	0.191777884	0.174601775	0.154413599	0.123768983	0.106869326

Attachm**en**t B

Construction and Operational Emission Estimates

Table B-1: Modeling Parameters for On-Road Construction Sources

Road	Road Width (ft)	Road Width (m)	Base Elevation	SourceID	Line Volume Src Type	Release Height from	Initial Lateral Dimensio	Initial Vertical Dimensio	# Volume Sources	Total Length (m)	g/s per vol (1 g/s)
Marine Way (West of Perimeter Rd and East of Rt-133)	89.47	27.27	varies - AERMAP	MARINE1	Adjacent	2.00	varies - based on	2.30	10	395	**1.0000E-01**
Marine Way (West of Rt-133 and East of Sand Canyon Ave)	26.90	8.20	varies - AERMAP	MARINE2	Adjacent	2.00	varies - based on	2.30	34	236.7	**2.9412E-02**
Perimeter Road (Project Site to Marine Way)	24.67	7.52	varies - AERMAP	PERIM1	Adjacent	2.00	varies - based on	2.30	12	155.7	**8.3333E-02**
Sand Canyon Ave (North of Marine Way and South of I-5 on ramp Westbound)	126.64	38.60	varies - AERMAP	SAN1	Adjacent	2.00	varies - based on	2.30	3	173	**3.3333E-01**
Sand Canyon Ave (South of Marine Way and North of I-5 on ramp Eastbound)	126.64	38.60	varies - AERMAP	SAN2	Adjacent	2.00	varies - based on	2.30	3	90.8	**3.3333E-01**
I-5 on ramp Westbound	42.65	13.00	varies - AERMAP	I5ON1	Adjacent	2.00	varies - based on	2.30	19	370.4	**5.2632E-02**
I-5 on ramp Eastbound	24.93	7.60	varies - AERMAP	I5ON2	Adjacent	2.00	varies - based on	2.30	24	596	**4.1667E-02**
I-5 off ramp from Westbound	43.64	13.30	varies - AERMAP	I5OFF1	Adjacent	2.00	varies - based on	2.30	12	172.7	**8.3333E-02**
I-5 off ramp from Eastbound	41.67	12.70	varies - AERMAP	I5OFF2	Adjacent	2.00	varies - based on	2.30	22	408.3	**4.5455E-02**
Entrance Road to Site South of Marine Way	76.35	23.27	varies - AERMAP	ENT1	Adjacent	2.00	varies - based on	2.30	7	208.7	**1.4286E-01**
Entrance Road Turning East	76.35	23.27	varies - AERMAP	ENT2	Adjacent	2.00	varies - based on	2.30	7	122	**1.4286E-01**

	2023-2025		2026-2027	
Route Length	**meters**	**miles**	**meters**	**miles**
Outbound West	1330.8	0.826921	1505.8	0.935661
Outbound East	1474.2	0.916025	1649.2	1.024765
Inbound West	1330.5	0.826734	1505.5	0.935474
Inbound East	1791.7	1.113311	1966.7	1.222051
Route 1 (out west, in east)	3122.5	1.940232	3472.5	2.157711
Route 2 (out east, in west)	2804.7	1.74276	3154.7	1.96024

Table B-2: Modeling Parameters On-Site Sources

Model ID	Description	Source Type	Ht. (ft)	Ht. (m)	Init. Lateral (m)	Init. Vert (m)[2]	No. of Volumes	Exit Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
FUEL_D1-4	Fuel Dispensing	Volume	3.38[1]	1.03	3.4571[1,3]	1.4295	1	---	---	---
DISPEN	Fuel Delivery	Volume	3.38[1]	1.03	3.4571[1,3]	2.5518	1	---	---	---
DEFTNK	Def Tank	Volume	18	5.49	3.4571[1,3]	2.5518	1	---	---	---
SAND1-2	Sand Silos (2)	Volume	30	9.14	2.7907[1]	1.4295	1	---	---	---
SKID	Pump Skid Def Tank	Volume	3.38	1.03	1.8605[1]	0.4792	1	---	---	---
WASH	Train Wash	Volume	55	16.76	5.58[2]	7.80	6	---	---	---
MAINT	Maintenance	Volume	75	22.86	13.02[2]	10.63	4	---	---	---
CRANE	Crane/Forklift	Volume	75	22.86	13.02[2]	10.63	4	---	---	---
GEN1	Emergency Generator[1]	Point	12	3.66	---	---	---	739.8	45.3	0.183
TNKVENT1-4	Fuel Tank Vent (4)	Point	12	3.66	---	---	---	ambient	0.001	0.0762

[1] Based on SF 2020 Citywide HRA (Table 7).

[2] Based on building height/2.15 (EPA 2017).

[3] Assumes 1 dispenser.

Table B-3: Building Inputs

Building ID	Description	Height (ft)	Height (m)
TRANS	Transportation Building	75	22.86
MAINT1	Maintenance Building	75	22.86
UTILITY	Utility Building	55	16.76
TRN_WASH	Train Wash Building	55	16.76
PUMP	Pump House	18	5.49
WATER	Water Treatment Room	30	9.14
MATERIAL	Materials Storage Building	30	9.14
DEF_TNK	Def Fuel Tank	18	5.49
TANK1-4	Fuel Tanks	10.08	3.07
SILO1-2	Sand Silos	30	9.14

Table B-4: Modeling Parameters for On-Road Operation Sources

Road	Road Width (m)	Base Elevation	SourceID	Line Volume Src Type	Release Height from CRRP-HRA (m)	Initial Lateral Dimension (m)	Initial Vertical Dimension (m) from CRRP-HRA	# Volume Sources	Total Length (m)	g/s per vol (1 g/s)
Marine Way (West of Perimeter Rd and East of Rt-133)	27.27	varies - AERMAP	MARINE1	Adjacent	2.00	varies - based on plume width	2.30	10	395	**1.0000E-01**
Marine Way (West of Rt-133 and East of Sand Canyon Ave)	8.20	varies - AERMAP	MARINE2	Adjacent	2.00	varies - based on plume width	2.30	34	236.7	**2.9412E-02**
Sand Canyon Ave (North of Marine Way and South of Great Park Blvd)	38.60	varies - AERMAP	SAN4	Adjacent	2.00	varies - based on plume width	2.30	29	1271.2	**3.4483E-02**
Sand Canyon Ave (South of Marine Way and North of I-5 on ramp Eastbound)	38.60	varies - AERMAP	SAN2	Adjacent	2.00	varies - based on plume width	2.30	3	90.8	**3.3333E-01**
I-5 on ramp Westbound	13.00	varies - AERMAP	I5ON1	Adjacent	2.00	varies - based on plume width	2.30	20	428.2	**5.0000E-02**
I-5 on ramp Eastbound	7.60	varies - AERMAP	I5ON2	Adjacent	2.00	varies - based on plume width	2.30	24	596	**4.1667E-02**
I-5 off ramp from Westbound	13.30	varies - AERMAP	I5OFF1	Adjacent	2.00	varies - based on plume width	2.30	12	172.7	**8.3333E-02**
I-5 off ramp from Eastbound	12.70	varies - AERMAP	I5OFF2	Adjacent	2.00	varies - based on plume width	2.30	22	408.3	**4.5455E-02**
Entrance Road to Site South of Marine Way	23.27	varies - AERMAP	ENT1	Adjacent	2.00	varies - based on plume width	2.30	7	208.7	**1.4286E-01**
Entrance Road Turning East	23.27	varies - AERMAP	ENT2	Adjacent	2.00	varies - based on plume width	2.30	7	122	**1.4286E-01**
Sand Canyon Ave (South of I-5 on ramp Eastbound and North of Irvine Center Dr)	38.60	varies - AERMAP	SAN3	Adjacent	2.00	varies - based on plume width	2.30	23	1010.3	**4.3478E-02**
Marine Way (East of Perimeter Rd and West of Skyhawk)	27.27	varies - AERMAP	MARINE3	Adjacent	2.00	varies - based on plume width	2.30	31	1033.6	**3.2258E-02**
Ridge Valley (North of Marine Way and South of Great Park Blvd)	27.27	varies - AERMAP	RVAL	Adjacent	2.00	varies - based on plume width	2.30	39	1281.6	**2.5641E-02**
I-5 (South of Sand Canyon Ave)	64.40	varies - AERMAP	EASTI5	Adjacent	2.00	varies - based on plume width	2.30	15	1075.6	**6.6667E-02**
I-5 (North of Sand Canyon Ave)	64.40	varies - AERMAP	WESTI5	Adjacent	2.00	varies - based on plume width	2.30	17	1216.9	**5.8824E-02**
Entrance Onsite	7.62	varies - AERMAP	ENT3	Adjacent	2.00	varies - based on plume width	2.30	10	138.8	**1.0000E-01**
Fuel/Sand Loop	7.62	varies - AERMAP	LOOPA1	Adjacent	2.00	varies - based on plume width	2.30	59	801.3	**1.6949E-02**
Delivery Loop	7.62	varies - AERMAP	LOOPB1	Adjacent	2.00	varies - based on plume width	2.30	13	183.6	**7.6923E-02**

Table B-5: HARP2 Emissions for Construction Years

				2023		2024		2025		2026		2027	
				lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr
CONST	1	9901	DieselExhPM	1.23E+02	0.00E+00	1.25E+02	0.00E+00	3.33E+01	0.00E+00	4.38E+01	0.00E+00	2.64E+01	0.00E+00
MARINE1	2	9901	DieselExhPM	1.48E-01	0.00E+00	5.04E-02	0.00E+00	3.40E-02	0.00E+00	2.94E-02	0.00E+00	1.40E-02	0.00E+00
MARINE2	3	9901	DieselExhPM	8.87E-02	0.00E+00	3.02E-02	0.00E+00	2.04E-02	0.00E+00	1.76E-02	0.00E+00	8.41E-03	0.00E+00
PERIM1	4	9901	DieselExhPM	5.83E-02	0.00E+00	1.99E-02	0.00E+00	1.34E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SAN1	5	9901	DieselExhPM	6.48E-02	0.00E+00	2.21E-02	0.00E+00	1.49E-02	0.00E+00	1.29E-02	0.00E+00	6.14E-03	0.00E+00
SAN2	6	9901	DieselExhPM	3.40E-02	0.00E+00	1.16E-02	0.00E+00	7.83E-03	0.00E+00	6.77E-03	0.00E+00	3.22E-03	0.00E+00
I5ON1	7	9901	DieselExhPM	3.12E-02	0.00E+00	1.06E-02	0.00E+00	7.17E-03	0.00E+00	6.27E-03	0.00E+00	2.99E-03	0.00E+00
I5ON2	8	9901	DieselExhPM	5.58E-02	0.00E+00	1.90E-02	0.00E+00	1.28E-02	0.00E+00	1.11E-02	0.00E+00	5.29E-03	0.00E+00
I5OFF1	9	9901	DieselExhPM	1.62E-02	0.00E+00	5.51E-03	0.00E+00	3.72E-03	0.00E+00	3.22E-03	0.00E+00	1.53E-03	0.00E+00
I5OFF2	10	9901	DieselExhPM	3.44E-02	0.00E+00	1.17E-02	0.00E+00	7.90E-03	0.00E+00	6.91E-03	0.00E+00	3.29E-03	0.00E+00
ENT1	11	9901	DieselExhPM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-02	0.00E+00	7.41E-03	0.00E+00
ENT2	12	9901	DieselExhPM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.09E-03	0.00E+00	4.33E-03	0.00E+00
RAIL_WEL	13	9901	DieselExhPM	2.71E-01	0.00E+00	2.71E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RAIL_DEL	13	9901	DieselExhPM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.18E-02	0.00E+00	3.18E-02	0.00E+00	3.18E-02	0.00E+00
RAIL_IDL	14	9901	DieselExhPM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.13E-02	0.00E+00	5.13E-02	0.00E+00	5.13E-02	0.00E+00
CONSTP2	15	9901	DieselExhPM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.19E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Notes: In 2025, source CONST represents final 6 months of Phase 1 construction (Jan. through Jun.). CONSTP2 represents initial 6 months (Jul. through Dec.) of Phase 2 construction. DPM lb/hr emissions are listed as zero since it does not have an acute risk threshold.

Table B-6: Fuel Tank Emissions

Tank	Total Losses (tpy)	Hexane (-n) tpy	Benzene (tpy)	Toluene (tpy)	Ethylbenzene (tpy)	Xylene (-m) (tpy)	1,2,4-Trimethylbenzene (tpy)
Tank 1-30,000	1.48E-02	0.00E+00	0.00E+00	3.23E-04	3.48E-05	8.81E-04	7.15E-04
Tank 2-30,000	1.48E-02	0.00E+00	0.00E+00	3.23E-04	3.48E-05	8.81E-04	7.15E-04
Tank 3-30,000	1.48E-02	0.00E+00	0.00E+00	3.23E-04	3.48E-05	8.81E-04	7.15E-04
Tank 4-30,000	1.48E-02	0.00E+00	0.00E+00	3.23E-04	3.48E-05	8.81E-04	7.15E-04
Tank 5-10,000	1.44E-02	0.00E+00	0.00E+00	3.14E-04	3.37E-05	8.54E-04	6.92E-04
Speciated TACs from SCAQMD storage tank guidance document for diesel.							
http://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/supplemental-instructions-for-liquid-organic-storage-tanks.pdf							

Table B-7: Sand Silo Emission Estimates

SCC/EIC	YEAR	PM PROFILE NUMBER	PM2.5/TPM	PM10/TPM	OG PROFILE NUMBER	ROG/TOG	VOC/TOG
43042270780000	0	371	0.075	0.5	600	0.6986	0.6986

https://www.arb.ca.gov/app/emsinv/2017/emseic_query.php?F_YR=2020&F_DIV=-4&F_SEASON=A&SP=SIP105ADJ&SPN=SIP105ADJ&F_AREA=CA&F_EICSUM=430

PM10 (lb/yr)	1.652870894	
PM10 (lb/hr)	0.000754736	Assumes 6 hours/day
PM10/PM2.5 (g/s)	9.50951E-05	per silo

PM PROFILE NUMBER	SAROAD	WEIGHT FRACTION OF PM2.5	WEIGHT FRACTION OF PM10	WEIGHT FRACTION OF TPM	CAS	TAC	lb/yr	lb/hr
371	12114	0.0005	0.0005	0.0005	7440508	Copper	8.26E-04	3.77E-07
371	12136	0.0005	0.0005	0.0005	7440020	Nickel	8.26E-04	3.77E-07
371	12165	0.4	0.4	0.4	1175	Silica, crystln	6.61E-01	3.02E-04
371	12403	0.0055	0.0055	0.0055	9960	Sulfates	9.09E-03	4.15E-06

Table B-8: Onsite Locomotive Emission Estimates for HRA

Daily Locomotive Operational Emissions	Daily In-Transit Emissions (lbs/day)		
Operational Activity	**NOx**	**PM10**	**PM2.5**
On-site (2025-2027)	98.30	1.98	1.92
On-site (2028+)	81.15	1.22	1.18

Day/Night Percentage	%
Day	20%
Night	80%

Phase 1 (2025 – 2027)																
			Daily In-Transit Emissions (lbs/hr)			Daily In-Transit Emissions (lbs/yr)						# of Vol	Daily In-Transit Emissions per source (g/s)			
Source	**% Allocated**	**Hours / Day**	**NOx**	**PM10**	**PM2.5**	**NOx (Day)**	**NOx (Night)**	**PM10 (Day)**	**PM10 (Night)**	**PM2.5 (Day)**	**PM2.5 (Night)**		**NOx (Day)**	**NOx (Night)**	**PM2.5 (Day)**	**PM2.5 (Night)**
Tracks (Idling & In-Transit)	55%	24	2.253	0.05	0.04	3.95E+03	1.58E+04	7.93E+01	3.17E+02	7.70E+01	3.08E+02	682	8.32396E-05	3.32959E-04	1.62307E-06	6.49229E-06
Maintenance Shop	0%	24	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
Wash Station	45%	24	1.84	0.04	0.04	3.23E+03	1.29E+04	6.49E+01	2.60E+02	6.30E+01	2.52E+02	6	7.74129E-03	3.09651E-02	1.50946E-04	6.03783E-04
Phase 2 (2028+)																
			Daily In-Transit Emissions (lbs/hr)			Daily In-Transit Emissions (lbs/yr)						# of Vol	Daily In-Transit Emissions per source (g/s)			
Source	**% Allocated**	**Hours / Day**	**NOx**	**PM10**	**PM2.5**	**NOx (Day)**	**NOx (Night)**	**PM10 (Day)**	**PM10 (Night)**	**PM2.5 (Day)**	**PM2.5 (Night)**		**NOx (Day)**	**NOx (Night)**	**PM2.5 (Day)**	**PM2.5 (Night)**
Tracks (Idling & In-Transit)	40%	24	1.35	0.02	0.02	2.37E+03	9.48E+03	3.55E+01	1.42E+02	3.45E+01	1.38E+02	781	4.36402E-05	1.74561E-04	6.34964E-07	2.53986E-06
Maintenance Shop	30%	24	1.01	0.02	0.01	1.78E+03	7.11E+03	2.67E+01	1.07E+02	2.59E+01	1.03E+02	4	6.39056E-03	2.55622E-02	9.29826E-05	3.71930E-04
Wash Station	30%	24	1.01	0.02	0.01	1.78E+03	7.11E+03	2.67E+01	1.07E+02	2.59E+01	1.03E+02	6	4.26037E-03	1.70415E-02	6.19884E-05	2.47954E-04

Table B-9: Onsite Point Sources

Equipment Type	Emissions (lbs/year)			Annual Emissions (g/s)			Short-term Emissions (g/s)		
	NO_X	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	NO_X	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	NO_X	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
300KV Backup Generator	9.22E+01	4.85E+00	6.65E+00	1.32604E-03	6.97916E-05	9.56049E-05	2.32323E-01	1.22275E-02	1.67500E-02
Crane	2.01E+02	3.69E+00	3.40E+00						
Forklift	5.11E+01	1.88E+00	1.73E+00						
Crane + Forklift (Model ID: CRANE)	2.52E+02	5.58E+00	5.13E+00	9.06402E-04	2.0051E-05	1.84469E-05	0.01450	0.00032	0.00030

Table B-10: HARP2 Emissions for Operations – Phase 1 (2025 – 2027) & Phase 2 (2028+)

				2025-2027		2028+	
				lb/yr	lb/hr	lb/yr	lb/hr
GEN	1	9901	DieselExhPM	6.65E+00	0.00E+00	6.65E+00	0.00E+00
RAIL_D	2	9901	DieselExhPM	7.70E+01	0.00E+00	3.45E+01	0.00E+00
RAIL_N	3	9901	DieselExhPM	3.08E+02	0.00E+00	1.38E+02	0.00E+00
WASH_D	4	9901	DieselExhPM	6.30E+01	0.00E+00	2.59E+01	0.00E+00
WASH_N	5	9901	DieselExhPM	2.52E+02	0.00E+00	1.03E+02	0.00E+00
MARINE1	6	9901	DieselExhPM	5.77E-02	0.00E+00	5.77E-02	0.00E+00
MARINE2	7	9901	DieselExhPM	3.46E-02	0.00E+00	3.46E-02	0.00E+00
MARINE3	8	9901	DieselExhPM	8.89E-03	0.00E+00	8.89E-03	0.00E+00
ENT1	9	9901	DieselExhPM	3.59E-02	0.00E+00	3.59E-02	0.00E+00
ENT2	10	9901	DieselExhPM	2.10E-02	0.00E+00	2.10E-02	0.00E+00
SAN2	11	9901	DieselExhPM	1.56E-03	0.00E+00	1.56E-03	0.00E+00
SAN3	12	9901	DieselExhPM	1.74E-02	0.00E+00	1.74E-02	0.00E+00
SAN4	13	9901	DieselExhPM	1.09E-02	0.00E+00	1.09E-02	0.00E+00
I5ON1	14	9901	DieselExhPM	1.84E-02	0.00E+00	1.84E-02	0.00E+00
I5ON2	15	9901	DieselExhPM	2.56E-02	0.00E+00	2.56E-02	0.00E+00
I5OFF1	16	9901	DieselExhPM	7.43E-03	0.00E+00	7.43E-03	0.00E+00
I5OFF2	17	9901	DieselExhPM	1.76E-02	0.00E+00	1.76E-02	0.00E+00
RVAL	18	9901	DieselExhPM	2.20E-02	0.00E+00	2.20E-02	0.00E+00
EASTI5	19	9901	DieselExhPM	4.63E-02	0.00E+00	4.63E-02	0.00E+00
WESTI5	20	9901	DieselExhPM	9.42E-02	0.00E+00	9.42E-02	0.00E+00
ENT3	21	9901	DieselExhPM	2.39E-02	0.00E+00	2.39E-02	0.00E+00
LOOPA1	22	9901	DieselExhPM	3.03E-02	0.00E+00	3.03E-02	0.00E+00
LOOPB1	23	9901	DieselExhPM	2.46E-02	0.00E+00	2.46E-02	0.00E+00
TNKVENT1	24	108883	Toluene	6.47E-01	7.39E-05	6.47E-01	7.39E-05
TNKVENT1	24	100414	Ethyl benzene	6.96E-02	7.95E-06	6.96E-02	7.95E-06
TNKVENT1	24	108383	m-Xylene	1.76E+00	2.01E-04	1.76E+00	2.01E-04
TNKVENT1	24	95636	1,2,4TriMeBenze	1.43E+00	1.63E-04	1.43E+00	1.63E-04
TNKVENT2	25	108883	Toluene	6.47E-01	7.39E-05	6.47E-01	7.39E-05
TNKVENT2	25	100414	Ethyl benzene	6.96E-02	7.95E-06	6.96E-02	7.95E-06
TNKVENT2	25	108383	m-Xylene	1.76E+00	2.01E-04	1.76E+00	2.01E-04
TNKVENT2	25	95636	1,2,4TriMeBenze	1.43E+00	1.63E-04	1.43E+00	1.63E-04
TNKVENT3	26	108883	Toluene	6.47E-01	7.39E-05	6.47E-01	7.39E-05
TNKVENT3	26	100414	Ethyl benzene	6.96E-02	7.95E-06	6.96E-02	7.95E-06
TNKVENT3	26	108383	m-Xylene	1.76E+00	2.01E-04	1.76E+00	2.01E-04
TNKVENT3	26	95636	1,2,4TriMeBenze	1.43E+00	1.63E-04	1.43E+00	1.63E-04
TNKVENT4	27	108883	Toluene	6.47E-01	7.39E-05	6.47E-01	7.39E-05
TNKVENT4	27	100414	Ethyl benzene	6.96E-02	7.95E-06	6.96E-02	7.95E-06
TNKVENT4	27	108383	m-Xylene	1.76E+00	2.01E-04	1.76E+00	2.01E-04
TNKVENT4	27	95636	1,2,4TriMeBenze	1.43E+00	1.63E-04	1.43E+00	1.63E-04
DEFTNK	28	108883	Toluene	6.27E-01	7.16E-05	6.27E-01	7.16E-05
DEFTNK	28	100414	Ethyl benzene	6.75E-02	7.70E-06	6.75E-02	7.70E-06

DEFTNK	28	108383	m-Xylene	1.71E+00	1.95E-04	1.71E+00	1.95E-04
DEFTNK	28	95636	1,2,4TriMeBenze	1.38E+00	1.58E-04	1.38E+00	1.58E-04
FUEL_D1	29	108883	Toluene	6.47E-01	7.39E-05	6.47E-01	7.39E-05
FUEL_D1	29	100414	Ethyl benzene	6.96E-02	7.95E-06	6.96E-02	7.95E-06
FUEL_D1	29	108383	m-Xylene	1.76E+00	2.01E-04	1.76E+00	2.01E-04
FUEL_D1	29	95636	1,2,4TriMeBenze	1.43E+00	1.63E-04	1.43E+00	1.63E-04
FUEL_D2	30	108883	Toluene	6.47E-01	7.39E-05	6.47E-01	7.39E-05
FUEL_D2	30	100414	Ethyl benzene	6.96E-02	7.95E-06	6.96E-02	7.95E-06
FUEL_D2	30	108383	m-Xylene	1.76E+00	2.01E-04	1.76E+00	2.01E-04
FUEL_D2	30	95636	1,2,4TriMeBenze	1.43E+00	1.63E-04	1.43E+00	1.63E-04
FUEL_D3	31	108883	Toluene	6.47E-01	7.39E-05	6.47E-01	7.39E-05
FUEL_D3	31	100414	Ethyl benzene	6.96E-02	7.95E-06	6.96E-02	7.95E-06
FUEL_D3	31	108383	m-Xylene	1.76E+00	2.01E-04	1.76E+00	2.01E-04
FUEL_D3	31	95636	1,2,4TriMeBenze	1.43E+00	1.63E-04	1.43E+00	1.63E-04
FUEL_D4	32	108883	Toluene	6.47E-01	7.39E-05	6.47E-01	7.39E-05
FUEL_D4	32	100414	Ethyl benzene	6.96E-02	7.95E-06	6.96E-02	7.95E-06
FUEL_D4	32	108383	m-Xylene	1.76E+00	2.01E-04	1.76E+00	2.01E-04
FUEL_D4	32	95636	1,2,4TriMeBenze	1.43E+00	1.63E-04	1.43E+00	1.63E-04
SKID	33	108883	Toluene	6.27E-01	7.16E-05	6.27E-01	7.16E-05
SKID	33	100414	Ethyl benzene	6.75E-02	7.70E-06	6.75E-02	7.70E-06
SKID	33	108383	m-Xylene	1.71E+00	1.95E-04	1.71E+00	1.95E-04
SKID	33	95636	1,2,4TriMeBenze	1.38E+00	1.58E-04	1.38E+00	1.58E-04
DISPEN	34	108883	Toluene	6.47E-01	7.39E-05	6.47E-01	7.39E-05
DISPEN	34	100414	Ethyl benzene	6.96E-02	7.95E-06	6.96E-02	7.95E-06
DISPEN	34	108383	m-Xylene	1.76E+00	2.01E-04	1.76E+00	2.01E-04
DISPEN	34	95636	1,2,4TriMeBenze	1.43E+00	1.63E-04	1.43E+00	1.63E-04
SAND1	35	7440508	Copper	8.26E-04	3.77E-07	8.26E-04	3.77E-07
SAND1	35	7440020	Nickel	8.26E-04	3.77E-07	8.26E-04	3.77E-07
SAND1	35	1175	Silica, crystln	6.61E-01	3.02E-04	6.61E-01	3.02E-04
SAND1	35	9960	Sulfates	9.09E-03	4.15E-06	9.09E-03	4.15E-06
SAND2	36	7440508	Copper	8.26E-04	3.77E-07	8.26E-04	3.77E-07
SAND2	36	7440020	Nickel	8.26E-04	3.77E-07	8.26E-04	3.77E-07
SAND2	36	1175	Silica, crystln	6.61E-01	3.02E-04	6.61E-01	3.02E-04
SAND2	36	9960	Sulfates	9.09E-03	4.15E-06	9.09E-03	4.15E-06
MAINT_D	37	9901	DieselExhPM	N/A	0.00E+00	2.59E+01	0.00E+00
MAINT_N	38	9901	DieselExhPM	N/A	0.00E+00	1.03E+02	0.00E+00
CRANE	39	9901	DieselExhPM	N/A	0.00E+00	5.13E+00	0.00E+00

Notes: Grey-shaded sources only exist in the Phase 2 (2028+) scenario.

DPM lb/hr emissions are listed as zero since it does not have an acute risk threshold.

Appendix C
Technical Memorandum
Biological Resources

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority
550 S. Main St.
Orange, CA 92868

and

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

Prepared by:

AECOM
300 S. Grand Ave.
Los Angeles, CA 90071

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Revision	Description	Date
0	Draft Biological Resources Technical Memorandum	01/06/21
1	Draft Biological Resources Technical Memorandum Rev 1 (Incorporating OCTA's comments)	02/25/21
2	Draft Biological Resources Technical Memorandum Rev 2 (Incorporating OCTA's comments)	06/17/21
3	Draft Biological Resources Technical Memorandum Rev 3 (Incorporating OCTA's comments)	08/04/21
4	Final Biological Resources Technical Memorandum	09/22/2023

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Regional Special-Status Wildlife Species

1. INTRODUCTION

The Southern California Regional Railroad Authority (SCRRA) Metrolink Commuter Rail System (Metrolink) is proposing to construct a new Orange County Maintenance Facility (hereafter referred to as "OCMF" or "the Project"). The Project would include several facilities including a transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth, sand silos, a maintenance facility, a maintenance facility extension, and 11 tracks. Approximately 80 employees would report to the Project. The Project consists of buildings that would have a total building area of approximately 90,000 square feet when combined. Metrolink currently operates two maintenance facilities across its service area: Central Maintenance Facility (CMF) in Los Angeles and Eastern Maintenance Facility (EMF) in San Bernardino County. Due to projected population expansion within its service area and the agency's goal to be prepared for the 2028 Los Angeles Summer Olympic Games, Metrolink will require an increased number of commuter rail services, as well as additional train storage and maintenance facilities associated with an increased fleet size. As a significant proportion of the expanded services will operate in Orange County, the Project would provide an optimal location for a new Metrolink maintenance facility. Metrolink's member agency, the Orange County Transportation Authority (OCTA), proposes to build this facility on an OCTA-owned parcel in the City of Irvine. OCTA is the lead agency under the California Environmental Quality Act (CEQA). The City of Irvine and SCRRA are the responsible agencies under CEQA.

The Biological Resource Technical Memorandum was prepared for the Project in support of CEQA review process. This memorandum summarizes the results of biological resource database reviews and a site survey conducted for the Project to document existing biological conditions at the site (Project Site), a discussion of potential impacts to biological resources, and mitigation measures identified to minimize and avoid potential impacts to biological resources.

2. PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

As a result of the projected population expansion within the five-county area (Orange County, Los Angeles County, San Bernardino County, Riverside County, and Ventura County) currently served by the SCRRA, Metrolink will require an increased number of commuter rail services to support the growth. Consequently, the Metrolink system (Figure 2.1-1) would require additional train storage and maintenance facilities to support an increased fleet size.

Figure 2.1-1 Metrolink System Map



Source: SCRRA (2019)

Metrolink's CMF facility is located on the east bank of the Los Angeles River near the Interstate 5 (I-5) and Interstate 10 (I-10) highways, just south of the location of the former Southern Pacific Taylor Yard. The CMF is currently near capacity, which will impact the ability to provide the necessary train servicing for planned service-expansion of various Metrolink lines throughout the system under the Southern California Optimized Rail Expansion (SCORE) program. By transferring a portion of the current fleet from CMF to the proposed OCMF (specifically the Orange County Line trains), capacity for the non-Orange County trains will be increased at CMF. The Orange County Line has the highest ridership within the Metrolink system; therefore, a maintenance facility to serve the Orange County area with sufficient storage and servicing capabilities for both locomotives and rail cars is critical to controlling operating costs. In order to optimize rail service in the region, the proposed facility development would need to be completed by 2028. The SCORE program may also require heavy overhaul capabilities at OCMF, subject to pending decisions regarding fleet technology and management.

The expansion of Orange County and overall Metrolink commuter rail service will ultimately require additional or expanded equipment servicing capabilities for both locomotives and rail cars. Since a significant portion of the fleet will be in Orange County, a maintenance facility located along the Metrolink route through Orange County would be the optimal location as it would reduce operating costs by limiting non-revenue moves to the existing SCRRA storage and maintenance facilities in the cities of Los Angeles and San Bernardino. The proposed maintenance facility would provide equipment to inspect, clean, and maintain cars and locomotives on a regular and efficient basis. Much of the inspection and maintenance activity is federally mandated and must be performed at specific intervals. The OCMF will also provide refueling services thus reducing fuel costs, reducing fuel consumption, and will reduce emissions. Currently trains operating in the Orange County Region must travel either the CMF or EMF for refueling, which are sometimes non-revenue runs. The location of the Project is on a 21.3-acre OCTA-owned parcel on Ridge Valley south of Marine Way in the City of Irvine (Project Site). The Project Site is located within the boundaries of a closed military base (Marine Corps Air Station [MCAS] El Toro) formerly owned by the United States Department of the Navy (DON). After MCAS El Toro was closed, the site was quitclaimed by the Navy to Heritage Fields El Toro, LLC in 2011, and then by way of grant deed conveyed by Heritage Fields to the City of Irvine that same year. OCTA then purchased the fee ownership of the Project Site from the City of Irvine. Regional vehicle access to the Project Site is from I-5 at Sand Canyon Avenue. Local vehicle access is via Marine Way to Ridge Valley.

Prior to the current construction of the storage/set-out track, the Project Site was mostly vacant. The site currently includes 1,000-foot-long storage for miscellaneous rail equipment including temporary railroad bridges, signal houses, railroad ties, and signal components. Although not part of the Project, OCTA is currently installing a single 1,000-foot-long, single-ended storage track and fencing of the perimeter of the property to provide temporary storage of two trainsets and/or track maintenance equipment when necessary.

2.2 PROJECT DESCRIPTION

The OCMF would be located in the City of Irvine, on a 21.3-acre parcel owned by OCTA and adjacent to Marine Way and the Metrolink Orange subdivision between mileposts 183.50 and 184.00 on Metrolink's "Orange" Subdivision (Figure 2.2-1). The Project Site is located within Planning Area 51 of the updated City of Irvine General Plan, adopted in June 2015, and designated for the Great Park (formerly known as the Orange County Great Park (OCGP)) land use under the General Plan. Per the City's zoning ordinance, the proposed use is a conditionally allowable use under the existing zone; therefore, OCTA is submitting a Conditional Use Permit to the City of Irvine for approval.

The Project would be developed in two phases with an anticipated completion date of 2028. Phase 1 focuses on developing facilities needed for the storage and routine cleaning, inspection and servicing of the anticipated trainsets. The total area of the Phase 1 buildout would be approximately 20,996 square feet and would be comprised of the following facilities: the transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth and sand silos (Table 2.2-1). A total of 11 tracks would be built. The Phase 1 layout situates the train wash, fueling/sanding, and service and inspection tracks on the two tracks with the greatest tangent length, which are the ones nearest the railroad right of way ("ROW"). This is important in fitting a second fueling/sanding facility so that there is one at each end of the service and inspection platform to support having the locomotive at either end, all within tangent track. Additionally, six storage tracks and appurtenant features (air, water, head end power and toilet dump facilities) would be constructed. The storage tracks would be built near the middle of the site east of the service and inspection tracks. Phase 1 of the buildout would anticipate approximately 52 employees total throughout the entire day, split across three eight-hour shifts.

Table 2.2-1 Building Specifications

Building/Facility/Item	Building Area	Building Height
Transportation Building	7,495 sq. ft.	20 ft
Train Wash Building	11,110 sq. ft.	21 ft
Maintenance Building	40,392 sq. ft.	48 ft
Maintenance Building Expansion	27,880 sq. ft.	---
Utility Building	981 sq. ft.	20 ft
Pump House	750 sq. ft.	14 ft
Guard Booth	36 sq. ft.	---
Equipment Booth	48 sq. ft.	---
Sand Silos (2 Total)	576 sq. ft.	---
Total	89,268 sq. ft.	

Source: Gannett Fleming, Metrolink (February 2022)

Note: sq. ft. = square feet; ft = feet

A runaround track would be provided between the service and inspection tracks and storage tracks. Additionally, two temporary stub-ended set out tracks would be provided in the Phase 1 layout that occupies the footprint of the future shop tracks (one at the north and one at the south end of the yard). These set out tracks would be converted to shop access tracks in Phase 2 and therefore, would no longer be available as set out tracks. A new set out track would then be provided as part of Phase 2.

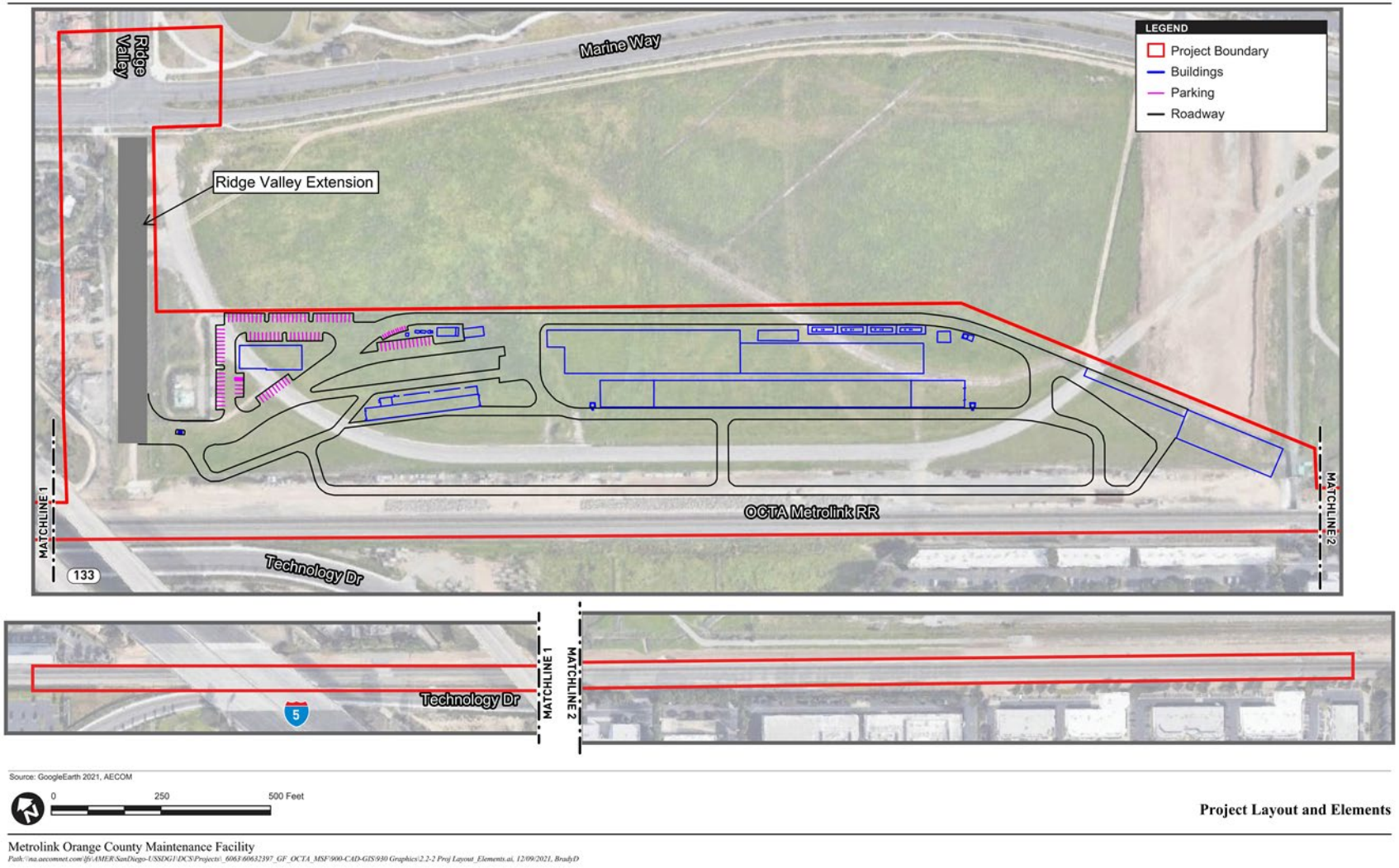
A transportation building that would be utilized for administrative purposes is also included in Phase 1. This building would house managerial offices, welfare spaces for train crews and on-site personnel. This facility would include restrooms, showers, locker rooms, a break/day room, vending space and a kitchenette. Approximately 120 automobile parking spaces would be provided for staff reporting to the site. Fire department compliant roadways would be developed to permit circulation of the site for Metrolink vehicles as well as delivery trucks (sand and fuel).

Phase 2 completes the full buildout of the Project. It would include development of the maintenance shop building and its future extension that would comprise of a total buildout area of 68,272 square feet (Table 2.2-1). The shop would have capabilities to perform regular three-month, six-month, and one-year preventive maintenance cycles on trainsets. Phase 2 of the buildout would consist of approximately 28 employees. With the full buildout of Phase 1 and Phase 2, approximately 80 employees are expected to access the Project Site daily, split across three eight-hour shifts.

Access to the OCMF would require a roadway extension along Ridge Valley from the intersection of Ridge Valley and Marine Way. The Project includes the southern extension of Ridge Valley Road from Marine Way and associated traffic signal improvements to provide access to the OCMF.

The 11 new east and west lead tracks, as discussed in this section above, would be constructed within the existing railroad corridor between MP 183.0 and MP 184.00 on Metrolink's "Orange" Subdivision to connect the existing mainline railroad to the proposed OCMF rail yard. A new single span concrete bridge over the Bee Canyon Channel (Channel) would be built for the east lead track. A segment of the Channel and utilities that are found to be in conflict would be lowered by approximately 2.5 feet to facilitate the construction of the bridge.

Figure 2.2-1 Project Layout and Elements



Source: ESRI (2021), OCTA (2021)

3. METHODS FOR ASSESSING BIOLOGICAL RESOURCES

A search of relevant regional databases for special-status biological resources in the vicinity of the project area was conducted prior to conducting a field survey. The Project Site is located in the City of Irvine, with most of the Project Site located in the southwest corner of the U.S. Geological Survey's El Toro, California quadrangle and a smaller portion located in the southeast corner of the Tustin, California quadrangle. A search of the El Toro and surrounding eight quadrangles including Tustin, Orange, Black Star Canyon, Corona South, Santiago Peak, Laguna Beach, San Juan Capistrano, and Canada Gobernadora were made of the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB) (CDFW 2020a), California Native Plant Society's (CNPS) on-line Inventory of Rare and Endangered Plants of California (CNPS 2020), and National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) California Species List Tool (NMFS 2016). Additionally, the U.S. Fish and Wildlife Service's (USFWS) online Information for Planning and Consultation (IPaC) (USFWS 2020) environmental review process was queried. These desktop reviews provided a list of special-status species, sensitive natural communities, and protected areas known from the project vicinity and are referenced and discussed further in this memorandum.

The area evaluated for biological resources includes the Project Site and a 500-foot survey buffer, known as the Biological Survey Areas (BSA). A buffer around the Project Site was evaluated in order to capture potential indirect effects to biological resources from implementation of the Project. Indirect effects could include elevated noise and dust levels and increased human activity within the BSA. A 500-foot survey buffer is appropriate for capturing potential indirect impacts from a project on biological resources. It is anticipated that indirect impacts beyond 500 feet for this Project are generally diffuse and would not significantly impact biological resources.

Prior to conducting a field survey, aerial imagery of the BSA was reviewed for the presence of areas that could potentially support special-status biological resources. Since most of the BSA is developed by hardscape features (i.e. buildings and a paved lot), the desktop review focused on identifying any significant green or otherwise open spaces in the vicinity of the Project. On July 30, 2020, a field survey of the Project Site and survey buffer was conducted by AECOM biologist Chris Hargreaves to document existing biological resources that occur or have the potential to occur within and adjacent to the BSA, and to evaluate the potential for special-status plant and wildlife species to occur within the BSA. Binoculars were utilized to scan for evidence of wildlife activity in the BSA. Seasonal, species-specific botanical or wildlife surveys were not conducted as part of this evaluation; however, based on the survey conducted and an assessment of conditions in the BSA, it is apparent that special-status plant and wildlife species are not anticipated within the urbanized environment of the BSA.

4. ENVIRONMENTAL SETTING

4.1 EXISTING CONDITIONS

The Project occurs on a 21.3-acre OCTA-owned parcel in the City of Irvine, Orange County. The entire BSA is urbanized or has otherwise been previously disturbed and includes roadways, rail tracks, commercial development, and undeveloped areas covered by weeds and grass. Athletic fields in the Great Park lie to the east and north and commercial development lies to the west and south. Vegetation within the Project Site consists primarily of non-native herbaceous mustard and grass species. The surrounding BSA includes similar ruderal vegetation and ornamental trees and shrubs associated with surrounding commercial and recreational uses. The Project Site is moderately sloped in a southeast to northwest direction, with an elevation of approximately 240 feet above mean sea level (amsl) in the far southern portion of the BSA, to 220 amsl in the northern portion. Bee Canyon Wash flows within an underground concrete box channel northeast to southwest at the southern perimeter of the Project Site. A short, isolated reach of the channel at the southern edge of the Project Site is open. Photographs of the Project Site are included in Attachment A.

4.2 VEGETATION COMMUNITIES AND PLANTS

Vegetation communities are assemblages of plant species that commonly coexist. The classification of vegetation communities is based on the life form of the dominant species within that community and the associated species. No natural vegetation communities exist within the BSA. The nearest areas of natural communities occur approximately four miles to both the northeast in foothills of the Santa Ana Mountains, and to the southwest in the San Joaquin Hills.

Project Site

Onsite habitat can be characterized as upland mustards and other ruderal forbs, as described in A Manual of California Vegetation (MCV) (Sawyer et al. 2009). Plant species within the proposed Project Site consist primarily of non-native herbaceous species, including: wild mustard (*Hirschfeldia incana*), black mustard (*Brassica nigra*), yellow starthistle (*Centaurea solsticialis*), red brome (*Bromus madritensis* spp. *rubens*), and wild oat (*Avena* sp.), with one native herb, doveweed (*Croton setigera*). (Photos 1-4, Attachment A). Some areas of the Project Site containing only patchy vegetative growth composed primarily of black mustard (Photo 5), and areas of bare ground where railroad equipment is currently being stored (Photo 6). It appears that most of the Project Site is regularly mowed to control vegetative growth. Areas at the eastern and western extent of the Project Site, at the bends in Marine Way, appear to be mowed less frequently and contain additional non-native herbaceous plant species (Photo 7). No trees or shrubs exist within the Project Site. A list of the plant species identified during the field survey of the site are provided in Table 4.2-1.

Table 4.2-1 Plant Species Observed Within the Project Site

Common Name	Scientific Name	Native/Non-Native Species
Ragweed	*Ambrosia psilostachya*	Native
Wild oat	*Avena sp.*	Non-Native
Black mustard	*Brassica nigra*	Non-Native
Red brome	*Bromus madritensis spp. rubens*	Non-Native
Yellow starthistle	*Centaurea solsticialis*	Non-Native
Doveweed	*Croton setigera*	Native
Bermuda grass	*Cynodon dactylon*	Non-Native
Jimsonweed	*Datura wrightii*	Native
Canada horseweed	*Erigeron canadensis*	Native
Spotted spurge	*Euphorbia maculata*	Non-Native
Prickly lettuce	*Lactuca seriola*	Non-Native
Telegraph weed	*Heterotheca grandiflora*	Native
White sweetclover	*Melilotus albus*	Non-Native
Fountain grass	*Pennisetum setaceum*	Non-native
Castor bean	*Ricinus communis*	Non-native

A short, open reach of Bee Canyon Wash occurs at the southern edge of the Project Site, where a bridge carrying rail tracks is proposed over the channel. At this location, the channel is a concrete box, with some rip-rap above the channel on the banks (Photo 8). The channel is underground north (upstream) of this reach. There is no vegetative growth in the channel.

Stormwater runoff drains from the Project Site via an open concrete channel that occurs in the northwest corner of the site (Photo 9). From this point, stormwater is further conveyed downstream to the Marshburn Channel, which occurs outside the BSA to the northwest.

Surrounding BSA

The 500-foot survey buffer around the Project Site includes roadways, rail tracks, commercial development to the southwest and athletic fields in Great Park to the northeast. Vegetation within the BSA consists of ornamental pine (*Pinus* sp.), fig (*Ficus* sp.), and sweet gum (*Liquidambar styraciflua*) trees within landscaped areas in the commercial development. These trees are visible in the background of Photos 5-8. Vacant land covered by herbaceous habitat similar to that on the Project Site occurs in the BSA to the east around Voyager Drive and to the south of the Project Site.

A soft-bottom, vegetated stormwater channel drains into the open portion of Bee Canyon channel from the southeast in the BSA. Some growth of native riparian species including willow (*Salix* sp.) and mulefat (*Baccharis salicifolia*) are present in this channel; however, it occurs just outside the Project Site and would not be impacted by the Project.

4.3 WILDLIFE

With most vegetation being less than a foot in height, the Project is generally unsuitable for wildlife nesting and cover. Wildlife activity was minimal during the field survey. Species observed include western fence lizard (*Sceloporus occidentalis*), and observations of mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), and common raven (*Corvus corax*) flying across the Project Site. No active or old bird nests were observed within the Project Site; however, killdeer (*Charadrius vociferous*), a common ground-nester could potentially nest on site.

4.4 WILDLIFE CORRIDORS

In an urban context, a wildlife migration corridor can be defined as a linear landscape feature of sufficient width and buffer to allow animal movement between two comparatively undisturbed habitat fragments, or between a habitat fragment and some vital resource that encourages population growth and diversity. Habitat fragments are isolated patches of habitat separated by otherwise foreign or inhospitable areas, such as urban tracts or highways. Two types of wildlife migration corridors seen in urban settings are regional corridors, defined as those linking two or more large areas of natural open space, and local corridors, defined as those allowing resident wildlife to access critical resources (food, cover, and water) in a smaller area that might otherwise be isolated by urban development.

The BSA occurs within an urbanized area and does not occur within or intersect a recognized or established regional wildlife corridor. Vegetative growth within the Project Site and ornamental trees and shrubs within landscaped areas within the surrounding BSA provide some opportunities for cover, resting, foraging, and nesting to localized bird populations; however, they do not provide functions as a significant wildlife movement corridor.

5. SPECIAL-STATUS SPECIES

5.1 SPECIAL-STATUS PLANT SPECIES

Special-status plant species include those listed as Endangered, Threatened, Rare or those species proposed for listing by the USFWS under the federal Endangered Species Act (FESA), those listed by CDFW under the California Endangered Species Act (CESA), and the CNPS.[1,2,3] The CNPS inventory is sanctioned by the CDFW and essentially serves as the list of candidate plant species for state listing. CNPS's California Rare Plant Ranks (CRPR) 1B and 2 species are considered eligible for state listing as endangered or threatened.

A total of 76 special-status plant species were identified from the El Toro and surrounding eight quadrangles in the CNDDB and CNPS, and from a search of IPaC for the vicinity of the Project Site, including 10 federal and/or state-listed species:

- Munz's onion (*Allium munzii*), federal-listed endangered and state-listed threatened
- Braunton's milk-vetch (*Astragalus brauntonii*), federal-listed endangered
- Thread-leaved brodiaea (*Brodiaea filifolia*), federal-listed threatened and state-listed endangered
- San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*), federal candidate for listing and state-listed endangered
- Slender-horned spineflower (*Dodecahema leptoceras*), federal and state-listed endangered
- Santa Monica dudleya (*Dudleya cymosa* ssp. *ovatifolia*), federal-listed threatened
- Laguna Beach dudleya (*Dudleya stolonifera*), federal and state-listed threatened
- Santa Ana River woollystar (*Eriastrum densifolium* ssp. *sanctorum*), federal and state-listed endangered
- Gambel's water cress (*Nasturtium gambellii*), federal-listed endangered and state-listed threatened
- Big-leaved crownbeard (*Verbesina dissita*), federal and state-listed threatened

The 76 special-status plant species identified during the database reviews, their status, and habitat requirements are provided in Attachment B, Table A.

No special-status plant species were observed during the field survey and no records of special-status plant species were found during the database reviews to coincide with the BSA. Due to the developed nature of the BSA and lack of natural habitats that are potentially suitable to support special-status plants, none are

[1] Species listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (Title 50 Code of Federal Regulations [CFR] 17.12 [listed plants], Title 50 CFR 17.11 [listed animals] and includes notices in the Federal Register for proposed species).

[2] Species listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (Title 14 California Code of Regulations 670.5).

[3] Plants listed as rare under the California Native Plant Protection Act (California Fish and Game Code Section 1900 *et seq*.).

expected to occur in the BSA. The nearest special-status plant species identified during database reviews are primarily recorded from native habitats two plus miles southwest of the BSA, in the vicinity of Sand Canyon Reservoir.

5.2 SPECIAL-STATUS WILDLIFE SPECIES

Special-status wildlife species include those listed by USFWS under FESA and by CDFW under CESA. USFWS and CDFW officially list species as either threatened, endangered, or as candidates for listing. Additional species receive federal protection under the Bald Eagle Protection Act (e.g., bald eagle, golden eagle), the Migratory Bird Treaty Act (MBTA), and state protection under CEQA Section 15380(d).

All birds, except European starlings, English house sparrows, rock doves (pigeons), and non-migratory game birds such as quail, pheasant, and grouse are protected under the MBTA. However, the nests and eggs of non-migratory game birds are protected under California Fish and Game Code (CFGC) Section 3503. Many other species are considered by CDFW to be California Species of Special Concern (SSC) and others are on a CDFW Watch List (WL). The CNDDB tracks species within California for which there is conservation concern, including many that are not formally listed, and assigns them a CNDDB Rank (CDFW 2020b). Although CDFW SSC and WL species and species that are tracked by the CNDDB but not formally listed are afforded no official legal status, they may receive special consideration during the environmental review process. CDFW further classifies some species as "Fully Protected" (FP), indicating that the species may not be taken or possessed except for scientific purposes, under special permit from CDFW. Additionally, CFGC Sections 3503, 3505, and 3800 prohibit the take, destruction, or possession of any bird, nest, or egg of any bird except English house sparrows and European starlings unless authorization is obtained from CDFW.

A total of 66 special-status wildlife species were identified during a search of the El Toro and surrounding eight quadrangles in the CNDDB and NMFS databases, and from a search of IPaC for the vicinity of the Project, including 20 federal and/or State-listed wildlife species:

- Tricolored blackbird (*Agelaius tricolor*), state-listed threatened
- Arroyo toad (*Anaxyrus californicus*), federal-listed endangered
- Crotch bumble bee (*Bombus crotchii*), state candidate-endangered
- San Diego fairy shrimp (*Branchinecta sandiegonensis*), federal-listed endangered
- Santa Ana sucker (*Catostomus santaanae*), federal-listed threatened
- Western snowy plover (*Charadrius alexandrinus nivosus*), federal-listed threatened
- Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), federal-listed threatened and state-listed endangered
- Stephens' kangaroo rat (*Dipodomys stephensi*), federal-listed endangered and state-listed threatened
- Southwestern willow flycatcher (*Empidonax traillii extimus*), federal and state-listed endangered
- Tidewater goby (*Eucyclogobius newberryi*), federal-listed endangered
- Quino checkerspot butterfly (*Euphydryas editha quino*), federal-listed endangered
- Bald eagle (*Haliaeetus leucocephalus*), state-listed endangered
- California black rail (*Laterallus jamaicensis coturniculus*), state-listed threatened
- Steelhead – southern California DPS (*Oncorhynchus mykiss pop. 10*), federal-listed endangered
- Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), state-listed endangered
- Pacific pocket mouse (*Perognathus longimembris pacificus*), federal-listed endangered
- Coastal California gnatcatcher (*Polioptila californica californica*), federal-listed threatened
- Light-footed Ridgway's rail (*Rallus obsoletus levipes*), federal and state-listed endangered
- California least tern (*Sternula antilarum browni*), federal and state-listed endangered
- Least Bell's vireo (*Vireo bellii pusillis*), federal and state-listed endangered

The 66 special-status wildlife species identified during the database reviews, their status, and habitat requirements are provided in Attachment B, Table B.

No special-status wildlife species were detected during the field survey and no historical records of special-status wildlife were identified to coincide with the BSA during database reviews. Records of burrowing owl (*Athena cunicularia*), a CDFW SSC, are known from 1-2 miles east of the BSA from 2010, within the former El Toro Air Station, where adults were found overwintering. It was determined at the time that these individuals were not nesting and burrows were collapsed to prohibit reuse (CDFW 2020a). No records of burrowing owl have been made in the vicinity of the Project Site since 2010 and no individuals of this species or burrows suitable for this species were observed onsite during the field survey. Although this species prefers open grassland habitat with low plant growth similar to that within the Project Site, a lack of

recent records and absence of any indication of the species occurrence in the Project Site indicate the species is likely no longer present in the vicinity. CNDDB records from 1999 of tricolored blackbird are known from 1-2 miles west and southwest of the BSA, on the other (west) side of I-5 from the Project Site. Subsequent surveys for this species in 2014 noted it was no longer present and the area had been developed (CDFW 2020a). Due to the developed nature of the BSA, native habitats suitable to support these and other special-status wildlife species are generally absent from the BSA. No special-status invertebrates, reptiles, amphibians, fish, or mammals are expected to occur within the BSA.

Two CDFW WL species, Cooper's hawk (*Accipiter cooperii*) and California horned lark (*Eremphila alpestris actia*) have some potential to occur within the BSA; California horned lark as a potential ground-nester within the Project Site and Cooper's hawk as a transient migrant or forager across the BSA (refer to Attachment B, Table B).

6. SENSITIVE NATURAL COMMUNITIES

Sensitive natural communities are those that are designated as rare in the region by CDFW in the CNDDB, support special-status plant or wildlife species, or are aquatic communities such as wetlands, rivers, streams, and riparian areas that fall under regulatory jurisdiction of the U.S. Army Corps of Engineers (USACE), CDFW, and/or the Regional Water Quality Control Board (RWQCB). Tidal waters around the peninsula are considered sensitive natural communities, falling under the jurisdiction of NMFS. Regulations applicable to sensitive natural communities are discussed further in Section 7 of this memorandum.

Fourteen sensitive vegetative communities were identified during a search of the CNDDB for the El Toro and surrounding eight quadrangles, including the following:

- California Walnut Woodland
- Canyon Live Oak Ravine Forest
- Riversidian Alluvial Fan Sage Scrub
- Southern California Arroyo Chub/Santa Ana Sucker Stream
- Southern Coast Live Oak Riparian Forest
- Southern Coastal Salt Marsh
- Southern Cottonwood Willow Riparian Forest
- Southern Interior Cypress Forest
- Southern Mixed Riparian Forest
- Southern Riparian Forest
- Southern Riparian Scrub
- Southern Sycamore Alder Riparian Woodland
- Southern Willow Scrub
- Valley Needlegrass Grassland

These communities are absent from the BSA and are known from inland mountain ranges and coastal canyons generally occurring within 3-4 miles northeast and southwest of the BSA. No USFWS-designated critical habitats for federally-listed species or any other sensitive, protected, or managed communities or habitats were identified during a review of IPaC to coincide with the Project Site.

As identified in Section 4.1, Bee Canyon Wash (Lower San Diego Creek; Hydrologic Unit Code [HUC] 12 = 180702040102) occurs as a mostly underground channel along the southeastern perimeter of the Project Site, with a short, isolated open portion of the channel at the southern edge of the Project Site. Bee Canyon Wash originates as a headwater channel in the Santa Ana Mountains five to six miles northeast of the BSA in the vicinity of the Frank R. Bowerman Landfill. Round Canyon Wash, a tributary of Bee Canyon Wash, originates to the southeast of Bee Canyon in Limestone Canyon Regional Park. From their source, these streams flow southwest (under the 241 Toll Road) and confluence just south of the Portola Springs area of the City of Irvine. Bee Canyon Wash then flows under the former El Toro Marine Air Station and daylights along the southeast perimeter of the Project Site, before flowing into an underground storm drain system which eventually enters San Diego Creek, approximately one mile southwest of the BSA.

The San Diego Creek watershed drains roughly 112 square miles, most of which is located in the City of Irvine. From its confluence with Bee Canyon Wash, San Diego Creek continues through urbanized portions of the City for approximately eight miles before flowing into Newport Bay, where it contributes nearly all of the freshwater inflow to Newport Bay.

7. BIOLOGICAL RESOURCES REGULATORY FRAMEWORK

Several regulations and standards have been established by federal, state, and local agencies to protect and conserve biological resources. The Project's compliance with the regulations and standards listed below were assessed.

Federal

Federal Endangered Species Act

Enacted in 1973, the FESA provides for the conservation of threatened and endangered species and their ecosystems (United States Code [U.S.C.] Title 16, Chapter 35, Sections 1531–1544). The ESA prohibits the "take" of threatened and endangered species except under certain circumstances and only with authorization from USFWS through a permit under Section 4(d), 7 or 10(a) of the ESA. "Take" under the FESA is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

Formal consultation under the FESA would be required if the Project had the potential to affect a federally-listed species that has been detected within or adjacent to the BSA. No federally-listed species were detected during the field survey and suitable habitats for such species do not occur in the BSA. Therefore, formal consultation is not expected for the Project.

Migratory Bird Treaty Act (MBTA)

Under the MBTA, it is unlawful at any time, by any means or manner, to pursue, hunt, take, capture, or kill migratory birds. The law applies to the removal of nests occupied by migratory birds during the breeding season. The MBTA (16 U.S.C. 703-71 1), 50 CPR Part 10, protects migratory birds, their occupied nests, and their eggs from disturbance or destruction.

Although unlikely due to the absence of trees and shrubs on site, native migratory bird species protected under the MBTA may nest on site. No permit is issued under the MBTA; therefore, the Project would need to employ measures that would avoid take of protected migratory birds, their occupied nests and their eggs.

Bald and Golden Eagle Protection Act (Eagle Act)

The Eagle Act was originally implemented for the protection of bald eagles. In 1962, Congress amended the Eagle Act to also cover golden eagles, a move that was partially an attempt to strengthen protection of bald eagles, since the latter were often killed by people mistaking them for golden eagles. This act makes it illegal to import, export, take (which includes molest or disturb), sell, purchase, or barter any bald eagle or golden eagle or part thereof.

Although known from the region, bald and golden eagles are not known from the vicinity of the Project, and habitat in the BSA is not suitable for these species. As a result, the Project is not expected to take a bald or golden eagle.

Clean Water Act (CWA)

Under Section 404 of the CWA, the USACE regulates the discharge of dredged or fill material into jurisdictional waters of the U.S., which include those waters listed in 33 CFR 328.3 (Definitions) (U.S.C. Title 33, Chapter 26, Sections 101–607). In June of 2020, the Navigable Waters Protection Rule became effective. The Final Rule modified the definition of Waters of the U.S. 33 CFR 328 3(b)(3) indicates that ephemeral features are not regulated by the CWA. The definitions of intermittent and perennial require surface water flowing continuously for weeks or months during certain times of the year and more than in direct response to precipitation (e.g., ephemeral drainages). The final rule preamble Section III.A.2 does clarify that features with effluent-derived intermittent or perennial flows may be considered jurisdictional as well.

As described in Section 6, Bee Canyon Wash occurs along the southeastern perimeter of the Project Site. Although Bee Canyon Wash's hydrologic regime is not currently known, the analysis assumes that the wash is jurisdictional due to the size of the watershed and urban influence located upstream. This feature constitutes a potential jurisdictional water of the U.S. per USACE regulations. Potential permitting requirements pursuant to Section 404 and 401 of the CWA are discussed in Section 8.

Section 401 of the CWA requires a Water Quality Certification from the state for all permits issued by the USACE under Section 404 of the CWA. The RWQCB is the state agency in charge of issuing a CWA Section 401 Water Quality Certification or waiver.

Magnuson-Stevens Fisher Conservation and Management Act (Magnuson-Stevens Act)

Under the purview of NMFS, amendments in 1996 to the Magnuson-Stevens Act set forth a number of mandates for NMFS, Regional Fishery Management Councils, and federal action agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NMFS, are required to delineate Essential Fish Habitat (EFH) in fishery management plans for all managed species. As defined by this act, EFH is necessary for fish to spawn, breed, feed, or grow to maturity, and includes subsets of habitats known as Habitat Areas of Particular Concern (HAPC), which are high-priority areas for conservation, management, and research and are necessary for healthy ecosystems and sustainable fisheries. HAPC include estuaries, kelp canopies, rocky reefs, and beds of seagrass, habitats that are rare, stressed by development, provide important ecological functions for federally managed species, and/or are especially vulnerable to anthropogenic (or human impact) degradation. They can cover a specific location (a bank or ledge, spawning location) or a habitat that is found over a wider area, such as coral, nearshore nursery areas, or pupping grounds. The HAPC designation does not provide additional protection or restrictions on an area but helps prioritize conservation efforts (NMFS 2020a).

As described in Section 6, Bee Canyon Wash occurs within the BSA and flows into San Diego Creek and further into Newport Bay. Waters in Newport Bay are identified by NMFS as EFH and a review of HAPC

occurring along and off the coast of Newport Bay indicates the presence of estuary habitat in the Bay (NMFS 2020b). However, due to the distance from the BSA to Newport Bay, coordination with NMFS regarding potential impacts to EFH and HAPC are not anticipated for the Project.

State

California Environmental Quality Act (CEQA)

CEQA requires that biological resources be considered when assessing the environmental impacts resulting from proposed actions. CEQA does not specifically define what constitutes an "adverse effect" on a biological resource. Instead, lead agencies are charged with determining what specifically should be considered an impact. This memorandum has been prepared in support of a review of biological resource pursuant to CEQA.

California Fish and Game Code (CFGC)

CFGC regulates the taking or possession of birds, mammals, fish, amphibians, and reptiles, as well as impacts to natural resources such as wetlands and waters of the state. It includes CESA (Sections 2050–2115) and Lake and Streambed Alteration Agreement (LSAA) regulations (Section 1600 et seq.).

Wildlife "take" is defined by CDFW as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Protection extends to the animals, dead or alive, and all their body parts. Section 2081 of CESA allows CDFW to issue an incidental take permit for state-listed threatened or endangered species, should the Project have the potential to "take" a state-listed species that has been detected within or adjacent to the Project Site. Certain criteria are required under CESA prior to the issuance of such a permit, including the requirement that impacts of the take are minimized and fully mitigated.

Additionally, CFGC Sections 3503, 3505, and 3800 mirror the MBTA, but also prohibit the take, destruction, or possession of any bird, nest, or egg of any bird species except English house sparrows and European starlings unless authorization is obtained from CDFW.

No state-listed species are anticipated to be affected by the Project as habitat potentially suitable for such species does not occur within the BSA, or the species' known distribution does not coincide with the BSA. As a result, a permit under Section 2081 is not anticipated for the Project.

Bee Canyon Wash may constitute a regulated streambed under the jurisdiction of CDFW. As a result, an LSAA will be required for the Project.

Porter-Cologne Water Quality Control Act

Under Section 13000 et seq., of the Porter-Cologne Water Quality Act (Porter-Cologne), the RWQCB is the agency that regulates discharges of waste and fill material within any region that could affect a water of the state (CWC 13260[a]) (including wetlands and isolated waters) as defined by CWC Section 13050(e).

Waste Discharge Requirements (WDR) pursuant to Porter-Cologne may be required if water quality certification pursuant to Section 401 of the CWA is not required. General Waste Discharge Order 2004-2004-DWQ may apply if Bee Canyon Wash would be subject to discharge of fill and is not regulated under CWA.

Local

Orange County Central and Coastal Subregion Natural Community Conservation Plan and Habitat Conservation Plan (NCCP/HCP)

The NCCP/HCP (County of Orange 1996a) was prepared by the County of Orange in cooperation with California Department of Fish and Game (CDFG, now CDFW) and USFWS. The document was prepared in accordance with the provisions of the state Natural Community Conservation Planning Act of 1991 (NCCP Act), Sections 1600 *et seq.* of the CFGC and FESA. The 208,00-acre Central and Coastal Subregion is part of a five-county NCCP Study Area established by the state as part of the Southern California Coastal Sage Scrub NCCP Program. The Project falls within the Central Subregion of the NCCP/HCP.

In addition, a Joint Programmatic Environmental Impact Report and Environmental Impact Statement (Joint EIR/EIS) (County of Orange 1996b) that addresses the effects related to the NCCP/HCP was prepared in accordance with the CEQA, and National Environmental Policy Act (NEPA). The County is the lead agency responsible for preparation of the NCCP/HCP and the EIR. The USFWS is the lead agency responsible for preparation of the HCP and EIS.

The NCCP/HCP focuses on creating a multiple-species, multiple-habitat subregional Reserve System and implementing a long-term "adaptive management" program that will protect coastal sage scrub and other habitats and species located within the coastal sage scrub habitat mosaic, while providing for economic uses that will meet the social and economic needs of the people of the subregion. The primary goal is to protect and manage habitat supporting a broad range of plant and animal populations that are found within the Central and Coastal subregions of Orange County. To accomplish this goal, the NCCP/HCP creates a subregional habitat Reserve System for coastal sage scrub and related habitats and implements a program that manages biological resources within the habitat reserve. The Reserve System would be established by incorporating existing parklands and open space and additional dedications that would occur over 25 years or more.

Two categories of landowners are identified by the NCCP/HCP including, *participating landowners* and *non-participating landowners*. Each of these landowner categories is offered different endangered species habitat mitigation opportunities under the NCCP/HCP. Non-participating landowners, such as OCTA, are those public and private landowners that are not contributing significant land and/or funding toward implementation of the Reserve System and adaptive management program. For non-participating landowners, development activities are required under current law to assure that impacts to listed species resulting from activities on their lands are fully mitigated consistent with the FESA and CESA. Consistency with the FESA and CESA is achieved by 1) onsite avoidance of impacts to listed species; 2) satisfying

applicable FESA and CESA provisions under the consultation and permit provisions of these acts; or 3) payment of a Mitigation Fee to the non-profit management corporation as provided for in the NCCP/HCP.

As presented in Section 8 below, significant impacts to federally and/or State-listed species and non-listed special-status-species and sensitive community will be avoided. Listed species are not expected onsite, sensitive communities are absent from the site, and avoidance and minimization measures would be implemented to reduce potential impacts to nesting birds protected under the MBTA and CFGC. As a result, the Project is not anticipated to conflict with the NCCP/HCP and payment of a Mitigation Fee per the NCCP/HCP is not expected.

8. IMPACTS ON BIOLOGICAL RESOURCES

Biological resources may be either directly or indirectly impacted by a project. Direct and indirect impacts may be either permanent or temporary in nature. These impact categories are defined below.

- **Direct**: Any alteration, physical disturbance, or destruction of biological resources that would result from project-related activities is considered a direct impact. Examples include clearing vegetation, encroaching into wetlands or a stream, and the loss of individual species and/or their habitats.
- **Indirect**: As a result of project-related activities, biological resources may also be affected in a manner that is ancillary to physical impacts. Examples include elevated noise and dust levels, increased human activity, decreased water quality, and the introduction of invasive wildlife (domestic cats and dogs) and plants.
- **Permanent**: All impacts that result in the long-term or irreversible removal of biological resources are considered permanent. Examples include constructing a building or permanent road on an area containing biological resources.
- **Temporary**: Any impacts considered to have reversible effects on biological resources can be viewed as temporary. Examples include the generation of fugitive dust during construction; or removing vegetation for the preparation of stream bank stabilization activities, and either allowing the natural vegetation to recolonize or actively revegetating the impact area. Surface disturbance that removes vegetation and disturbs the soil is considered a long-term temporary impact because of slow natural recovery in arid ecosystems.

8.1 CONSTRUCTION

The anticipated impacts of Project construction on biological resources are described below.

Vegetation

Herbaceous vegetation composed primarily of non-native mustard and grass species occur within the Project Site; no trees or shrubs occur on site. The removal of such vegetation during implantation of the Project does not constitute a significant direct impact.

Indirect impacts to vegetation during the Project's construction could include the accumulation of fugitive dust and further colonization of non-native, invasive plant species. Other indirect impacts could include the potential for surface runoff, increased erosion, and sediment deposition beyond the footprint of disturbance as a result of the use of heavy construction equipment and general construction-related activities. However, standard construction practices related to fugitive dust and erosion control would be implemented. As a result, no significant indirect impacts to vegetation are anticipated.

Special-Status Plant Species

No federal- or state-listed plant species were identified during the field survey and special-status plants are not expected to occur in the BSA due to a lack of potentially suitable habitat. As a result, direct impacts to special-status plant species would not occur.

Likewise, suitable habitat for special-status plants is not present in the urbanized environment surrounding the Project Site. As a result, significant indirect impacts to special-status plant species are not anticipated.

Wildlife

No federal- or state-listed wildlife species were identified during the field survey or are expected to occur in the BSA due to a lack of potentially suitable habitat. As a result, direct impacts to federal- or state-listed wildlife species would not occur.

Although no trees or shrubs occur within the Project Site, the low and sometimes sparse vegetative growth present is potentially suitable for ground-nesting bird species such as California horned lark, a CDFW WL, and killdeer (*Charadrius vociferus*). Additionally, trees in ornamental landscapes within the surrounding BSA at the athletic fields to the northeast and in commercial development to the southwest provide potentially suitable nesting opportunities for birds protected under CFGC. By implementing avoidance and minimization measures outlined in Mitigation Measure BIO-1 in Section 9, direct impacts to any birds protected under the MBTA and by CFGC that may occur in the BSA would be less than significant.

Indirect impacts to nesting birds within the BSA could occur during construction as a result of noise, dust, increased human presence, and vibrations resulting from construction activities. Such disturbances could result in increased nestling mortality due to nest abandonment or decreased feeding frequency; mortalities resulting from such indirect effects would be considered significant. However, implementing and adhering to avoidance and minimization measures outlined in Mitigation Measure BIO-1 in Section 9 would reduce potential indirect impacts to nesting birds protected under the MBTA and by CFGC to a level that is less than significant.

Special-Status Wildlife Species

No federal- or state-listed wildlife species have been identified in the BSA, and potentially suitable habitat for such species is absent from the BSA. However, as presented in Section 5.2, two non-listed special-status bird species identified as CDFW WL species, Cooper's hawk and California horned lark, have some potential to occur within the BSA. As a result, direct and indirect impacts to special-status wildlife could occur. However, by implementing and adhering to avoidance and minimization measures outlined in Mitigation Measure BIO-1 in Section 9, potential impacts to nesting individuals of these special-status birds and any other bird species that could occur on site, would be reduced to a level that is less than significant.

Wildlife Movement Corridor

The BSA does not serve as a regional wildlife corridor and as a result, impacts to a regional wildlife movement corridor would not occur.

Sensitive Natural Communities

No sensitive natural vegetation communities occur within the BSA; however, Bee Canyon Wash, an aquatic feature under regulatory jurisdiction of the USACE, CDFW, and RWQCB, occurs within the BSA. Under the current design, construction of the bridge over Bee Canyon Wash would require a discharge of fill (e.g. soil, concrete) as the channel must be modified (e.g. widened, deepened, realigned, storm drain outlets added or modified) to accommodate the new bridge structure. Such impacts would require permits from USACE, CDFW and RWQCB. The Project occurs within the San Diego Creek (SDC) Watershed Special Area Management Plan (SAMP) area and is located outside of any pre-defined Aquatic Resource Integrity Area. Additionally, this segment of Bee Canyon Wash is not located within the "major streams" category. Construction of the Project would meet the terms and conditions of a Letter of Permission (LOP), and operation and maintenance would potentially meet the criteria for authorization under Regional General Permit (RGP) No. 74.

Construction of a bridge to carry rail tracks over an isolated, open portion of Bee Canyon Wash may be eligible to obtain an LOP from the USACE as a "Road Crossing," which includes construction and/or maintenance of new and existing bridges and culverts. The LOP application process would require:

- Pre-application coordination meeting with USACE to address:
    - CWA Section 404(b)(1) Guidelines alternatives analysis;
    - How avoidance and minimization of discharges to jurisdictional waters were achieved for the Project;
    - Compensatory mitigation plan consistent with the SAMP mitigation framework to address any unavoidable impacts to jurisdictional waters and the program goal of no net loss of wetlands.
- Coordination with RWQCB regarding a Section 401 Water Quality Certification that demonstrates the Project's compliance with water quality standards.

Alternatively, it may be determined during coordination with USACE that the proposed bridge over Bee Canyon Wash would qualify for RGP No. 74 to fulfill CWA Section 404 requirements. A RGP 74 would be issued by the USACE, Los Angeles District. This RGP authorizes discharges of dredged or fill material resulting in temporary impacts up to 0.5 acre of jurisdictional waters of the U.S. in eligible areas, no more than 0.1 acre of which may be vegetated with native riparian and/or wetland vegetation. No permanent impacts to waters of the U.S., including impacts from fills, flooding, excavation beyond a Corps Regulatory Division-approved maintenance baseline, or drainage are permitted under this RGP.

Construction of the proposed bridge over Bee Canyon Wash would require the Project applicant to obtain a permit pursuant to Sections 404 and 401 of the CWA and to Section 1600 et seq of CFGC. The Project would comply with the regulatory framework set forth by the USACE, RWQCB, and CDFW. Following the permitting process and SAMP requirements described below would further reduce the impacts of bridge installation over Bee Canyon Wash at a level less than significant. For CEQA purposes, potentially significant impacts would include those impacts that require mitigation.

Permitting Process:

- If discharge of fill to Bee Canyon Wash cannot be avoided and it is determined to meet the definition of a Water of the U.S., then prior to the start of the Project's construction, the Project Applicant shall coordinate with the USACE to obtain authorization pursuant to Section 404 of the CWA (i.e. LOP or RGP 74 per SAMP permit procedures) and the RWQCB to obtain a Water Quality Certification pursuant to Section 401 of the CWA.
- If discharge of fill to Bee Canyon Wash cannot be avoided and it is determined to NOT meet the definition of a Water of the U.S., then prior to the start of the Project's construction, the Project Applicant shall submit a Notice of Intent to be enrolled under and to comply with General Water Quality Order No. 2004-2004-DWQ.
- If the Project results in substantial modification of the bed or banks of Bee Canyon Wash, then, the Project Applicant shall coordinate with CDFW to determine the need to obtain a LSAA pursuant to Section 1600 et seq. of CFGC.

SAMP Requirements:

- The applicant shall comply with the SAMP Mitigation Framework (see Section 9 below) applicable to the LOP or RGP 74 permit procedures.
- If a permanent loss of regulated waters or streambed occurs because of the Project, compensatory mitigation (purchase of credit at an in-lieu fee or mitigation bank approved by the resource agencies), or applicant proposed enhancement or establishment of waters or streambed) shall be provided at a minimum ratio of 1:1. Temporary impacts shall be restored to pre-Project conditions to the extent practicable.

Local Plans

Although the Project Site falls within the boundary of the Orange County Central/Coastal NCCP/HCP, OCTA is not a participating landowner and as a result, the Project is not eligible for coverage under the NCCP/HCP for impacts to federally and/or state listed species. However, since no federally and/or State-listed species are expected to be impacted, no sensitive communities occur on site, and avoidance and minimization measures will be implemented to reduce impacts to nesting birds protected under the MBTA and CFGC, the Project does not conflict with the NCCP/HCP and will not require payment of a Mitigation Fee per the NCCP/HCP for such impacts.

8.2 OPERATION

Impacts to biological resources during operation and maintenance of the Project are not anticipated as such activities would be conducted within previously disturbed and developed surfaces containing non-native vegetation and would generally not change biological conditions from those present prior to and after the Project's construction. Special-status plant species are not expected to occur due to a lack of suitable habitat within the Project Site and surrounding BSA, and impacts to common wildlife, special-status wildlife species, and wildlife movement are not anticipated. Maintenance activities would be conducted at the Project Site and therefore Impacts would be less than significant.

9. AVOIDANCE AND MINIMIZATION MEASURES

With the potential for ground-nesting birds protected under the MBTA and CFGC to occur within the Project Site and other bird species to occur in the surrounding BSA, implementation of Mitigation Measure BIO-1 presented below would mitigate potential impacts to nesting birds should construction overlap the bird breeding season (February 15 through September 1).

MM-BIO-1 Ground-disturbing activities during construction shall occur outside of the nesting bird season (generally February 15 through September 1). If avoiding the nesting season is not practicable, the following additional measures shall be employed:

- A pre-construction nesting survey shall be conducted by a qualified biologist within three days prior to the start of construction activities to determine whether active nests are present within or directly adjacent to the construction zone. All nests found shall be recorded.
- If construction activities must occur within 300 feet of an active nest of any passerine bird or within 500 feet of an active nest of any raptor, with the exception of an emergency, a qualified biologist shall monitor the nest on a weekly basis, and the activity shall be postponed until the biologist determines that the nest is no longer active.
- If the recommended nest avoidance zone is not feasible, the qualified biologist shall determine whether an exception is possible and obtain concurrence from the resource agencies before construction work can resume within the avoidance buffer zone. All work shall cease within the avoidance buffer zone until either agency concurrence is obtained or the biologist determines that the adults and young are no longer reliant on the nest site.

Additionally, construction of the proposed bridge over Bee Canyon Wash would require the project applicant to obtain a permit pursuant to Sections 404 and 401 of the CWA and to Section 1600 et seq of CFGC. The Project Applicant shall coordinate with the USACE to obtain authorization pursuant to Section 404 of the CWA (i.e. LOP or RGP 74 per SAMP permit procedures) and the RWQCB to obtain a Water Quality Certification pursuant to Section 401 of the CWA. Additionally, If the Project results in any modification of the bed or banks of Bee Canyon Wash, then, the Project Applicant shall coordinate with CDFW to determine the need to obtain a LSAA pursuant to Section 1600 et seq. of CFGC.

Mitigation Measure Bio-2 presented below would mitigate potential impacts of the proposed bridge to Bee Canyon Wash, reducing impacts to this jurisdictional feature to less than significant.

MM-BIO-2 Pursuant to SAMP requirements, if a permanent loss of regulated waters or streambed occurs because of the Project, compensatory mitigation (purchase of credit at an in-lieu fee or mitigation bank approved by the resource agencies), or applicant proposed enhancement or establishment of waters or streambed) shall be provided at a minimum ratio of 1:1. Temporary impacts shall be restored to pre-Project conditions to the extent practicable.

10.CONCLUSIONS

No direct impacts to special-status plant species are anticipated, as none were observed during the field survey and the BSA lacks habitat suitable for such species. As a result, the Project would not result in a significant impact on any federally listed or state-listed threatened, endangered, or candidate plant species, or any non-listed special-status plant species occurring or potentially occurring within the Project.

No special-status wildlife species were observed during the field survey; however, as presented in Section 5.2, two CDFW WL bird species have some potential to occur within the BSA. In addition, bird species protected by the MBTA and CFGC have the potential to occur and nest in the BSA. Potential direct impacts to these species or their nests could occur during construction or during the use or transport of the Project's equipment or materials, on which common bird species may nest. Potential indirect impacts are associated with noise, dust, vibration, and increased human activity, which could cause adults to change their behavior, move out of the area, and abandon the nest or conduct less feedings, resulting in nestling mortality. Implementation of the avoidance and minimization measures in Section 9 would avoid disturbance of these species, resulting in less than significant impacts to special-status wildlife species and nesting birds.

Construction and operation of the Project would not affect a wildlife movement corridor. The Project Site itself does not serve as a wildlife movement corridor and vegetation removed during construction does not provide the functions and values to support wildlife movement compared to native vegetation communities. No impacts to a wildlife movement corridor would occur.

The Project would have no impact on any sensitive native vegetation community, USFWS-designated critical habitat, NMFS-managed habitat, or any other managed or protected habitat or community. However, construction of the Project includes a bridge over Bee Canyon Wash, which could result in impacts to a potential jurisdictional aquatic feature under the jurisdiction of USACE, RWQCB, and CDFW. However, by adhering to the avoidance and minimization measures in Section 9 related to coordination with regulatory agencies pursuant to CWA Section 404 and 401 and CFGC Section 1600, impacts to potential jurisdictional features would be less than significant.

11.REFERENCES

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Appendix C Attachments
Technical Memorandum
Biological Resources

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority

550 S. Main St.
Orange, CA 92868

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

AECOM
Kaiser Center
300 S. Grand Ave.
Los Angeles, CA 90071

September 2023

Attachment A

Project Site Photos



Photo 1. Southeast-facing view from the northwest corner across Project Site.
Marine Way is visible at left, with miscellaneous rail equipment and materials stored onsite and rail tracks at right.



Photo 2. Southwest-facing view across the Project Site. Marine Way is visible at right.



Photo 3. Northwest-facing view across the Project Site, with Marine Way at left.



Photo 4. North-facing view from the southwest corner of the Project Site. Vehicles in background are parked on Marine Way. Miscellaneous rail equipment and materials stored onsite are visible at left.



Photo 5. South-facing view across patchy vegetative cover in the southern portion of the Project Site.



Photo 6. South-facing view of railroad equipment and materials stored onsite.



Photo 7. South-facing view of unmowed vegetation along Marine Way at the north end of the Project Site.



Photo 8. Southwest-facing view of portion of Bee Canyon Wash at southern edge of the Project Site.



Photo 9 A bridge carrying rail tracks into the site from rail tracks visible in the background would cross over this portion of the Bee Canyon channel.

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Attachment B

Regional Special-Status Plant Species and Sensitive Natural Communities
Regional Special-Status Wildlife Species

Table A
Special-Status Plant Species and Natural Vegetation Communities[1]

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA
PLANTS			
chaparral sand-verbena *Abronia villosa* var. *aurita*	Federal: None State: None CRPR: 1B.1	Prefers sandy soils in chaparral, coastal scrub, and desert dune habitats. Occurs between 75-1,500 meters (250-5,250 feet). Blooms (January) March-September.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Munz's onion *Allium munzii*	Federal: FE State: ST CRPR: 1B.1	Prefers mesic or clay soils in chaparral, cismontane woodland, coastal scrub, pinyon and juniper woodland, and valley and foothill grassland habitats. Occurs between 295-1,070 meters (965-3,510 feet). Blooms March-May.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
aphanisma *Aphanisma blitoides*	Federal: None State: None CRPR: 1B.2	Prefers sandy or gravelly soils in coastal bluff scrub, coastal dunes, and coastal scrub habitats. Occurs between 0-305 meters (0-1,000 feet). Blooms February-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
western spleenwort *Asplenium vespertinum*	Federal: None State: None CRPR: 4.2	Found in rocky habitats, including chaparral, cismontane woodland, and coastal scrub. Occurs between 180-1,000 meters (590-3,280 feet). Blooms February-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
Braunton's milk-vetch *Astragalus brauntonii*	Federal: FE State: None CRPR 1B.1	Prefers recent burns or disturbed areas, in stiff gravelly clay soils overlying granite or limestone. Found in closed-cone coniferous forest, chaparral, coastal scrub, and valley and foothill grassland habitats. Occurs between 5-640 meters (10-2,100 feet). Blooms January-August.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Coulter's saltbush *Atriplex coulteri*	Federal: None State: None CRPR 1B.2	Prefers alkaline areas or clay soils in coastal bluff scrub, coastal dune, coastal scrub, and valley and foothill grassland habitats. Occurs between 0-460 meters (10-1,510 feet). Blooms March-October.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA
south coast saltscale *Atriplex pacifica*	Federal: None State: None CRPR 1B.2	Found in alkali sink, coastal sage scrub, wetland-riparian playas and coastal habitats. Occurs between 0-140 meters (0-460 feet). Blooms March-October.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Parish's brittlescale *Atriplex parishii*	Federal: None State: None CRPR 1B.1	Found in alkaline chenopod scrub, playa, and vernal pool habitats. Occurs between 25-1,900 meters (80-6,230 feet). Blooms June-October.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Davidon's saltscale *Atriplex serenana* var. *davidsonii*	Federal: None State: None CRPR 1B.2	Found in areas with alkaline soils in coastal bluff scrub and coastal scrub habitats. Occurs between 10-200 meters (30-660 feet). Blooms April-October.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Malibu baccharis *Baccharis malibuensis*	Federal: None State: None CRPR 1B.1	Found in chaparral, cismontane woodland, coastal scrub, and riparian woodland habitats. Occurs between 150–305 meters (500-1,000 feet). Blooms in August.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
thread-leaved brodiaea *Brodiaea filifolia*	Federal: FT State: SE CRPR: 1B.1	Prefers clay soils in chaparral (openings), cismontane woodland, coastal scrub, playa, valley and foothill grassland, and vernal pool habitats. Occurs between 25-1,120 meters (85-3,675 feet). Blooms March-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Brewer's calandrinia *Calandrinia breweri*	Federal: None State: None CRPR: 4.2	Prefers sandy or loamy soils, disturbed sites, and burns in chaparral and coastal scrub habitats. Occurs between 10-1,220 meters (35-4,000 feet). Blooms (Jan) March-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Catalina mariposa lily *Calochortus catalinae*	Federal: None State: None CRPR: 4.2, NCCP	Found in chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland habitats. Occurs between 15-700 meters (50-2,300 feet). Blooms February-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA
Plummer's mariposa-lily *Calochortus plummerae*	Federal: None State: None CRPR 4.2	Prefers rocky or sandy soils in coastal scrub, chaparral, valley and foothill grassland, cismontane woodland, lower montane coniferous forest habitats. Occurs between 100–1,700 meters (330-5,580 feet). Blooms May-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
intermediate mariposa lily *Calochortus weedii* var. *intermedius*	Federal: None State: None CRPR: 1B.2, NCCP	Found in chaparral, chenopod scrub, cismontane woodland, coastal scrub, lower montane coniferous forest and valley and foothill grassland. Occurs between 30-1,500 meters (100-4,920 feet). Blooms April-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Lewis' evening-primrose *Camissoniopsis lewisii*	Federal: None State: None CRPR: 3	Prefers sandy or clay soils in coastal bluff-scrub, cismontane woodland, coastal dune, coastal scrub, and valley and foothill grassland habitats. Occurs between 0-300 meters (0-985 feet). Blooms March-May (June).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Payson's jewelflower *Caulanthus simulans*	Federal: None State: None Other: 4.2	Prefers sandy or granitic soils in chaparral and coastal scrub habitats. Occurs between 90-2,200 meters (295-7,215 feet). Blooms (February) March-May (June).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
southern tarplant *Centromadia parryi* ssp. *australis*	Federal: None State: None CRPR: 1B.1	Found in margins of marshes and swamps, valley and foothill grassland, and vernal pool habitats. Occurs between 0-480 meters (0-1,570 feet). Blooms May-November.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
smooth tarplant *Centromadia pungens* ssp. *laevis*	Federal: None State: None CRPR: 1B.1	Prefers alkaline soils in chenopod scrub, meadows and seeps, playas, riparian woodland, and valley and foothill grassland habitats. Occurs between 0-640 meters (0-2,100 feet). Blooms April-September.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Orcutt's pincushion *Chaenactis glabriuscula* var. *orcuttiana*	Federal: None State: None CRPR: 1B.1	Found in sandy coastal bluff scrub and coastal dune habitats. Occurs between 0-100 meters (0-330 feet). Blooms January-August.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name ***Scientific Name***	**Status[2]**	**General Habitat Description[3]**	**Potential for Occurrence in the BSA**
Peninsular spineflower *Chorizanthe leptotheca*	Federal: None State: None CRPR: 4.2	Prefers alluvial fan or granitic areas in chaparral, coastal scrub, and lower montane coniferous forest habitats. Occurs 300-1,900 (980-6,230 feet). Blooms May-August.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
San Fernando Valley spineflower *Chorizanthe parryi* var. *fernandina*	Federal: FC State: SE CRPR 1B.1	Found in sandy coastal scrub and valley and foothill grassland habitats. Occurs 150-1,220 meters (490-4,000 feet). Blooms April – July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
long-spined spineflower *Chorizanthe polygonoides* var. *longispina*	Federal: None State: None CRPR: 1B.2	Prefers clay soils in chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, and vernal pool habitats. Occurs between 30-1,530 meters (100-5,020 feet). Blooms between April-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
white-bracted spineflower *Chorizanthe xanti* var. *leucotheca*	Federal: None State: None CRPR: 1B.2	Prefers sandy or gravelly soils in coastal scrub (alluvial fans), Mojavean desert scrub, and pinyon and juniper woodland habitats. Occurs between 300-1,200 meters (980-3,940 feet). Blooms April-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
seaside cisanthe *Cistanthe maritima*	Federal: None State: None CRPR: 4.2	Prefers sandy habitats in coastal bluff scrub, coastal scrub, and valley and foothill grassland habitats. Occurs between 5-300 meters (15-985 feet). Blooms February-August.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
San Miguel savory *Clinopodium chandleri*	Federal: None State: None CRPR: 1B.2	Prefers rocky, gabbroic, or metavolcanic soils in chaparral, cismontane woodland, coastal scrub, riparian woodland, and valley and foothill grassland habitats. Occurs between 120-1,075 meters (390-3,525 feet). Blooms March-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
summer holly *Comarostaphylis diversifolia* ssp. *diversifolia*	Federal: None State: None Other: 1B.2	Found in chaparral and cismontane woodland habitats. Occurs between 30-790 meters (95-2,595 feet). Blooms April-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA
small-flowered morning glory *Convolvulus simulans*	Federal: None State: None CRPR: 4.2	Prefers clay soils and serpentine seeps in chaparral, coastal scrub, and valley and foothill grassland habitats. Occurs between 30-700 meters (100-2,300 feet). Blooms March-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
paniculate tarplant *Deinandra paniculata*	Federal: None State: None CRPR: 4.2	Usually prefers vernally mesic, sometimes sandy coastal scrub, valley foothill grassland, and vernal pool habitats. Occurs between 25-940 meters (80-3,085 feet). Blooms (March) April-November.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
western dichondra *Dichondra occidentalis*	Federal: None State: None CRPR: 4.2, NCCP	Found in chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland habitats. Occurs between 50-500 meters (160-1,640 feet). Blooms (January) March-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Cleveland's bush monkeyflower *Diplacus clevelandii*	Federal: None State: None CRPR: 4.2	Found in gabbroic or rocky soils, disturbed areas, and openings in chaparral, cismontane woodland, and lower montane coniferous forest habitats. Occurs between 450-2,000 meters (1,475-6,565 feet). Blooms April-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
slender-horned spineflower *Dodecahema leptoceras*	Federal: FE State: SE CRPR 1B.1	Found in sandy chaparral, cismontane woodland, and alluvial fan coastal scrub habitats. Occurs between 200-760 meters (890-2,510 feet). Blooms April-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
Santa Monica dudleya *cymosa* ssp. *ovatifolia*	Federal: FT State: None CRPR 1B.1, NCCP	Prefers volcanic or sedimentary rocky soils in chaparral and coastal scrub habitats. Occurs between 150-1675 meters (495-5,525 feet). Blooms March–June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
many-stemmed dudleya *Dudleya multicaulis*	Federal: None State: None CRPR 1B.2	Prefers clay soils in chaparral, coastal scrub, and valley and foothill grassland habitats. Occurs between 15-790 meters (50-2,520 feet). Blooms April-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA
Laguna Beach dudleya *Dudleya stolonifera*	Federal: FT State: ST CRPR:1B.1, NCCP	Prefers rocky areas in chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland habitats. Occurs between 10-260 meters (30-855 feet). Blooms May-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
sticky dudleya *Dudleya viscida*	Federal: None State: None CRPR: 1B.2	Prefers rocky areas in coastal bluff scrub, chaparral, cismontane woodland, and coastal scrub habitats. Occurs between 10-550 meters (30-1,805 feet). Blooms May-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Santa Ana River woollystar *Eriastrum densifolium* ssp. *sanctorum*	Federal: FE State: SE CRPR:1B.1	Prefers sandy or gravelly soils in chaparral and coastal scrub (alluvial fan) habitats. Occurs between 90-610 meters (300-2,000 feet). Blooms April-September.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
Palomar monkeyflower *Erythranthe diffusa*	Federal: None State: None CRPR: 4.3	Prefers sandy or gravelly soils in chaparral and lower montane coniferous forest habitats. Occurs between 1,220-1,830 meters (4,000-6,000 feet). Blooms April-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
cliff spurge *Euphorbia misera*	Federal: None State: None CRPR: 2B.2	Prefers rocky areas in coastal bluff scrub, coastal scrub, and Mojavean desert scrub habitats. Occurs between 10-550 meters (30-1,810 feet). Blooms December-August (October).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Palmer's grapplinghook *Harpagonella palmeri*	Federal: None State: None CRPR 4.2, NCCP	Prefers clay soils in open grassy areas within chaparral, coastal scrub, and valley and foothill grassland habitats. Occurs between 20-955 meters (65-3,130 feet). Blooms March-May.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Los Angeles sunflower *Helianthus nuttallii* ssp. *parishii*	Federal: None State: None CRPR: 1A	Found in coastal salt and freshwater marshes and swamps. Occurs between 10-1,525 meters (30-5,005 feet). Blooms August-October.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name ***Scientific Name***	**Status**[2]	**General Habitat Description**[3]	**Potential for Occurrence in the BSA**
Tecate cypress *Hesperocyparis forbesii*	Federal: None State: None CRPR: 1B.1, NCCP	Prefers clay, gabbroic or metavolcanic soils in closed-cone coniferous forest and chaparral habitats. Occurs between 80-1,500 meters (260-4,920 feet).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
vernal barley *Hordeum intercedens*	Federal: None State: None CRPR: 3.2	Found in coastal dune, coastal scrub, valley and foothill grassland (saline flats and depressions), and vernal pool habitats. Occurs between 5-1,000 meters (15-3,280 feet). Blooms March-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
mesa horkelia *Horkelia cuneata* var. *puberula*	Federal: None State: None CRPR 1B.1	Prefers sandy or gravelly soils in chaparral, cismontane woodland, and coastal scrub habitats. Occurs between 70-810 meters (230-2,660 feet). Blooms February-September.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
California satintail *Imperata brevifolia*	Federal: None State: None CRPR: 2B.1	Prefers mesic areas in chaparral, coastal scrub, Mojavean desert scrub, alkali meadows and seeps, and riparian scrub habitats. Occurs between 0-1,215 meters (0-3,990 feet). Blooms September-May.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
decumbent goldenbush *Isocoma menziesii* var. *decumbens*	Federal: None State: None CRPR 1B.2	Prefers sandy soils or disturbed areas in chaparral and coastal scrub habitats. Occurs between 10-135 meters (30-450 feet). Blooms April-November.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	Federal: None State: None CRPR 1B.1	Found in coastal salt marsh, playa, and vernal pool habitats. Occurs between 0-1,220 meters (0-4,000 feet). Blooms February-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
heart-leaved pitcher sage *Lepechinia cardiophylla*	Federal: None State: None CRPR: 1B.2, NCCP	Found in closed-cone coniferous forest, chaparral, and cismontane woodland habitats. Occurs between 520-1370 meters (1,705-4,495 feet). Blooms April-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA
Robinson's pepper-grass *Lepidium virginicum* var. *robinsonii*	Federal: None State: None CRPR: 4.3	Found in chaparral and coastal scrub habitats. Occurs between 0-885 meters (5-2,905 feet). Blooms January-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
ocellated Humboldt lily *Lilium humboldtii* ssp. *ocellatum*	Federal: None State: None CRPR: 4.2	Prefers openings in chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and riparian woodland habitats. Occurs between 30-1,800 meters (100-6,000 feet). Blooms March-July (August).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
California box-thorn *Lycium californicum*	Federal: None State: None CRPR: 4.2	Found in coastal bluff scrub and coastal scrub habitats. Occurs between 5-150 meters (15-495 feet). Blooms December-August.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
cliff malacothrix *Malacothrix saxatilis* var. *saxatilis*	Federal: None State: None CRPR: 4.2	Found in coastal bluff scrub and coastal scrub habitats. Occurs between 0-200 meters (0-660 feet). Blooms March-September.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
intermediate monardella *Monardella hypoleuca* ssp. *lanata*	Federal: None State: None CRPR: 1B.3	Prefers chaparral, cismontane woodland, and sometimes lower montane coniferous forest habitats. Occurs between 400-1,250 meters (1,310-4,100 feet). Blooms April-September.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
felt-leaved monardella *Monardella hypoleuca* ssp. *lanata*	Federal: None State: None CRPR: 1B.2	Found in chaparral and cismontane woodland habitats. Occurs between 300-1,575 meters (980-5,170 feet). Blooms June-August.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
Hall's monardella *Monardella macrantha* ssp. *hallii*	Federal: None State: None CRPR: 1B.3	Found in broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland habitats. Occurs between 730-2,195 meters (2,395-7,200 feet). Blooms June-October.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
mud nama *Nama stenocarpa*	Federal: None State: None CRPR: 2B.2	Prefers marches and swamps along lake margins and riverbanks. Occurs between 5-500 meters (15-1,640 feet). Blooms January-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA
Gambel's water cress *Nasturtium gambellii*	Federal: FE State: ST CRPR: 1B.1	Found in freshwater or brackish marshes and swamps. Occurs between 5-330 meters (15-1,085 feet). Blooms April-October.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
prostrate vernal pool navarretia *Navarretia prostrata*	Federal: None State: None CRPR: 1B.1	Found in mesic areas in coastal scrub, meadows and seeps, valley and foothill grassland, and vernal pool habitats. Occurs between 0-1,210 meters (5-3,970 feet). Blooms April- July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
chaparral nolina *cismontana*	Federal: None State: None CRPR 1B.2	Prefers sandstone or gabbro soils in chaparral and coastal scrub habitats. Occurs between 140-1,275 meters (460-4,180 feet). Blooms (March) May-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
California beardtongue *Penstemon californicus*	Federal: None State: None CRPR: 1B.2	Prefers sandy areas in chaparral, lower montane coniferous forest, or pinyon and juniper woodland habitats. Occurs between 1,170-2,300 meters (3,840-7,545 feet). Blooms May-June (August).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
Allen's pentachaeta *Pentachaeta aurea* ssp. *allenii*	Federal: None State: None CRPR: 1B.1	Prefers openings in coastal scrub and valley and foothill grassland habitats. Occurs between 75-520 meters (245-1,706 feet). Blooms March-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Santiago Peak phacelia *Phacelia keckii*	Federal: None State: None CRPR: 1B.3	Found in closed-cone coniferous forest and chaparral habitats. Occurs between 545-1,600 meters (1,785-5,250 feet). Blooms May-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
south coast branching phacelia *Phacelia ramosissima* var. *austrolitoralis*	Federal: None State: None CRPR: 3.2	Prefers sandy or rocky areas in chaparral, coastal dune, coastal scrub, and coastal salt marsh and swamp habitats. Occurs between 5-300 meters (15-985 feet). Blooms March-August.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA
woolly chaparral-pea *Pickeringia montana* var. *tomentosa*	Federal: None State: None CRPR: 4.3	Prefers gabbroic, granitic, and clay soils in chaparral habitats. Occurs 0-1,700 meters (0-5,575 feet). Blooms May-August.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
chaparral rein orchid *Piperia cooperi*	Federal: None State: None CRPR: 4.2	Found in chaparral, cismontane woodland, and valley and foothill grassland habitats. Occurs 15-1,585 meters (50-5,200 feet). Blooms March-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
narrow-petaled rein orchid *Piperia leptopetala*	Federal: None State: None CRPR: 4.3	Found in cismontane woodland, lower montane coniferous forest, and upper montane coniferous forest habitats. Occurs 380-2,225 meters (1,245-7,300 feet). Blooms May-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
Fish's milkwort *Polygala cornuta* var. *fishiae*	Federal: None State: None CRPR: 4.3	Found in chaparral, cismontane woodland, and riparian woodland habitats. Occurs between 100-1,000 meters (330-3,280 feet). Blooms May-August.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
white rabbit-tobacco *Pseudognaphalium leucocephalum*	Federal: None State: None CRPR: 2B.2	Prefers sandy, gravelly areas in chaparral, cismontane woodland, coastal scrub, or riparian woodland habitats. Occurs between 0-2,100 meters (0-6,890 feet). Blooms (July) August-November (December).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Nuttall's scrub oak *Quercus dumosa*	Federal: None State: None CRPR 1B.1, NCCP	Prefers sandy or clay loam soils in closed-cone coniferous forest, chaparral, and coastal scrub habitats. Occurs between 15-400 meters (50-1,310 feet). Blooms February-August.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Coulter's matilija poppy *Romneya coulteri*	Federal: None State: None CRPR: 4.2, NCCP	Found in chaparral or coastal scrub habitats. Occurs between 20-1,200 meters (65-3,940 feet). Blooms March-July (August).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
chaparral ragwort *Senecio aphanactis*	Federal: None State: None CRPR: 2B.2	Prefers alkaline sites in chaparral, cismontane woodland, and coastal scrub habitats. Occurs 15-800	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA
		meters (50-2,625 feet). Blooms January-April (May).	
salt spring checkerbloom *Sidalcea neomexicana*	Federal: None State: None CRPR: 2B.2	Prefers alkaline or mesic sites in chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub, and playas. Occurs between 15-1,530 meters (50-5,020 feet). Blooms March-June.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
estuary seablite *Suaeda esteroa*	Federal: None State: None CRPR: 1B.2	Found in coastal salt marshes and swamps. Occurs between 0-5 meters (0-20 feet). Blooms May-January.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
San Bernardino aster *Symphyotrichum defoliatum*	Federal: None State: None CRPR: 1B.2	Prefers sites near ditches, streams, and springs in coastal scrub, meadows and seeps, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland habitats. Occurs between 0-2,040 meters (0-6,690 feet). Blooms July-November.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Parry's tetracoccus *Tetracoccus dioicus*	Federal: None State: None CRPR: 1B.2	Found in chaparral and coastal scrub habitats. Occurs between 165-1,000 meters (540-3,280 feet). Blooms April-May.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the project falls outside the elevation range known for this species.
big-leaved crownbeard *Verbesina dissita*	Federal: FT State: ST CRPR: 1B.1	Found in maritime chaparral and coastal scrub habitats. Occurs between 45-205 meters (145-675 feet). Blooms (March) April-July.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Sensitive Natural Communities			
California Walnut Woodland			**Absent**
Canyon Live Oak Ravine Forest			**Absent**
Riversidian Alluvial Fan Sage Scrub			**Absent**
Southern California Arroyo Chub/Santa Ana Sucker Stream			**Absent**
Southern Coast Live Oak Riparian Forest			**Absent**
Southern Coastal Salt Marsh			**Absent**
Southern Cottonwood Willow Riparian Forest			**Absent**
Southern Interior Cypress Forest			**Absent**
Southern Mixed Riparian Forest			**Absent**

Common Name ***Scientific Name***	**Status[2]**	**General Habitat Description[3]**	**Potential for Occurrence in the BSA**
Southern Riparian Forest			**Absent**
Southern Riparian Scrub			**Absent**
Southern Sycamore Alder Riparian Woodland			**Absent**
Southern Willow Scrub			**Absent**
Valley Needlegrass Grassland			**Absent**

[1] Special-status plant species and sensitive natural communities known from the CNDDB and CNPS to occur on the El Toro, Tustin, Orange, Black Star Canyon, Corona South, Santiago Peak, Laguna Beach, San Juan Capistrano, and Canada Gobernadora quadrangles, and from a search of the IPaC for the project vicinity.

[2] Sensitivity Status Codes

Federal
- **FT** - Federally Threatened under the Federal Endangered Species Act
- **FE** - Federally Endangered under the Federal Endangered Species Act
- **FC** – A Federal Candidate for listing under the Federal Endangered Species Act

State
- **ST** - State Threatened under the California Endangered Species Act
- **SE** - State Endangered under the California Endangered Species Act

CRPR — CNPS California Rare Plant Rank (CRPR)
- **1A:** Plants presumed extinct in California
- **1B**: Plants rare, threatened, or endangered in California and elsewhere
- **2**: Plants rare, threatened, or endangered in California, but more common elsewhere
- **3**: Plants more information is needed for
- **4**: Plants of limited distribution – a watch list
  - **0.1**: Seriously threatened in California
  - **0.2**: Fairly endangered in California
  - **0.3**: Not very endangered in California

[3] General Habitat Descriptions from CNPS.

Table B
Special-Status Wildlife Species[1]

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA[4]
Invertebrates			
Crotch bumble bee *Bombus crotchii*	Federal: None State: CE Other: CNDDB	Occurs at relatively warm and dry sites, including the inner Coast Range of California and the margins of the Mojave Desert.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
San Diego fairy shrimp *Branchinecta sandiegonensis*	Federal: FE State: None Other: NCCP	Occurs in vernal pools from 5-30 centimeters deep at temperatures between 10-20°C (50-68°F). Occasionally found in ditches and road ruts that support suitable conditions.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Riverside fairy shrimp *Streptocephalus wootoni*	Federal: FE State: None Other: NCCP	Occurs in vernal pools at least 30 centimeters in depth. Found in Riverside and San Diego counties, as well as northern Baja California.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
monarch butterfly-California overwintering population *Danaus plexippus pop. 1*	Federal: None State: None Other: CNDDB	Winter roosts occur along California coast from Mendocino County, south to Baja California, Mexico. Roosts in wind-protected tree groves (eucalyptus, Monterey pine, cypress) with nectar and water sources nearby.	**Not Expected.** Potentially suitable tree groves are absent from the BSA and there are no suitable water sources nearby.
quino checkerspot butterfly *Euphydryas editha quino*	Federal: FE State: None Other: NCCP	Occurs in coastal sage scrub habitats in southern California and northern Baja California. Larvae rely on host plants *Plantago erecta* or *Castilleja exserta* found in meadows and upland sage scrub/chaparral.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the host plant for this species was not detected within the BSA.
San Gabriel chestnut *Glyptostoma gabrielense*	Federal: None State: None Other: CNDDB	Found in humid areas in rocky hills and mountains at low elevations.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
mimic tryonia (=California brackishwater snail) *Tryonia imitator*	Federal: None State: None Other: CNDDB	Prefers coarse brackish sediments at the mouths of creeks, streams and rivers of southern California.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Fish			
Santa Ana sucker *Catostomus santaanae*	Federal: FT State: None	Inhabits permanent streams and rivers, with depths from a few centimeters to over a meter. Water must be cool with variable flows. Substrates of gravel, rubble and boulders are preferred for foraging and required for breeding.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA[4]
tidewater goby *Eucyclogobius newberryi*	Federal: FE State: None Other: SSC	Occurs in small coastal lagoons, lower reaches of streams, and uppermost portions of large bays. Most abundant in the upper ends of lagoons created by small coastal streams. In lower sections of coastal streams, occurs in fresh to brackish water (preferably less than 10 ppt).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
arroyo chub *Gila orcuttii*	Federal: None State: None Other: SSC	Found in headwaters, creeks, and small to medium rivers, often intermittent streams; permanent, small to moderate-sized, moderate to high gradient streams with more than 50% of the habitat as runs and pools < 10 cm deep and reaches of permanent water more than 2 km long; requires some flow.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
steelhead – southern California DPS *Oncorhynchus mykiss irideus pop.10*	Federal: FE State: None	Found in Pacific Ocean tributaries from Aleutian Islands in Alaska south to Southern California. Anadromous forms are known as steelhead, freshwater forms as rainbow trout.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Santa Ana speckled dace *Rhinichthys osculus ssp. 3*	Federal: None State: None Other: SSC	Inhabits a variety of habitats, including perennial streams, riffles dominated by gravel and cobble, and pools in low-gradient streams. Mainly found in areas that maintain summer water temperatures below 68 °F (20 °C).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Reptiles			
southern California legless lizard *Anniella stebbinsi*	Federal: None State: None Other: SSC	Found in a broader range of habitats than any of the other species in the genus. Often locally abundant, specimens are found in coastal sand dunes and a variety of interior habitats, including sandy washes and alluvial fans.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
California glossy snake *Arizona elegans occidentalis*	Federal: None State: None Other: SSC	Most common is desert habitats but also occur in chaparral, sagebrush, valley-foothill hardwood, pine-juniper, and annual grass.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
orange-throated whiptail *Aspidoscelis hyperythra*	Federal: None State: None Other: WL, NCCP	Inhabits washes, streams, terraces, and other sandy areas often where there are rocks and patches of brush and rocky hillsides. Frequent coastal chaparral, thorn scrub and streamside growth.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA[4]
coastal whiptail *Aspidoscelis tigris stejnegeri*	Federal: None State: None Other: SCC, NCCP	Found in deserts and semiarid areas with sparse vegetation and open areas. Also occurs in woodland and riparian areas. Substrate may be firm, sandy, or rocky soils.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
red-diamond rattlesnake *Crotalus ruber*	Federal: None State: None Other: SSC, NCCP	Occurs in coastal sage scrub, chamise chaparral, redshank, desert slope scrub, desert washes, grassy fields, orchards, cactus patches, and rocky areas.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
western pond turtle *Emys marmorata*	Federal: None State: None Other: SSC	Inhabits permanent or nearly permanent bodies of water in many habitat types, below 1,830 meters (6,000 feet). Requires basking sites such as partially submerged logs, vegetation mats, or open mud banks. Also needs suitable nesting sites.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
coast horned lizard *Phrynosoma blainvillii*	Federal: None State: None Other: SSC, NCCP	Inhabits coastal sage scrub and chaparral in arid and semiarid climates. Prefers friable, rocky, or shallow sandy soils.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
coast patch-nosed snake *Salvadora hexalepis virgultea*	Federal: None State: None Other: SSC	Inhabits brushy chaparral habitats dominated by chamise and redshank, as well as riparian areas.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
two-striped garter snake *Thamnophis hammondii*	Federal: None State: None Other: SSC	Highly aquatic, found in or near permanent freshwater, often along streams with rocky beds and riparian growth. Known from coastal California from the vicinity of Salinas to northwest Baja California, from sea level to about 2,135 meters (7,000 feet).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Amphibians			
arroyo toad *Anaxyrus californicus*	Federal: FE State: None Other: SSC, NCCP	Requires shallow, slow moving stream and riparian habitat, with extensive braided channels and sediment deposits of sand, gravel, or pebbles, occasionally reworked by flooding. Tadpoles may require 2-4 years to complete their aquatic development.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
western spadefoot *Spea hammondii*	Federal: None State: None Other: SSC, NCCP	Grasslands with shallow temporary pools are optimal habitats for the western spadefoot. Elevations of occurrence extend from near sea level to 1,360 meters (4,460 feet). This species occurs primarily in	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA[4]
		grasslands, but occasional populations also occur in valley-foothill hardwood woodlands.	
Coast Range newt *Taricha torosa*	Federal: None State: None Other: SSC	Endemic to California. Found in wet forests, oak forests, chaparral, and rolling grasslands. In southern California, drier chaparral, oak woodland, and grasslands are used.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Birds			
Cooper's hawk *Accipiter cooperii*	Federal: None State: None Other: WL	Inhabits dense stands of live oak, riparian deciduous, or other forest habitats near water. Nests in deciduous riparian areas, usually near streams. Species has become a fairly common urban/suburban bird in southern California.	**Low:** This species is common in urbanized areas across southern California and a CNDDB record of this species from 2016 occurs approximately one mile southwest of the BSA along San Diego Creek. This species may fly over or occur within the BSA as a transient migrant or forager. Mature trees in the BSA may provide suitable nesting habitat; however, this species prefers nesting in riparian habitats and is not expected to nest in the BSA.
tricolored blackbird *Agelaius tricolor*	Federal: None State: ST Other: SSC	Inhabits annual grasslands, wet and dry vernal pools, seasonal wetlands. Frequently found in and around agricultural areas.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
southern California rufous-crowned sparrow *Aimophila ruficeps*	Federal: None State: None Other: WL, NCCP	Resident of southern California coastal sage scrub and sparse mixed chaparral. Frequents relatively steep, often rocky hillsides with grass and forb patches.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
grasshopper sparrow *Ammodramus savannarum*	Federal: None State: None Other: SSC	Prefers moderately open grasslands with scattered shrubs such as California buckwheat and California sagebrush.	**Not Expected.** The BSA lacks scattered native scrubs preferred by this species and the nearest record is from 2003 and is approximately 4-5 miles south of the BSA. As a result, this species is not expected to occur within the BSA. Potentially suitable habitat for this species is absent from the BSA.

Common Name ***Scientific Name***	**Status[2]**	**General Habitat Description[3]**	**Potential for Occurrence in the BSA[4]**
golden eagle *Aquila chrysaetos*	Federal: None State: None Other: BGE, FP, NCCP	Prefers rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, and cliffs and rock outcrops. Uncommon permanent resident and migrant throughout California, except center of Central Valley. Ranges from 0-3,830 meters (0-11,500 feet). Habitat typically includes rolling foothills, mountain areas, sage-juniper flats, and desert.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
great blue heron *Ardea herodias*	Federal: None State: None Other: CNDDB	Prefers shallow estuaries and fresh and saline emergent wetlands.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
long-eared owl *Asio otus*	Federal: None State: None Other: SSC	Prefers dense foliage, such as willow thickets and evergreen trees. Nests in conifer groves adjacent to open fields and wetlands.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
burrowing owl *Athene cunicularia*	Federal: None State: None Other: SSC	Inhabits open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, California ground squirrel.	**Not Expected.** Although two 2010 records of this species occur within 2 miles of the BSA and conditions onsite are marginally suitable, no indications of this species presence onsite (i.e. suitable burrows, owl pellets, white-wash) were observed during the field survey. As a result, this species is not expected to occur within the BSA.
ferruginous hawk *Buteo regalis*	Federal: None State: None Other: WL	Inhabits arid grasslands and adjacent farmlands. Nests in isolated trees or on rock outcrops.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
coastal cactus wren *Campylorhynchus brunneicapillus sandiegensis*	Federal: None State: None Other: SSC, NCCP	Inhabits cactus scrub complexes that can include *Rhus* sp. Presence of cholla cactus is preferred, as well as large dense stands of cactus.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
western snowy plover *Charadrius nivosus*	Federal: FT State: None Other: SSC	Inhabits coastal beaches, coastal dunes, beaches at creek and river mouths, and salt pans at lagoons and estuaries. Less common habitat includes dredged material disposal sites, salt pond levees, dry salt ponds, and river bars.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA[4]
northern harrier *Circus hudsonius*	Federal: None State: None Other: SSC, NCCP	Found in meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands, and occasionally in wooded areas. Occurs from 0-3,000 meters (0-10,000 feet).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
western yellow-billed cuckoo *Coccyzus americanus occidentalis*	Federal: FT State: SE	Found in valley foothill and desert riparian habitats across California. Breeding pairs are known to reside in the Sacramento and Owens valleys and along the Kern, Santa Ana, Amargosa, and San Luis Rey rivers.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
yellow rail *Coturnicops noveboracensis*	Federal: None State: None Other: SSC	Inhabits sedge marshes and meadows with moist soil or shallow standing water.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
white-tailed kite *Elanus leucurus*	Federal: None State: None Other: FP	Inhabits herbaceous and open stages of most habitats, primarily in cismontane California. Prefers undisturbed, open grasslands, meadows, farmlands, and emergent wetlands for foraging.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
southwestern willow flycatcher *Empidonax traillii extimus*	Federal: FE State: SE Other: NCCP	Found in riparian woodlands in Southern California.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
California horned lark *Eremophila alpestris actia*	Federal: None State: None Other: WL	Prefers expansive open areas, with barren or sparsely vegetated ground, such as beaches, plowed fields and occasionally parking lots or runways.	**Low.** Although site conditions may be suitable for this ground-nesting species, the nearest record of this species is from 2003 and occurs approximately 4 miles south of the BSA.
American peregrine falcon *Falco peregrinus anatum*	Federal: Delisted State: Delisted Other: FP, NCCP	Frequents bodies of water in open areas with cliffs and canyons nearby for cover and nesting. Also know to nest on tall buildings or bridges within urban environments.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
bald eagle *Haliaeetus leucocephalus*	Federal: Delisted State: SE Other: BGE, FP	Occurs as a local winter migrant of inland waters in southern California, including at Big Bear Lake, Cachuma Lake, Lake Mathews, Nacimiento Reservoir, San Antonio Reservoir, and along the Colorado River.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
yellow-breasted chat *Icteria virens*	Federal: None State: None Other: SSC	Occurs in dense tangled brushy patches, hedgerows and wood edges, in open sunny areas and along riparian woodland ecotones.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA[4]
California black rail *Laterallus jamaicensis coturniculus*	Federal: None State: ST Other: FP	Inhabits saline, brackish, and fresh emergent wetlands.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Belding's savannah sparrow *Passerculus sandwichensis beldingi*	Federal: None State: SE	Inhabits southern coastal wetlands.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
coastal California gnatcatcher *Polioptila californica*	Federal: FT State: None Other: SSC, NCCP	Obligate, permanent resident of coastal sage scrub below 2.500 feet (760 meters) in southern California. Inhabits low, coastal sage scrub in arid washes, on mesas and slopes.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
light-footed Ridgway's rail *Rallus obsoletus levipes*	Federal: FE State: SE Other: FP	Resident of coastal wetlands in southern California.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
yellow warbler *Setophaga petechia*	Federal: None State: None Other: SSC	Occupy riparian vegetation in close proximity to water along streams and in wet meadows. Associated with willows and cottonwoods.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
California least tern *Sternula antillarum browni*	Federal: FE State: SE Other: FP	Found along coastal beaches, bays, large rivers, and salt flats. Known to feed in shallow coastal waters and occasionally inland.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
least Bell's vireo *Vireo bellii pusillus*	Federal: FE State: SE Other: NCCP	Summer resident of southern California in low riparian habitat in vicinity of water or in dry river bottoms, below 620 meters (2,000 feet).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Mammals			
pallid bat *Antrozous palidus*	Federal: None State: None Other: SCC, WBWG-H	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rock areas for roosting. Roosts must protect bats from high temperatures; very sensitive to disturbance of roosting sites.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
northwestern San Diego pocket mouse *Chaetodipus fallax*	Federal: None State: None Other: SSC	Found in coastal scrub, chamise-redshank chaparral, mixed chaparral, sagebrush, desert wash, desert scrub, desert succulent scrub, pinyon-juniper, and annual grassland habitats. Prefers sandy herbaceous areas with rocks or course gravel. Occurs in Riverside, San Bernardino, and San Diego counties from 0-1,350 meters (0-4,500 feet).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA[4]
Mexican long-tongued bat *Choeronycteris mexicana*	Federal: None State: None Other: SSC, WBWG-H	In California, mostly known from urban habitats in San Diego county. In New Mexico and Arizona, found in desert and montane riparian, desert succulent shrub, desert scrub, and pinyon-juniper habitats from 0-2,400 meters (0-6,000 feet).	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Stephens' kangaroo rat *Dipodomys stephensi*	Federal: FE State: ST	Found from San Jacinto Valley in Riverside County to the vicinity of Vista in San Diego County. Prefers grassland habitats, but also found in open coastal scrub or sagebrush and disturbed areas.	**Not Expected.** Although onsite habitat is potentially suitable for this species, it is not known to occur in Orange County.
western mastiff bat *Eumops perotis californicus*	Federal: None State: None Other: SCC, WBWG-H	Known from open semiarid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grassland, and chaparral. Roosts in crevices in cliff faces, high buildings, trees, and tunnels. Roost locations are generally high above the ground providing a 3-meter minimum clearance below the entrance for flight. Requires large open-water drinking sites.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
western red bat *Lasiurus blossevillii*	Federal: None State: None Other: SCC, WBWG-H	Prefers edges or habitat mosaics that have trees for roosting and open areas for foraging. Roosting habitat includes forests and woodlands from sea level up through mixed conifer forests. Feeds over a wide variety of habitats including grasslands, shrublands, open woodlands and forests, and croplands. Not found in desert areas	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
western yellow bat *Lasiurus xanthinus*	Federal: None State: None Other: SSC, WBWG-H	Occurs below 600 meters (2,000 feet) in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees and palms.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Yuma myotis *Myotis yumanensis*	Federal: None State: None Other: WBWG-LM	Distribution is closely tied to bodies of water, which it uses as foraging sites and sources of drinking water. Found in a wide variety of habitats ranging from sea level to 3,300 meters (11,000 feet), but it is uncommon to rare above 2,560 meters (8,000 feet). Optimal habitats are open forests and woodlands with sources of water over which to feed.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*	Status[2]	General Habitat Description[3]	Potential for Occurrence in the BSA[4]
San Diego desert woodrat *Neotoma lepida intermedia*	Federal: None State: None Other: SCC, NCCP	Found in coastal scrub of southern California from San Diego County to San Luis Obispo County. Moderate to dense canopies preferred. They are particularly abundant in rock outcrops and rocky cliffs and slopes.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
pocketed free-tailed bat *Nyctinomops femorosaccus*	Federal: None State: None Other: SSC, WBWG-M	Occurs in pinyon-juniper woodlands, desert scrub, desert succulent scrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis habitats. Roost in rock crevices, caverns, or buildings.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
big free-tailed bat *Nyctinomops macrotis*	Federal: None State: None Other: SSC, WBWG-MH	Often found in urban areas. Roost in buildings, caves, hollow trees, high cliffs, and rocky outcrops.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
southern grasshopper mouse *Onychomys torridus ramona*	Federal: None State: None Other: SSC	Prefers alkali desert scrub and other desert scrub habitats. Also occurs in succulent shrub, wash, riparian, coastal scrub, mixed chaparral, sagebrush, low sage, and bitterbrush habitats.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Pacific pocket mouse *Perognathus longimembris pacificus*	Federal: FE State: None Other: SSC, NCCP	Inhabits areas with fine-grained sandy substrates in coastal dunes, river alluvium, and coastal sage scrub habitats within 3 miles of the ocean.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
southern California saltmarsh shrew *Sorex ornatus salicornicus*	Federal: None State: None Other: SSC	Occurs in coastal salt marshes, preferring those dominated by pickleweed and saltgrass.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
American badger *Taxidea taxus*	Federal: None State: None Other: SCC	Uncommon, permanent resident found throughout most of the state, except in the northern North Coast area. Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and burrows suitable for the species were not observed during the field survey.

[1] Special-status wildlife species known from the CNDDB and NMFS databases to occur in the El Toro, Tustin, Orange, Black Star Canyon, Corona South, Santiago Peak, Laguna Beach, San Juan Capistrano, and Canada Gobernadora quadrangles, and from a search of IPaC for the project vicinity.

[2] Sensitivity Status Codes

Federal **FT** – Federally Threatened under Federal Endangered Species Act (FESA)
FE – Federally Endangered under FESA

State **ST** – State Threatened under California Endangered Species Act (CESA)
SE – State Endangered under CESA
SC – State Candidate for listing under CESA

Other **BGE** – Bald and Golden Eagle Protection Act
SSC – Designated as a Species of Special Concern by CDFW

WL – Designated as a Watch List species by CDFW
CNDDB – Tracked by CDFW in the CNDDB or considered locally sensitive
WBWG-H – Designated by the Western Bat Working Group (WBWG) as High Priority - species that are imperiled or are at high risk of imperilment
WBWG-M – Designated by the WBWG as Medium Priority – a level of concern that should warrant closer evaluation, more research, and conservation actions of both species and possible threats
WBWG-L – Designated by the WBWG as Low Priority – an indication that existing data supports stable populations of the species and that the potential for major changes in status in the future is considered unlikely

[3] General Habitat Descriptions from CDFW and NMFS.
[4] References to historical species occurrences taken from the CNDDB (CDFW 2020a).

Appendix D
Technical Memorandum
Cultural Resources

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority

550 S. Main St.
Orange, CA 92868

And

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

AECOM
300 S. Grand Ave.
Los Angeles, CA 90071

September 2023

REVISION	DESCRIPTION	DATE
0	Draft Cultural Resources Technical Memorandum	01/08/21
1	Draft Cultural Resources Technical Memorandum (Incorporating OCTA's comments)	03/17/21
2	Draft Cultural Resources Technical Memorandum (Incorporating Independent Reviewer's comments)	08/24/21
3	Draft Cultural Resources Technical Memorandum (Incorporating Independent Reviewer's comments and results of Native American AB 52 consultation)	10/04/21
4	Draft Cultural Resources Technical Memorandum (Incorporating comments from OCTA)	11/18/2021
5	Draft Cultural Resources Technical Memorandum (Incorporating comments from OCTA)	12/13/2021
6	Update of Mitigation Measures per coordination with Kizh Nation	5/2/2022
7	Final Cultural Resources Technical Memorandum	09/22/2023

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1. INTRODUCTION

The Southern California Regional Railroad Authority (SCRRA) Metrolink Commuter Rail System (Metrolink) is proposing to construct a new Orange County Maintenance Facility (hereafter referred to as "OCMF" or "the Project"). The Project would include several facilities including a transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth, sand silos, a maintenance facility, a maintenance facility extension, and 11 tracks. Approximately 80 employees would report to the Project. The Project consists of buildings that would have a total building area of approximately 90,000 square feet when combined. Metrolink currently operates two maintenance facilities across its service area: Central Maintenance Facility (CMF) in Los Angeles and Eastern Maintenance Facility (EMF) in San Bernardino County. Due to projected population expansion within its service area and the agency's goal to be prepared for the 2028 Los Angeles Summer Olympic Games, Metrolink will require an increased number of commuter rail services, as well as additional train storage and maintenance facilities associated with an increased fleet size. As a significant proportion of the expanded services will operate in Orange County, the Project would provide an optimal location for a new Metrolink maintenance facility. Metrolink's member agency, the Orange County Transportation Authority (OCTA), proposes to build this facility on an OCTA-owned parcel in the City of Irvine. OCTA is the lead agency under the California Environmental Quality Act (CEQA). The City of Irvine and SCRRA are the responsible agencies under CEQA.

The purpose of this memorandum is to present the results of a cultural resources investigation and to describe the potential impacts to historic properties as defined by Section 106 of the National Historic Preservation Act (NHPA), or cultural resources as defined by CEQA, that may be associated with the Project.

2. PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

As a result of the projected population expansion within the five-county area (Orange County, Los Angeles County, San Bernardino County, Riverside County, and Ventura County) currently served by the SCRRA, Metrolink will require an increased number of commuter rail services to support the growth. Consequently, the Metrolink system (Figure 2.1-1) would require additional train storage and maintenance facilities to support an increased fleet size.

Metrolink's CMF facility is located on the east bank of the Los Angeles River near the Interstate 5 (I-5) and Interstate 10 (I-10) highways, just south of the location of the former Southern Pacific Taylor Yard. The CMF is currently near capacity, which will impact the ability to provide the necessary train servicing for planned service-expansion of various Metrolink lines throughout the system under the Southern California Optimized Rail Expansion (SCORE) program. By transferring a portion of the current fleet from CMF to the proposed OCMF (specifically the Orange County Line trains), capacity for the non-Orange County trains will be increased at CMF. The Orange County Line has the highest ridership within the Metrolink system; therefore, a maintenance facility to serve the Orange County area with sufficient storage and servicing capabilities for both locomotives and rail cars is critical to controlling operating costs. In order to optimize

rail service in the region, the proposed facility development would need to be completed by 2028. The SCORE program may also require heavy overhaul capabilities at OCMF, subject to pending decisions regarding fleet technology and management.

Figure 2.1-1 Metrolink System Map



Source: SCRRA (2019)

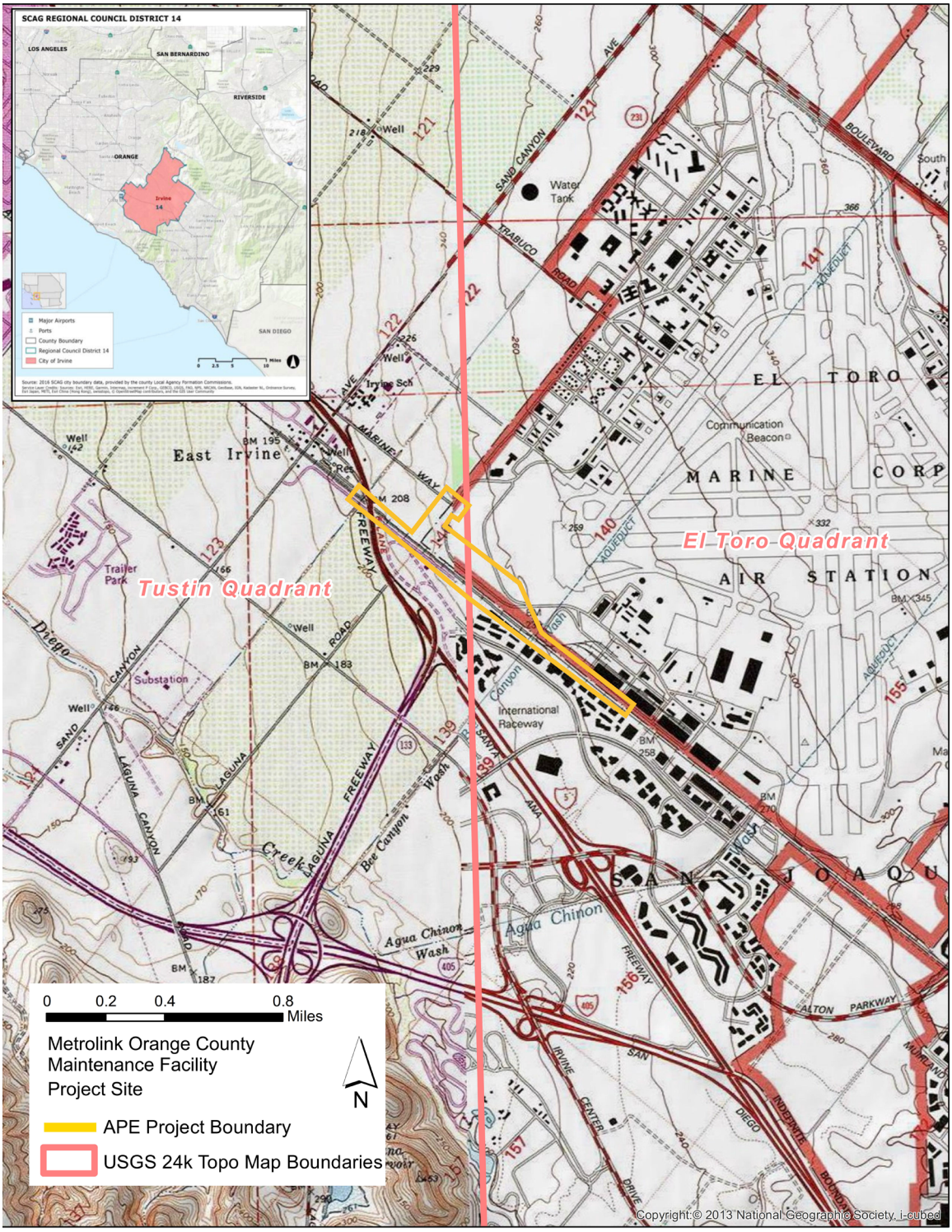
The expansion of Orange County and overall Metrolink commuter rail service will ultimately require additional or expanded equipment servicing capabilities for both locomotives and rail cars. Since a significant portion of the fleet will be in Orange County, a maintenance facility located along the Metrolink route through Orange County would be the optimal location as it would reduce operating costs by limiting non-revenue moves to the existing SCRRA storage and maintenance facilities in the cities of Los Angeles and San Bernardino. The proposed maintenance facility would provide equipment to inspect, clean, and maintain cars and locomotives on a regular and efficient basis. Much of the inspection and maintenance activity is federally mandated and must be performed at specific intervals. The OCMF will also provide refueling services thus reducing fuel costs, reducing fuel consumption, and will reduce emissions. Currently trains operating in the Orange County Region must travel either the CMF or EMF for refueling, which are sometimes non-revenue runs. The location of the Project is on a 21.3-acre OCTA-owned parcel on Ridge Valley south of Marine Way in the City of Irvine (Project Site). The Project Site is located within the boundaries of a closed military base (Marine Corps Air Station [MCAS] El Toro) formerly owned by the United States Department of the Navy (DON). After MCAS El Toro was closed, the site was quitclaimed by the Navy to Heritage Fields El Toro, LLC in 2011, and then by way of grant deed conveyed by Heritage Fields to the City of Irvine that same year. OCTA then purchased the fee ownership of the Project Site from the City of Irvine. Regional vehicle access to the Project Site is from I-5 at Sand Canyon Avenue. Local vehicle access is via Marine Way to Ridge Valley.

Prior to the current construction of the storage/set-out track, the Project Site was mostly vacant. The site currently includes 1,000-foot-long storage for miscellaneous rail equipment including temporary railroad bridges, signal houses, railroad ties, and signal components. Although not part of the Project, OCTA is currently installing a single 1,000-foot-long, single-ended storage track and fencing of the perimeter of the property to provide temporary storage of two trainsets and/or track maintenance equipment when necessary. There is a segment of an abandoned road, stormwater drains, and underground water transfer vault with a network of pipelines, valves and associated vents, that are currently not in use.

2.2 PROJECT DESCRIPTION

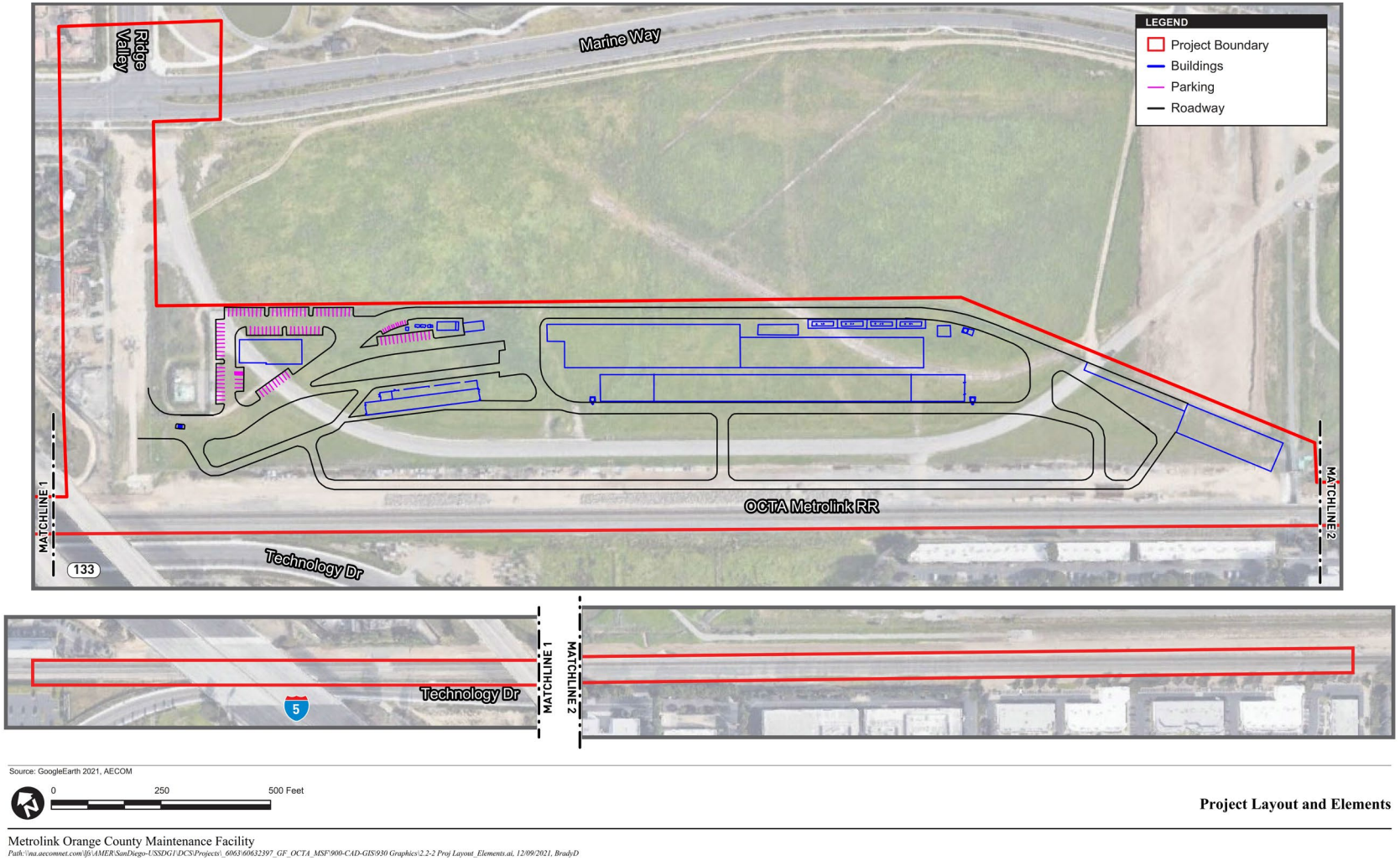
The OCMF would be located in the City of Irvine, on a 21.3-acre parcel owned by OCTA and adjacent to Marine Way and the Metrolink Orange subdivision between mileposts 183.50 and 184.00 on Metrolink's "Orange" Subdivision (Figure 2.2-1 and Figure 2.2-2). The Project Site is located within Planning Area 51 of the updated City of Irvine General Plan, adopted in June 2015, and designated for the Great Park (formerly known as the Orange County Great Park (OCGP)) land use under the General Plan. Per the City's zoning ordinance, the proposed use is a conditionally allowable use under the existing zone; therefore, OCTA is submitting a Conditional Use Permit to the City of Irvine for approval.

Figure 2.2-1 Project Location



Source: ESRI (2021), OCTA (2021)

Figure 2.2-2 Project Layout and Elements



Source: ESRI (2021), OCTA (2021)

The Project would be developed in two phases with an anticipated completion date of 2028. Phase 1 focuses on developing facilities needed for the storage and routine cleaning, inspection and servicing of the anticipated trainsets. The total area of the Phase 1 buildout would be approximately 20,996 square feet and would be comprised of the following facilities: the transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth and sand silos (Table 2.2-1). A total of 11 tracks would be built. The Phase 1 layout situates the train wash, fueling/sanding, and service and inspection tracks on the two tracks with the greatest tangent length, which are the ones nearest the railroad right of way ("ROW"). This is important in fitting a second fueling/sanding facility so that there is one at each end of the service and inspection platform to support having the locomotive at either end, all within tangent track. Additionally, six storage tracks and appurtenant features (air, water, head end power and toilet dump facilities) would be constructed. The storage tracks would be built near the middle of the site east of the service and inspection tracks. Phase 1 of the buildout would anticipate approximately 52 employees total throughout the entire day, split across three eight-hour shifts.

Table 2.2-1 Building Specifications

Building/Facility/Item	Building Area	Building Height
Transportation Building	7,495 sq. ft.	20 ft
Train Wash Building	11,110 sq. ft.	21 ft
Maintenance Building	40,392 sq. ft.	48 ft
Maintenance Building Expansion	27,880 sq. ft.	---
Utility Building	981 sq. ft.	20 ft
Pump House	750 sq. ft.	14 ft
Guard Booth	36 sq. ft.	---
Equipment Booth	48 sq. ft.	---
Sand Silos (2 Total)	576 sq. ft.	---
Total	89,268 sq. ft.	

Source: Gannett Fleming, Metrolink (February 2022)
Note: sq. ft. = square feet; ft = feet

A runaround track would be provided between the service and inspection tracks and storage tracks. Additionally, two temporary stub-ended set out tracks would be provided in the Phase 1 layout that occupies the footprint of the future shop tracks (one at the north and one at the south end of the yard). These set out tracks would be converted to shop access tracks in Phase 2 and, therefore, would no longer be available as set out tracks. A new set out track would then be provided as part of Phase 2.

A transportation building that would be utilized for administrative purposes is also included in Phase 1. This building would house managerial offices, welfare spaces for train crews and on-site personnel. This facility would include restrooms, showers, locker rooms, a break/day room, vending space and a kitchenette.

Parking would be provided for staff reporting to the site. Fire department compliant roadways would be developed to permit circulation of the site for Metrolink vehicles as well as delivery trucks (sand and fuel).

Phase 2 completes the full buildout of the Project. It would include development of the maintenance shop building and its future extension that would comprise of a total buildout area of 68,272 square feet (Table 2.2-1). The shop would have capabilities to perform regular three-month, six-month, and one-year preventive maintenance cycles on trainsets. Phase 2 of the buildout would consist of approximately 28 employees. With the full buildout of Phase 1 and Phase 2, approximately 80 employees are expected to access the Project Site daily, split across three eight-hour shifts.

Access to the OCMF would require a roadway extension along Ridge Valley from the intersection of Ridge Valley and Marine Way. The Project includes the southern extension of Ridge Valley Road from Marine Way and associated traffic signal improvements to provide access to the OCMF.

The 11 new east and west lead tracks, as discussed in this section above, would be constructed within the existing railroad corridor between MP 183.0 and MP 184.00 on Metrolink's "Orange" Subdivision to connect the existing mainline railroad to the proposed OCMF rail yard. A new single span concrete bridge over the Bee Canyon Channel (Channel) would be built for the east lead track. A segment of the Channel and utilities that are found to be in conflict would be lowered by approximately 2.5 feet to facilitate the construction of the bridge.

3. ENVIRONMENTAL SETTING

3.1 REGULATORY FRAMEWORK

3.1.1 National Environmental Policy Act and National Historic Preservation Act

Federal agencies must consider the effects of proposed projects on historic properties and natural resources. Lead agencies evaluate potential impacts under the National Environmental Policy Act (Public Law 91-190; NEPA) and potential effects under the NHPA (16 USC 470) to "historic properties," which are defined as resources that are listed in or eligible for listing in the National Register of Historic Places (NRHP), in an effort to avoid potential significant impacts and adverse effects. Resources that may be eligible for listing in the NRHP include districts, sites, buildings, structures, and objects that are at least 50 years old and are significant in American history, prehistory, architecture, archaeology, engineering, and/or culture. To be eligible for listing, the resource must meet one of the NRHP Criteria for Evaluation (A–D) (36 Code of Federal Regulations [CFR] 60.4), as follows:

A. A property is associated with events that have made a significant contribution to the broad patterns of our history; or

B. A property is associated with the lives of a person or persons significant in our past; or

C. A property embodies the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possesses high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction; or

D. A property has yielded, or may be likely to yield, information important in prehistory or history.

In addition, historic properties must possess integrity of location, design, setting, material, workmanship, feeling, and association.

Resources younger than 50 years may be eligible if they have exceptional importance and meet Criteria Consideration G, as described in Bulletin No. 22 from the National Park Service (NPS), *How to Evaluate and Nominate Potential National Register Properties that have Achieved Significance Within the Last 50 Years* (Sherfy and Luce 1998). Other types of resources that are typically not eligible for the NRHP, including religious properties, moved properties, birthplaces or graves, cemeteries, reconstructed properties, and commemorative properties, may be eligible under other specific NRHP criteria considerations.

NEPA requires that environmental impacts to historic properties be evaluated and addressed during the environmental review process in coordination with procedures established by Section 106 of the NHPA to address effects on historic properties. A significant impact and/or an adverse effect would occur if a project would directly or indirectly diminish any of the characteristics that qualify a historic property for NRHP eligibility or listing. Under NEPA, a significant impact may be resolved with mitigation measures to avoid the impact or to reduce the impact to a level of less than significant. Under Section 106 of the NHPA, adverse effects must be resolved through a consultation process between the federal lead agency, the State Historic Preservation Office, interested parties, and the Advisory Council on Historic Preservation (ACHP). If an adverse effect cannot be avoided, mitigation may be agreed upon and documented in a signed Memorandum of Agreement to resolve the adverse effect. If mitigation is not agreed upon through the Section 106 process, consultation is terminated and the ACHP may make comments on the procedure.

3.1.2 California Environmental Quality Act

CEQA (Public Resources Code [PRC] Sections 21000–21177) is intended to prevent significant avoidable impacts to the environment by requiring feasible alternatives or mitigation measures. If cultural resources are identified within the Project Site, the sponsoring agency must take those resources into consideration when evaluating project effects. The level of consideration may vary with the importance of the cultural resource.

A cultural resource is considered to be a "historical resource" under CEQA if the resource meets the criteria for listing in the California Register of Historical Resources (CRHR) (PRC Section 5024.1, Title 14 California Code of Regulations [CCR], Section 4852). The CRHR was designed to be used by state and local agencies, private groups and citizens to identify existing historical resources within the state and to indicate which of those resources should be protected, to the extent prudent and feasible, from substantial adverse change. The criteria for the CRHR (PRC Section 5024.1, Title 14 CCR, Section 4852) are consistent with the criteria for the NRHP, but generally focus on resources of statewide, rather than national, significance. To be eligible for listing in the CRHR, a property generally must be at least 50 years of age and possess significance at the local, state, or national level, under one or more of the following four criteria:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;
2. It is associated with the lives of persons important to local, California, or national history;
3. It embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values; and/or
4. It has yielded, or has the potential to yield, information important in the prehistory or history of the local area, California, or the nation.

Potential historical resources eligible for listing in the CRHR may include buildings, sites, structures, objects and historic districts. A resource less than 50 years of age may be eligible if it can be demonstrated that sufficient time has passed to understand its historic importance. While the criteria for the CRHR is less rigorous than the NRHP with regard to the issue of integrity, there is the expectation that properties reflect their appearance during their period of significance (Title 14 CCR, Section 4852).

Archaeological resources identified as "unique archaeological resources" are similarly protected by Division 13, Chapter 2.6, of the Public Resources Code. A "unique archaeological resource" is defined as an archaeological resource that:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person. (PRC Division 13, Chapter 2.6, 21083.2[g])

An archaeological resource that is considered nonunique need be given no additional consideration other than its existence being recorded, unless it is determined to be a tribal cultural resource.

3.1.3 Public Resources Code Section 5097.5

PRC Section 5097.5 states that no person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate

paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological, or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor. "Public lands" refers to land owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

3.1.4 Public Resources Code Section 5097.9-5097.991

PRC Section 5097.9 protects the free expression of Native American religion. Section 5097.91 creates the Native American Heritage Commission (NAHC) to coordinate with state agencies. Section 5097.94 empowers the NAHC to identify and catalog Native American sacred sites, including graves, thereby creating the Sacred Lands File. The NAHC is also empowered to make recommendations to public agencies to ensure their access and protection. Section 5097.98 mandates County Coroners to notify the NAHC when human remains of Native American origin are identified and provides for the identification of a Most Likely Descendant to advise the respectful treatment of such remains. Section 5097.99 makes it illegal to obtain Native American artifacts or human remains from a burial or cairn except by following the legal process outlined in Section 5097.98, and Section 5097.991 indicates that it is the policy of the State that Native American human remains and grave artifacts be repatriated.

3.1.5 Public Resources Code Section 21074

PRC Section 21074 was added as one of the amendments to CEQA enacted in Assembly Bill (AB) 52. This section creates a new category of resources called tribal cultural resources, which are defined as either of the following:

1. Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
    a. Included or determined to be eligible for inclusion in the CRHR.
    b. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

3.1.6 Public Resources Code Section 21080.3.1

PRC Section 21080.3.1 was also added to the Public Resources Code by AB 52. Section 21080.3.1 recognizes that California Native American tribes which are traditionally and culturally affiliated with a geographic area may have expertise regarding potential tribal cultural resources that may be impacted by proposed projects. Section 21080.3.1 also mandates that a lead agency consult with geographically and culturally affiliated Native American tribes prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report for a project in order to identify potential impacts to tribal

cultural resources and, if necessary, craft mitigation measures to reduce impacts to tribal cultural resources.

3.1.7 Local Regulations - City of Irvine General Plan

The City of Irvine General Plan includes Element E on Cultural Resources. It recognizes the importance of historical, archaeological and paleontological resources in the City and establishes a process for their early identification, consideration, and where appropriate, preservation. It requires assessment of potential resources on projects and utilizes planning policies, ordinances, approval conditions and mitigation measures to protect the resources.

Cultural resources are the physical remains of the City's historic and prehistoric heritage (City of Irvine, 2015). Historical resources include sites established after 1542 A.D., the date when European contact with California began, which may be significant to history, architecture, or culture. Archaeological resources include any location containing evidence of human activities which took place prior to 1750 A.D. Historical sites established prior to 1750 A.D. are also archaeological sites. Paleontological resources include any location containing a trace of plants or animals from past ages.

3.2 AREA OF POTENTIAL EFFECTS

The Area of Potential Effects (APE or “Project APE”) is defined in 36 CFR 800.16(d) as “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.”

The APE consists of the area where the proposed undertaking has the potential to cause effects on historic properties, and has been delineated to reflect the nature, scale, and location of the Project. The proposed APE includes built resources and historic and cultural landscapes and all areas that could be directly (caused by an action and occurring at the same time and place) or indirectly (caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable) affected by the proposed project, as defined in 40 CFR § 1508.8(a)-(b). The APE has been delineated to include the Project Site and a portion of railroad and right-of-way (which includes access roads, new roads and intersections, new track leads along the rail alignment, and construction staging areas), in which impacts on both archaeological and built environment resources are possible, and adjacent areas to consider the Project’s potential visual, atmospheric, and audible effects on built environment resources near the Project Site. The vertical extent of the APE encompasses the maximum depth of excavation and grading, which may extend up to 10 feet beneath the existing ground surface for the building foundations, and the maximum height of construction, which will extend no more than 30 feet above the existing ground surface for the proposed administration building. The APE, showing historic built resources, is shown in Figure 3.2-1. The APE showing all resources, including previously documented archaeological resources, is depicted in the map in Attachment A.

3.3 EXISTING CONDITIONS

3.3.1 Prehistoric Overview

Geologic maps indicate that the entire Project APE is covered with surficial deposits of Qyf (Morton and Miller 2006). These deposits consist of young Quaternary alluvial fan deposits. They consist of slightly consolidated to cemented deposits of unsorted boulders, cobbles, gravels, and sands deposited by fluvial processes. Shallow Qyf deposits date to the Holocene (approximately 11,650 calibrated radiocarbon years before present to today). These younger Quaternary deposits can be tens of feet thick and overlie older Quaternary alluvium at varying depths.

The earliest occupation of Southern California may be associated with the peoples who first colonized North America in the terminal Pleistocene and earliest Holocene (Arnold et al., 2004). A key indicator of these early cultures are fluted points, which have been reported at a number of locations in Southern California (Rondeau, 2008). Closest to the Project APE, the Farpoint Site (CA-LAN-451) in Malibu, Los Angeles County, has yielded a fluted point, and its excavator argues the site should be associated with the Clovis culture (Stickel, 2008). Clovis is the earliest universally recognized material culture in North America, and dates to approximately 11,500 radiocarbon years before present (B.P.).

However, scholarly consensus holds that the earliest unambiguous evidence of human occupation in the Los Angeles area dates to at least 9000 B.P. and is associated with a period known as the Millingstone Cultural Horizon (Wallace 1955; Warren 1968). Millingstone populations established permanent settlements that were located primarily on the coast and in the vicinity of estuaries, lagoons, lakes, streams, and marshes where a variety of resources, including seeds, fish, shellfish, small mammals, and birds, were exploited. Early Millingstone occupations are typically identified by the presence of handstones (manos) and millingstones (metates), while those Millingstone occupations dating later than 5000 B.P. contain a mortar and pestle complex as well, signifying the exploitation of acorns in the region.

Figure 3.2-1 Area of Potential Effects Map



Source: ESRI, AECOM

0 842 1,684 Feet

1 inch = 842 feet 1:10,100

Metrolink Orange County Maintenance Facility

Although many aspects of Millingstone culture persisted, by 3500 B.P., a number of socioeconomic changes occurred (Erlandson 1994; Wallace 1955; Warren 1968). These changes are associated with the period known as the Intermediate Horizon (Wallace 1955). Increasing population size necessitated the intensification of existing terrestrial and marine resources (Erlandson 1994). This was accomplished in part through use of new technological innovations such as the circular shell fishhook on the coast and, in inland areas, use of the mortar and pestle to process an important new vegetal food staple (acorns); and the dart and atlatl, which resulted in a more diverse hunting capability. Evidence for shifts in settlement patterns has been noted as well at a variety of locations at this time and is seen by many researchers as reflecting increasingly territorial and sedentary populations. The Intermediate Horizon marks a period in which specialization in labor emerged, trading networks became an increasingly important means by which both utilitarian and nonutilitarian materials were acquired, and travel routes were extended.

The Late Prehistoric period, spanning from approximately 1500 years B.P. to the Spanish mission era, is the period associated with the florescence of contemporary Native American groups. The group occupying the southern Channel Islands and adjacent mainland areas of Los Angeles and Orange Counties came to be known as the Gabrielino, after Mission San Gabriel. They are reported to have been second only to their Chumash neighbors in terms of population size, regional influence, and degree of sedentism (Bean and Smith 1978). The boundary between these two groups is commonly believed to be in the area by Topanga Canyon, with the Chumash living along the beaches of Malibu up to the area of Paso Robles and the Gabrielino residing along the coast to southern Orange County. The Gabrielino are estimated to have numbered around 5,000 in the pre-contact period (Kroeber 1925). Maps produced by early explorers indicate the existence of at least 40 Gabrielino villages, but as many as 100 may have existed prior to contact with Europeans (Bean and Smith 1978; McCawley 1996; Reid 1939 [1852]).

Subsistence during the Late Prehistoric period consisted of hunting, fishing, and gathering. Small terrestrial game was hunted with deadfalls and rabbit drives, and by burning undergrowth, while larger game such as deer were hunted using bows and arrows. Fish were taken by hook and line, nets, traps, spears, and poison (Bean and Smith 1978; Reid 1939 [1852]). The primary plant resources were acorns gathered in the fall and processed with mortars and pestles, and various seeds that were harvested in late spring and summer and ground with manos and metates. The seeds included chia and other sages, various grasses, and Islay or holly-leafed cherry (Reid 1939 [1852]).

3.3.2 Historic Overview

Spanish explorers made brief visits to Gabrielino territory in 1542 and 1602, and on both occasions the two groups exchanged trade items (McCawley 1996). Sustained contact with Europeans did not commence until the onset of the Spanish period, which began in 1769 when Gaspar de Portola and a small Spanish contingent began their exploratory journey along the California coast from present-day San Diego to Monterey. The Portola expedition crossed today's Orange County and forded the Santa Ana River on July 28, 1769. On the banks of the river they encountered "a populous village of Indians, who received us with great friendliness" (quoted in McCawley 1996:60).

Several Native American villages are known to have existed on the Santa Ana River plain at about the time of contact. The village encountered by the Portola expedition was probably *Hotuuknga*, which was located near the former location of the Bernardo Yorba adobe, in today's Yorba Linda (McCawley 1996:60). A village named *Pasbengna* was located on the Santa Ana River in the vicinity of today's Santa Ana (McCawley 1996:60). A place called *Moyo* or *Moyoonga*, which may have been a village, was located on what became the Rancho San Joaquin near Newport Bay (McCawley 1996:72). Other villages, some of the names of which were recorded by missionaries or early anthropologists, are known to have existed throughout today's Orange County, but no village centers are known to have existed within the APE.

In the years following the Portola expedition, missions were established across California. Mission San Gabriel Arcàngel was established in 1771 in what is now Whittier Narrows in Los Angeles County. Another location considered for the mission was near the Santa Ana River (McCawley 1996:189). The natives that occupied the northern areas of present-day Orange County became known as the *Gabrieleño* (later anglicized to Gabrielino) because of the mission. Mission San Juan Capistrano was established in 1776 in present-day San Juan Capistrano, and the Native American group in the vicinity became known as the *Juaneño* (Koerper et al. 2002: 64). Missionization brought with it significant and detrimental changes in *Gabrieleño* and *Juaneño* health and cultural integrity.

Alta California became a state when Mexico won its independence from Spain in 1821, and Los Angeles selected its first city council the following year. The authority of the California missions gradually declined, culminating with their secularization in 1834. Although the Mexican government directed that each mission's lands, livestock, and equipment be divided among its converts, the majority of these holdings quickly fell into non-Indigenous hands. Mission buildings were abandoned and quickly fell into decay.

The first party of U.S. immigrants arrived in Los Angeles in 1841, although surreptitious commerce had previously been conducted between Mexican California and residents of the United States and its territories. As the possibility of a takeover of California by the United States loomed large, the Mexican government increased the number of land grants in an effort to keep the land in the hands of upper-class *Californios* such as the Avila, Domínguez, Lugo, and Sepúlveda families (Wilkman and Wilkman 2006:14–17). Governor Pío Pico and his predecessors made more than 600 rancho grants between 1833 and 1846, putting most of the state's lands into private ownership for the first time (Gumprecht 1999).

The project APE lay in the southern portion of the sphere of influence of Mission San Gabriel from its establishment in 1771. In 1842, Governor Juan Bautista Alvarado granted lands that included the project APE to José Sepúlveda as part of Rancho San Joaquin. Throughout the Spanish and Mexican periods the local Native American populations continued to use the land. They also served as the labor on the mission lands and ranchos (Phillips 2010). Writing about a rancho in the San Fernando Valley, one mission father observed in 1795, "These Indians are the cowherds, cattlemen, irrigators, bird-catchers, foremen, horsemen, etc." (Englehardt 1927:5). As time went by the Native Americans were taught additional specialists' skills such as masonry, blacksmithing, carpentry, painting, and Mexican-style ceramics (Frierman 1992; Schuetz-Miller 1994). The same was true of today's Orange County, where Native Americans labored, often with the skills and knowledge of specialists, building wealth for the missions and the rancheros.

The United States took control of California after the Mexican–American War of 1846, and seized Monterey, San Francisco, San Diego, and Los Angeles (then the state capital) with little resistance. Hostilities officially ended with the signing of the Treaty of Guadalupe Hidalgo in 1848, in which the United States agreed to pay Mexico $15 million for the conquered territory, which included California, Nevada, and Utah, and parts of Colorado, Arizona, New Mexico, and Wyoming. The conquered territory represented nearly one-half of Mexico's pre-1846 holdings. California joined the United States in 1850 as the 31st state (Wilkman and Wilkman 2006:15).

The discovery of gold at Sutter's Mill in 1849 led to an enormous influx of people from other parts of the United States in the 1850s and 1860s; these "forty-niners" rapidly displaced the old rancho families. Southern California's prosperity in the 1850s was largely a result of the increased demand for cattle for meat and hides, which was created by the gold rush, and the local ranching community profited handsomely (Bell 1881:26).

James Irvine emigrated from Ireland to California in 1846. Between 1864 and 1876, Irvine created the Irvine Ranch (the predecessor to The Irvine Company) by purchasing three, large, Spanish-Mexican land grants: San Joaquin, Santiago de Santa Ana, and Lomas de Santiago. The Irvine Ranch was initially used for agriculture; farming fruits and vegetables, such as lima beans and oranges, and raising cattle. Irvine also developed water infrastructure by drilling wells and developing the Irvine Ranch water system.

During the 1880s, railroad development in the region put the Irvine Ranch landholdings at the focus of debate. The Southern Pacific Railroad (SPRR) wanted to build a line south to connect to San Diego before its rival the Atchison, Topeka, and Santa Fe Railroad (AT&SF). However, James Irvine despised one of the SPRR's primary investors, Collis Huntington, and refused to allow the railroad a convenient right-of-way across his property. The California Southern Railroad, a subsidiary of the AT&SF, laid a line from San Diego to Oceanside which routed northeast to Temecula, thereby avoiding the Irvine Ranch. However, this line was washed out shortly after its opening in 1882. The more ideal corridor passed through the Irvine Ranch. In 1887, the California Southern Railroad attempted to sue the ranch to obtain a right-of-way. Ultimately, the Irvine family agreed to grant the AT&SF passage, as long as the railroad would build a depot to serve the property. The railroad segment that passes through the ranch was laid in 1887 (Amtrak 2019; Cleland 1952; Liebeck 1988). The AT&SF railroad ceased operating passenger trains in 1971 with the establishment of the National Railroad Passenger Corporation (Amtrak). In 1995, the AT&SF ceased operations and the entire company's holdings were acquired by the Burlington Northern Santa Fe (BNSF). Within the APE, the Orange County Transportation Authority is the current owner of the SCRRA Orange Subdivision railroad tracks.

In 1942, a military pilot's fleet operational training facility was established on 2,340 acres of the Irvine Ranch Corporation. In the following year, the facility was commissioned as MCAS El Toro. During World War II, MCAS El Toro was a major debarkation location and served as a training base for pilots, aircrews, and ground personnel (City of Irvine 2003).

During the 1950s, the Irvine Company donated land to the University of California system, and the campus became the new focus of development in the periphery. The Irvine Company hired architect and planner William Pereira to develop a master plan. The master-planned community was defined by architectural themes among neighborhoods, roadway connections to shopping centers, and open spaces. The I-5 bridge crossing Bee Canyon Channel, located south of the APE, was constructed in 1958, and later reconstructed in 1969 (NBI 2020). The Irvine Ranch Water District (IRWD) was formed in 1961. The IRWD tiered off much of the existing water infrastructure developed during the 1930s and 1940s including Irvine Lake (formerly Santiago Reservoir) which was constructed in 1931.

MCAS El Toro was decommissioned in 1999. The roadways to the northwest and south of the APE were further developed in the 1990s. The I-5 bridge crossing the AT&SF was constructed in 1992, the State Route 133 (SR-133) bridge crossing Marine Way was constructed in 1997, and the SR-133 bridge over the former AT&SF was constructed in 1998 (NBI 2020). In 2001, Measure W was passed which authorized the former air station's use as a park and multi-use development, now known as the Great Park area.

Based on review of historical topographic maps and aerial photographs, the APE itself has undergone some development in the past 100 years. The earliest topographic map from 1901 shows the railroad alignment, but no buildings are depicted. A 1938 aerial photograph shows the area as agricultural fields bound to the southwest by the former AT&SF alignment (NETR 2020). From 1942 to 1950, a rail siding was added bisecting the APE. In 1952, the water transfer vault located at the northwestern end of the APE is present. The current footprint of the perimeter road is present by 1963, and trees were planted alongside the perimeter road by 1994 (NETR 2020). Additional fencing and water transfer equipment structures were constructed at the northwestern end of the APE during the mid-2000s. The former AT&SF alignment southwest of the APE boundaries has been altered over time for modern use, with modifications accommodating technological developments and commercial demands (e.g., larger trains, second track, automated switches), and other ongoing maintenance.

3.3.3 Archival Research

On April 30, 2020, AECOM requested a California Historical Resources Information System records search from the South Central Coastal Information Center (SCCIC) housed at California State University, Fullerton. The research focused on the identification of previously recorded cultural resources within the APE and a 0.5-mile radius around the Project site. The SCCIC responded via email on August 19, 2020.

The records search revealed that 37 cultural resources investigations were previously conducted within a 0.5-mile radius of the Project site (Table 3.3.3-1). Four of these investigations overlap the APE in whole or in part. The entirety of the APE has been subject to previous archaeological study.

Table 3.3.3-1 Previous Surveys Conducted within 0.5-Mile of the Project Site

Author	Report # (OR-)	Description	Date
Schroth, Adella	00305	The History of Archaeological Research on Irvine Ranch Property: The Evolution of a Company Tradition	1979
Douglas, Ronald D.	00586	Assessment of Cultural/Scientific Resources, Village 12, SCE HVtl Relocation, Irvine, California	1980
Padon, Beth	00754	Cultural Resource Assessment, Irvine Center Project, Orange County, California	1984
Padon, Beth	00787	Archaeological and Paleontological Monitoring for the Irvine Center Project	1985
Anonymous	00808	Final Environmental Impact Report Regional Domestic Water Storage and Transmission Facilities from Diemer/SAC and Wellfield Systems to Existing Distribution Network	1979
Romani, John F.	00814	Archaeological Survey Report for the Route I-5 Santa Ana Transportation Corridor, Route 405 in Orange County to Route 65 in Los Angeles County, PM 21.30/44.38; 0.00/6.85	1982
Padon, Beth	00847	Archaeological Resource Inventory, City of Irvine and Its Sphere of Influence	1985
Padon, Beth and Pat Jertberg	00906	Cultural Resources Report for the San Diego Creek Drainage Basin Project Level Facilities Orange County	1988
Jertberg, Patricia R.	00972	Archaeological and Paleontological Monitoring at Spectrum I Parcel #87-212	1989
Padon, Beth	01098	Cultural/Scientific Resources Assessment for Planning Area 13	1991
Cooley, Theodore G.	01099*	Archaeological Resources Assessment Conducted for Proposed Irvine Ranch Water District Pipeline Right-of-Ways	1979
Brock, James P.	01402*	Cultural Resources Assessment for the Irvine Desalter Project, Irvine California	1994
Webb, Lois M.	01844	Request for Finding of Effect for the Proposed Eastern Transportation Corridor	1991
Anonymous	01902	Historic Property Survey 07ORA-133	1985
Padon, Beth	01941	Archaeological and Paleontological Monitoring of Preliminary Grading for Jack-in-the-Box Restaurant 3278, Permit No. 34126 CCG, Irvine, California	1999
Anonymous	01944	Draft Environmental Impact Report, East Irvine Historical Site, Irvine, California	1991
Strozier, Hardy	02225	The Irvine Company Planning Process and California Archaeology—A Review and Critique	1978
Hunt, Kevin P.	02267	An Archaeological and Paleontological Survey of the Irvine Spectrum GPA Project	2000
Demcak, Carol, and Milos Vlechovsky	02337	Final Report on Archaeological and Paleontological Monitoring Program Conducted at Spectrum 6, City of Irvine, Orange County, California	2000
Anonymous	02534	Annual Report to the Irvine Company from Archaeological Research, Inc.	1976
Brown, Joan C.	02636	A Cultural Resources Literature Study and Field Reconnaissance for the Natural Treatment System Master Plan Facilities, Orange County, California	2003

Table 3.3.3-1 Previous Surveys Conducted within 0.5-Mile of the Project Site

Author	Report # (OR-)	Description	Date
Allen, Rebecca	02649*	Archaeological Survey Report Marine Corps Air Station, El Toro	1997
Mason, Roger D.	03293	Historic Property Survey Report for the Sand Canyon Grade Separation Project in the City of Irvine, Orange County, California	2003
Bonner, Michael A.	03347	Supplemental Environmental Impact Statement for the Eastern Transportation Corridor TCA EIS 2-1	1992
Marvin, Judith	03355	Historical Resources Evaluation Report for the Interstate 5/S and Canyon Avenue Interchange Improvement Project, City of Irvine, Orange County, California	2005
Padon, Beth	03380	Cultural Resource Assessment for Traveland Project, Irvine, Orange County	2007
Strudwick, Ivan H.	03392*	Cultural Resource Survey for the Proposed Irvine Desalter Project, City of Irvine, Orange County, California	2004
Bonner, Wayne H.	03357	Cultural Resources Records Search and Site Visit for Royal Street Communications, California LLC Candidate LA2516B—La Quinta	2008
Drover, Christopher	03825	A Cultural Resources Inventory of Planning Area 9B and 9C, Irvine, California	2000
McKenna, Jeanette A.	03917	Historic Resource Evaluation Report: Hangar 244 of the Former El Toro Marine Corps Air Station (MCAS) and Now Located Within the Great Park, Orange County, California (Project No. B-09-SP-CA-0359)	2010
Fitzgerald, Maggie	03933	Great Park, Cultural Resources Monitoring Report	2010
Fulton, Terri, and Deborah McLean	04084	Cultural Resource Assessment of 22 Natural Treatment System Facility Sites Within the San Diego Creek Watershed – Natural Treatment System Project, Irvine Ranch Water District, Orange County, California	2005
Flynn, Chris	04223	Notification of Finding of No Adverse Effect with Standard Conditions for the Bridge Deck Maintenance and Sealing at 30 Locations Throughout Orange County, California	2011
Strudwick, Ivan	04403	Cultural Resource Monitoring Report for the Sand Canyon Avenue Undercrossing Project, City of Irvine, County of Orange, California	2014
Strudwick, Ivan	04478	Cultural Resource Analysis for the Technology Drive Extension Project in the City of Irvine, Orange County, California	2013

In addition to the reports reviewed at the SCCIC, the 1998 *Architectural Survey of Marine Corps Air Station, El Toro* (JRP 1998) and the 2000 *California Historic Military Buildings and Structures Inventory* (USACE 2000) were reviewed. The 1998 study included an inventory and evaluation of the buildings and structures at MCAS El Toro and determined that there are no NRHP eligible buildings, structures, or districts within the former base (JRP 1998).

The SCCIC records search identified 14 previously recorded cultural resources within a 0.5-mile radius of the Project Site (Table 3.3.3-2). These resources include one isolated lithic flake and one isolated shell that, although unmodified, was transported to the APE by human activity, possibly during the prehistoric period. The remaining 12 resources include nine historic buildings dating from the 1890s to the 1950s, one historic district encompassing some of those buildings, and two historic railroad alignments. The majority of the historic buildings are associated with Old Town Irvine Historic District, which is located approximately 0.40-mile northeast of the APE.

Two of the resources overlap the APE in whole or in part and are detailed below in Table 3.3.3-2.

Table 3.3.3-2 Previously Recorded Resources within 0.5 Mile of the Project APE

Primary Number (P-30-)	Permanent Trinomial (CA-ORA-)	Description/Historic Name	Period of Significance	NRHP/CRHR Eligibility
100124	None	Isolated metavolcanic flake	Prehistoric	Not eligible for CRHR or NRHP
100372*	None	Isolated Venus clam shell	Prehistoric	Not eligible for CRHR or NRHP
157788	None	Irvine Blacksmith Shop	1915-1916	Listed on CRHR and NRHP
161870	None	Worker's Cottage	1904	Appears ineligible for NRHP; not evaluated for CRHR
161871	None	Irvine Hotel	1913	Appears ineligible for NRHP; not evaluated for CRHR
161872	None	Agricultural Storage Shed	1930	Appears ineligible for NRHP; not evaluated for CRHR
161875	None	Irvine Garage	1923	Appears ineligible for NRHP; not evaluated for CRHR
161889	None	Irvine Bean Growers Association Building	1895-1947	Listed in NRHP and CRHR
161894	None	Old Town Irvine Historic District	1887-1947	Listed in CRHR
176663*	None	Former AT&SF	1885-1888	Appears ineligible for NRHP, CRHR, or local designation
176838	None	Irvine Community Church	1952	Appears ineligible for NRHP, CRHR, or local designation
176945	None	Irvine General Store	1911	Appears ineligible for NRHP
177038	None	El Toro MCAS Hanger 244	1943-1945	Found ineligible for NRHP by consensus through the Section 106 process
179855*	None	Former AT&SF Railroad	1885-1888	Appears ineligible for NRHP

*Intersects with Project APE.

Resource P-30-100372

This resource is an isolated Venus clam shell. The shell was observed next to a gopher hole with no other shell or artifacts in the vicinity (Garcia and Vader 2006). A shovel test pit was excavated next to the shell to a depth of 30 centimeters with negative results. Because of the distance from the coast, it was assumed that the shell was transported to this location by human activity. However, it is impossible to determine

when or how the shell was transported, or whether the shell's transportation to this location was intentional or accidental. By their nature, isolated resources are in general not eligible for inclusion in the CRHR or NRHP.

Resource P-30-176663

This resource is an approximately 14.7-mile-long segment of the SCRRA Orange Subdivision railroad tracks (originally part of the AT&SF Railway and subsequently BNSF Railway) and is within Orange and Los Angeles Counties. While originally constructed between 1885 and 1888, the railroad has been continuously used, resulting in replacement of all or most of its historic fabric. Because of its lack of integrity, this resource has been repeatedly recommended ineligible for listing in the NRHP (see Attachment A, Records Search Results Map). The eligibility of this segment has not been formally determined via State Historic Preservation Officer (SHPO) consensus.

3.3.4 Sacred Lands File Search and Native American Consultation

On July 8, 2020, AECOM contacted the NAHC and requested the Sacred Lands File be searched for documented sacred sites within the APE or its vicinity. The NAHC responded in a letter dated July 9, 2020. According to the NAHC letter, "The results were positive [meaning that there are known sacred lands or resources in the vicinity of the APE]. Please contact the Juaneno Band of Mission Indians and the Juaneno Band of Mission Indians Acjachemen Nation - Belardes on the attached list for more information." The response also included a list of 11 Native American representatives of nine State-recognized tribal governments who may have interest in and knowledge of resources that may be impacted by the Project. Two of these tribal governments are also Federally-recognized.

OCTA is conducting consultation under AB 52.

Assembly Bill 52 Consultation

OCTA contacted each of the tribal contacts by mail on June 2, 2021, to invite them to consult under AB 52. One of these letters was returned by the U.S. Postal Service as undeliverable. Follow-up emails were sent on June 30, 2021, to each tribal contact who did not respond to the mailing.

To date, one tribal representative has responded to the request for AB 52 consultation. Chairperson Andrew Salas of the Gabrieleno Band of Mission Indians-Kizh Nation requested a meeting with OCTA to discuss his tribe's concerns regarding the project. On September 9, 2021, a meeting was held between OCTA representatives and Chairperson Salas and Tribal Archaeologist John Torres representing the Kizh Nation. At the meeting, Chairperson Salas expressed that the Project APE is sensitive for buried tribal cultural resources. He pointed out that his tribe, and his family in particular, have ties to the region. He noted that railroads often followed traditional Native American trails, and also observed that military bases often encompassed ancient village sites. Moreover, he informed OCTA that his monitors are currently involved in projects elsewhere in the Irvine area where buried human remains were identified by his tribal monitors. Chairperson Salas recommended tribal monitoring during ground-disturbing activities in order to identify and protect any tribal cultural resources that may exist within the APE. Chairperson Salas provided OCTA with more historical information regarding the general project region, the project APE, as well sample

language to help guide mitigation measures to be developed for this project. Consultation is ongoing (see Confidential Attachment B for files associated with consultation).

3.3.5 Field Survey

An archaeological and built environment survey was conducted on July 30, 2020, by AECOM personnel Marc Beherec, Ph.D., RPA, and Frank Humphries, M.S., RPA, who both meet the Secretary of the Interior's Professional Qualifications Standards in Archaeology (36 CFR Part 61). The two surveyors walked over the entire APE, with the exception of the active railroad right-of-way and a segment of Ridge Valley Road that is paved or covered in imported gravel (see Figure 3.2-1), in a series of transects spaced 15 meters apart. Part of the APE is obscured by a paved access road. Ground visibility in the rest of the APE ranged from approximately 10 to 50 percent. Non-native grasses obscured much of the ground surface, but the area was mowed at the time of visit.

Evidence of superficial disturbances included abundant gopher holes and evidence of an irrigation system in the form of 3/4-inch polyvinyl chloride (PVC) pipes and sprinkler heads. The ground also appeared recently disced or plowed and has been historically plowed based on historic aerial photographs.

Archaeological Resources

No archaeological resources were observed within the APE. The previously recorded isolated clam shell (P-30-100372) was not located during the survey. The resource was documented in 2006 (Garcia and Vader 2006); however, the single clam shell may have been misplotted, or it may have been removed or reburied by human or animal activity in the 14 years since it was recorded.

Built Environment Resources

The archival research and survey identified two built resources that are greater than 50 years of age within the APE. Resource information is included on California Department of Parks and Recreation (DPR) 523 forms included in Attachment C.

P-30-176663 Former AT&SF Segment

The portion of resource P-30-176663, the former AT&SF railroad within the APE, is a double track which runs northwest to southeast (Figure 3.3.5-1). The profile approaches one percent grade, rising from the north (west) end of the site as the tracks pass under the SR-133 overhead structure, to the south (east) end of the site where the mainline tracks cross over the Bee Canyon Channel on a double track bridge. This portion of the former AT&SF is a standard gauge railroad which sits on a bed of large-medium ballasts. The rails sit on wooden ties and are fastened via metal railroad spikes. This segment has been altered over time for modern use, with modifications accommodating technological developments and commercial demands (e.g., larger trains, second track, automated switches), and other ongoing maintenance. The original elements of the rail line have been repaired and replaced.

Figure 3.3.5-1 Cultural Resources within APE



Source: ESRI, AECOM

0 842 1,684 Feet

1 inch = 842 feet 1:10,100

Metrolink Orange County Maintenance Facility

Figure 3.3.5-2 Overview of P-30-176663, Former AT&SF Railroad from Project APE, View to West



Source: AECOM (2020)

NRHP and CRHR Evaluation

Resource P-30-176663 was originally recorded in 2002, and updated in 2007 (Ballester and Tang, 2002; McCormick, 2007; Smith and Harper, 2007). The resource was found to have been upgraded and substantially altered since its original construction and did not retain sufficient historical integrity to reflect its original historical association (Figure 3.3.5-2). Therefore, the railroad was recommended as not eligible for listing on the NRHP or CRHR due to its lack of integrity of materials, workmanship, and setting. The records do not note whether Section 106 consultation with the SHPO was performed for these undertakings. It does not appear that a formal determination of eligibility with SHPO concurrence has been completed for this resource. After review of the previous recordation and current field check and research, AECOM concurs with the previous eligibility assessments.

Water Transfer Vault

Within the APE and approximately 350 feet northeast of the SR-133 bridge over the former AT&SF railroad is a rectangular water transfer vault constructed circa 1950 and abandoned in 2006 (Figure 3.3.5-3). The resource is a concrete domestic water intake structure originally used for MCAS El Toro. The vault located on the western periphery of the former MCAS El Toro property does not have any distinct associations with the United States Marine Corps' mission operations during the 1950s and is a minor and vernacular water infrastructure element. The entrance to the subterranean structure is by way of stairs covered by a metal grate. The vault measures approximately 46 feet long and 27 feet wide; the interior is approximately 10 feet tall. The vault's footprint appears unchanged since construction; however, a low concrete interior

partition appears to have been removed in order to install new piping. Additional fencing and water transfer equipment structures were constructed adjacent to the vault during the mid-2000s.

Figure 3.3.5-3 Overview of Water Transfer Vault from surface, View to West



Source: AECOM (2020)

NRHP and CRHR Evaluation

Under NRHP Criterion A and CRHR Criterion 1, the water transfer vault has no significant association with the broad patterns of local, state, or national history. This structure was constructed during the 1950s and is associated with MCAS El Toro's expansion and development but does not convey an important association with the base. The water transfer vault's components, which include concrete construction and piping, are representative of utilitarian work. Since the water transfer vault has no association with the broad patterns of local, state, or national history, it is not eligible for the NRHP under Criterion A or CRHR under Criterion 1.

Under NRHP Criterion B and CRHR Criterion 2, this structure is not significant for any associations with the lives of persons important to history. Research did not identify any important associations between the water transfer vault and any notable persons or their work. Therefore, this property is not eligible under NRHP under Criterion B or CRHR Criterion 2.

Under NRHP Criterion C and CRHR Criterion 3, the water transfer vault is not an important example of a type, period, or method of construction. The vault's design and construction is typical of utilitarian

construction and does not appear to possess any unique characteristics; therefore, it is not eligible for the NRHP under Criterion B or CRHR under Criterion 3.

Under NRHP Criterion D and CRHR Criterion 4, the water transfer vault is not significant as a source (or likely source) of important information regarding history. It does not appear to have any likelihood of yielding important information about historic construction materials or technologies. It is not eligible for the NRHP under Criterion D or CRHR under Criterion 4.

The water transfer vault does not appear to meet the criteria for listing in the NRHP or CRHR, either as an individual resource or as a contributor to a larger resource such as the former MCAS El Toro. In addition, a 1998 inventory and evaluation of the buildings and structures at MCAS El Toro determined that there are no NRHP eligible buildings, structures, or districts within the former base (JRP 1998).

4. EXTENDED PHASE I

An Extended Phase I (XPI) cultural resources identification was completed within the APE in 2021 by HDR (HDR 2021). The XPI was conducted because the APE was determined to have a moderate sensitivity to encounter buried cultural resources. The purpose of the XPI was to determine the presence or absence of buried historic or prehistoric cultural resources and to further assess the overall archaeological sensitivity in portions of the OCMF project area where deep Project-related excavations are proposed. XPI investigations consisted of 40 subsurface shovel and hand auger test probe excavations to confirm the presence or absence of buried cultural materials. All tests were negative for the presence of prehistoric cultural material. No historic properties, historic resources, unique archaeological resources, or tribal cultural resources were identified during the XPI. Based on the results of the XPI, it is not anticipated that the Project will impact buried cultural resources. A copy of the XPI is included in Attachment E.

5. METHODOLOGY

Archival research, Native American consultation, and survey activities were conducted to identify archaeological or historic built resources within the Project APE that may be considered historical resources for the purposes of CEQA or historic properties for the purposes of Section 106 of the NHPA. In addition, this study sought to evaluate the potential to encounter unknown buried archaeological resources within the APE that may meet the criteria to be considered historical resources and/or historic properties. Because of the Project APE's sensitivity, an XPI study was also conducted to probe the APE for subsurface archaeological deposits. The section above contains the environmental setting, cultural history, previous archaeological studies, results of archival research and records search, survey results, and the results of the XPI for the Project APE.

Archival research was conducted to determine the nature and substance of existing documentation or archaeological resources within the APE. The research was conducted at the South Central Coastal Information Center, located at California State University, Fullerton. In addition, published and unpublished archival material was consulted as appropriate. The NAHC was contacted to provide their input regarding known tribal resources and contacts, and every tribal contact identified by the NAHC was invited to consult

upon the Project. However, no significant resources were identified within the Project APE as a result of the archival research, surface survey, or XPI. Mitigation measures are proposed for the treatment of potential buried resources that may be located within the APE.

6. IMPACTS ANALYSIS

Under Section 106 of the NHPA, an adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property as defined by 36 CFR 60.4 that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration must be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the NRHP. Adverse effects may include any reasonably foreseeable effects caused by the undertaking, including not only immediate effects, but also effects that may occur later in time, be farther removed in distance, or be cumulative.

As detailed in Appendix G of the CEQA Guidelines, a project would have an adverse impact to a historical resource if it would:

> a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5;
>
> b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5; or
>
> c) Disturb any human remains, including those interred outside of dedicated cemeteries.

The archival research and survey identified two built environment resources that are greater than 50 years of age within the Project APE. P-30-176663 is a segment of the former AT&SF that was previously recorded and evaluated as not eligible for the NRHP or CRHR; however, the records do not note whether a formal determination of eligibility was made. In addition, the survey identified a previously unrecorded historic-period resource, a water transfer vault. The water transfer vault is evaluated in Section 3.3.5 of this document and is recommended not eligible for inclusion in the CRHR or NRHP. Both resources do not appear to be historic properties as defined by 36 CFR 60.4 historical resource in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code.

The archival research identified one isolated archaeological resource within the Project APE. Resource P-30-100372 is a Venus clam shell that was documented within the boundaries of the APE in 2006 but could not be relocated during the recent survey. By its nature, this isolated shell is not eligible for inclusion in the NRHP or CRHR. No archaeological resources were identified within the Project APE that meet the criteria to be considered historic properties as defined by 36 CFR 60.4. No archaeological resources were identified within the Project APE that can be considered a historical resource in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California

Public Resources Code, or a unique archaeological resource in accordance with Section 15064.5(c) of the CEQA Guidelines, using the criteria outlined in Section 21083.2 of the California Public Resources Code.

However, based on the results of the archival research, field survey, Native American consultation, and past documented land use of the APE, the Project has a moderate to high sensitivity to encounter buried cultural resources. The single isolated Venus clam shell, while not itself significant and possibly not prehistoric, indicates an elevated sensitivity for resources within the APE. The APE is located near to water sources that both would have been attractive as natural resource procurement areas and could have contributed to burying archaeological resources beneath fluvial sediments. Native American authorities have pointed out their tribes; close ties to the project APE, the possibility that the existing railroad right-of-way was placed on an Native American trade route, and the fact that the project lay within the territory of nearby villages. Although the entire Project APE has been subject to surficial ground disturbance including farming and the construction of Marine Corps Station El Toro and despite the negative findings of the XPI, the likelihood of encountering native sedimentary deposits that may preserve significant archaeological remains increases with depth.

7. RECOMMENDATIONS

Based on the results of the archival research, field survey, and Native American consultation, the Project has a moderate to high sensitivity to encounter significant intact buried cultural resources. While the XP1 that was conducted was negative for the presence of subsurface cultural deposits, there is still the potential to encounter resources during construction as the Project will impact native soils. The possibility exists for the Project to encounter unknown archaeological resources in the course of ground-disturbing construction in native soils. The following mitigation measures are recommended to reduce any impacts to unknown archaeological resources encountered during excavations to a less than significant level.

MM-CUL-1 Prior to construction, OCTA shall retain a qualified archaeologist who meets the Secretary of the Interior's Guidelines for Archaeology (36 CFR Part 61). The qualified archaeologist shall prepare a Cultural and Tribal Cultural Resources Awareness Training as part of the Project Worker Environmental Awareness Program (WEAP). The training will instruct workers as to the laws protecting cultural and tribal cultural resources and also give examples of the kinds of resources that can be reasonably expected to be found in the Area of Potential Effect (APE). An environmental compliance contact responsible for enforcing mitigation measures and who is to be notified in the event of a find will be identified in the training. Training will be delivered to all staff involved in ground-disturbing activities prior to their working on the project.

MM-CUL-2 Prior to construction, a project-specific cultural resources monitoring, and discovery plan (CRMDP) will be developed by a qualified archaeologist who meets the Secretary of the Interior's Guidelines for Archaeology (36 CFR Part 61). The monitoring plan should identify what construction activities that occur in native soils would require archaeological and tribal monitoring, describe monitoring procedures, and outline the protocol to be followed in the event of a find. Criteria will be defined, and triggers identified as to when further consultation is required for the treatment of finds. Plans of treatment of typical finds will be detailed, as will a plan of treatment for any human remains that are inadvertently encountered. If a potentially significant discovery is made and cannot feasibly be avoided, then additional work, potentially including data recovery excavations, may be required. Key staff will be identified, and the process of notification and consultation will be specified within the CRMDP. A curation plan will also be outlined within the CRMDP. All work should be conducted under the direction of a qualified archaeological Principal Investigator who meets the Secretary of the Interior's standards for archaeology. Consulting tribes under AB52 for the Project shall have the opportunity to review and comment on the draft CRMDP.

MM-TCR-1 Retain a Native American Monitor Prior to Commencement of Ground-Disturbing Activities.

A. The project applicant/lead agency shall retain a Native American Monitor from or approved by the Gabrieleño Band of Mission Indians – Kizh Nation. The monitor shall be retained prior to the commencement of any "ground-disturbing activity" for the subject project at all project locations (i.e., both on-site and any off-site locations that are included in the project description/definition and/or required in connection with the project, such as public improvement work). "Ground-disturbing activity" shall include, but is not limited to, demolition, pavement removal, potholing, auguring, grubbing, tree removal, boring, grading, excavation, drilling, and trenching.

B. A copy of the executed monitoring agreement shall be submitted to the lead agency prior to the earlier of the commencement of any ground-disturbing activity, or the issuance of any permit necessary to commence a ground-disturbing activity.

C. The monitor will complete daily monitoring logs that will provide descriptions of the relevant ground-disturbing activities, the type of construction activities performed, locations of ground-disturbing activities, soil types, cultural-related materials, and any other facts, conditions, materials, or discoveries of significance to the Tribe. Monitor logs will identify and describe any discovered TCRs, including but not limited to, Native American cultural and historical artifacts, remains, places of significance, etc., (collectively, tribal cultural resources, or "TCR"), as well as any discovered Native American (ancestral) human remains and burial goods. Copies of monitor logs will be provided to the project applicant/lead agency upon written request to the Tribe.

D. On-site tribal monitoring shall conclude upon the latter of the following (1) written confirmation to the Kizh from a designated point of contact for the project applicant/lead agency that all ground-disturbing activities and phases that may involve ground-disturbing activities on the project site or in connection with the project are complete; or (2) a determination and written notification by the Kizh to the project applicant/lead agency that no future, planned construction activity and/or development/construction phase at the project site possesses the potential to impact Kizh TCRs.

E. Upon discovery of any TCRs, all construction activities in the immediate vicinity of the discovery shall cease (i.e., not less than the surrounding 50 feet) and shall not resume until the discovered TCR has been fully assessed by the Kizh monitor and/or Kizh archaeologist. The Kizh will recover and retain all discovered TCRs in the form and/or manner the Tribe deems appropriate, in the Tribe's sole discretion, and for any purpose the Tribe deems appropriate, including for educational, cultural and/or historic purposes.

MM-TCR-2 Unanticipated Discovery of Human Remains and Associated Funerary Objects.

A. Native American human remains are defined in PRC 5097.98 (d)(1) as an inhumation or cremation, and in any state of decomposition or skeletal completeness. Funerary objects, called associated grave goods in Public Resources Code Section 5097.98, are also to be treated according to this statute.

B. If Native American human remains and/or grave goods discovered or recognized on the project site, then all construction activities shall immediately cease. Health and Safety Code Section 7050.5 dictates that any discoveries of human skeletal material shall be immediately reported to the County Coroner and all ground-disturbing activities shall immediately halt and shall remain halted until the coroner has determined the nature of the remains. If the coroner recognizes the human remains to be those of a Native American or has reason to believe they are Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission, and Public Resources Code Section 5097.98 shall be followed.

C. Human remains and grave/burial goods shall be treated alike per California Public Resources Code section 5097.98(d)(1) and (2).

D. Construction activities may resume in other parts of the project site at a minimum of 200 feet away from discovered human remains and/or burial goods, if the Kizh determines in its sole discretion that resuming construction activities at that distance is acceptable and provides the project manager express consent of that determination (along with any other mitigation measures the Kizh monitor and/or archaeologist deems necessary). (CEQA Guidelines Section 15064.5(f).)

E. Preservation in place (i.e., avoidance) is the preferred manner of treatment for discovered human remains and/or burial goods. Any historic archaeological material that is not Native American in origin (non-TCR) shall be curated at a public, non-profit institution with a research interest in the materials, such as the Natural History Museum of Los Angeles County or the Fowler Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, it shall be offered to a local school or historical society in the area for educational purposes.

F. Any discovery of human remains/burial goods shall be kept confidential to prevent further disturbance.

MM-TCR-3 Procedures for Burials and Funerary Remains.

A. As the Most Likely Descendant ("MLD"), the Koo-nas-gna Burial Policy shall be implemented. To the Tribe, the term "human remains" encompasses more than human bones. In ancient as well as historic times, Tribal Traditions included, but were not limited to, the preparation of the soil for burial, the burial of funerary objects with the deceased, and the ceremonial burning of human remains.

B. If the discovery of human remains includes four or more burials, the discovery location shall be treated as a cemetery and a separate treatment plan shall be created.

C. The prepared soil and cremation soils are to be treated in the same manner as bone fragments that remain intact. Associated funerary objects are objects that, as part of the death rite or ceremony of a culture, are reasonably believed to have been placed with individual human remains either at the time of death or later; other items made exclusively for burial purposes or to contain human remains can also be considered as associated funerary objects. Cremations will either be removed in bulk or by means as necessary to ensure complete recovery of all sacred materials.

D. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24-hour guard should be posted outside of working hours. The Tribe will make every effort to recommend diverting the project and keeping the remains in situ and protected. If the project cannot be diverted, it may be determined that burials will be removed.

E. In the event preservation in place is not possible despite good faith efforts by the project applicant/developer and/or landowner, before ground-disturbing activities may resume on the project site, the landowner shall arrange a designated site location within the footprint of the project for the respectful reburial of the human remains and/or ceremonial objects.

F. Each occurrence of human remains and associated funerary objects will be stored using opaque cloth bags. All human remains, funerary objects, sacred objects and objects of cultural patrimony will be removed to a secure container on site if possible. These items should be retained and reburied within six months of recovery. The site of reburial/repatriation shall be on the project site but at a location agreed upon between the Tribe and the landowner at a site to be protected in perpetuity. There shall be no publicity regarding any cultural materials recovered.

G. The Tribe will work closely with the project's qualified archaeologist to ensure that the excavation is treated carefully, ethically and respectfully. If data recovery is approved by the Tribe, documentation shall be prepared and shall include (at a minimum) detailed descriptive notes and sketches. All data recovery data recovery-related forms of documentation shall be approved in advance by the Tribe. If any data recovery is performed, once complete, a final report shall be submitted to the Tribe and the NAHC. The Tribe does NOT authorize any scientific study or the utilization of any invasive and/or destructive diagnostics on human remains.

8. IMPACTS AFTER MITIGATION MEASURES

There are no known historic properties, cultural resources, or tribal cultural resources that would be impacted by the Project. In the event that any unknown resources that may meet the criteria to be considered historic properties, cultural resources, or tribal cultural resources are found during construction, implementation of Mitigation Measures MM-CUL-1 and MM-CUL-2 and MM-TCR-1, MM-TCR-2, and MM-TCR-3 would reduce any potential impacts to less than significant.

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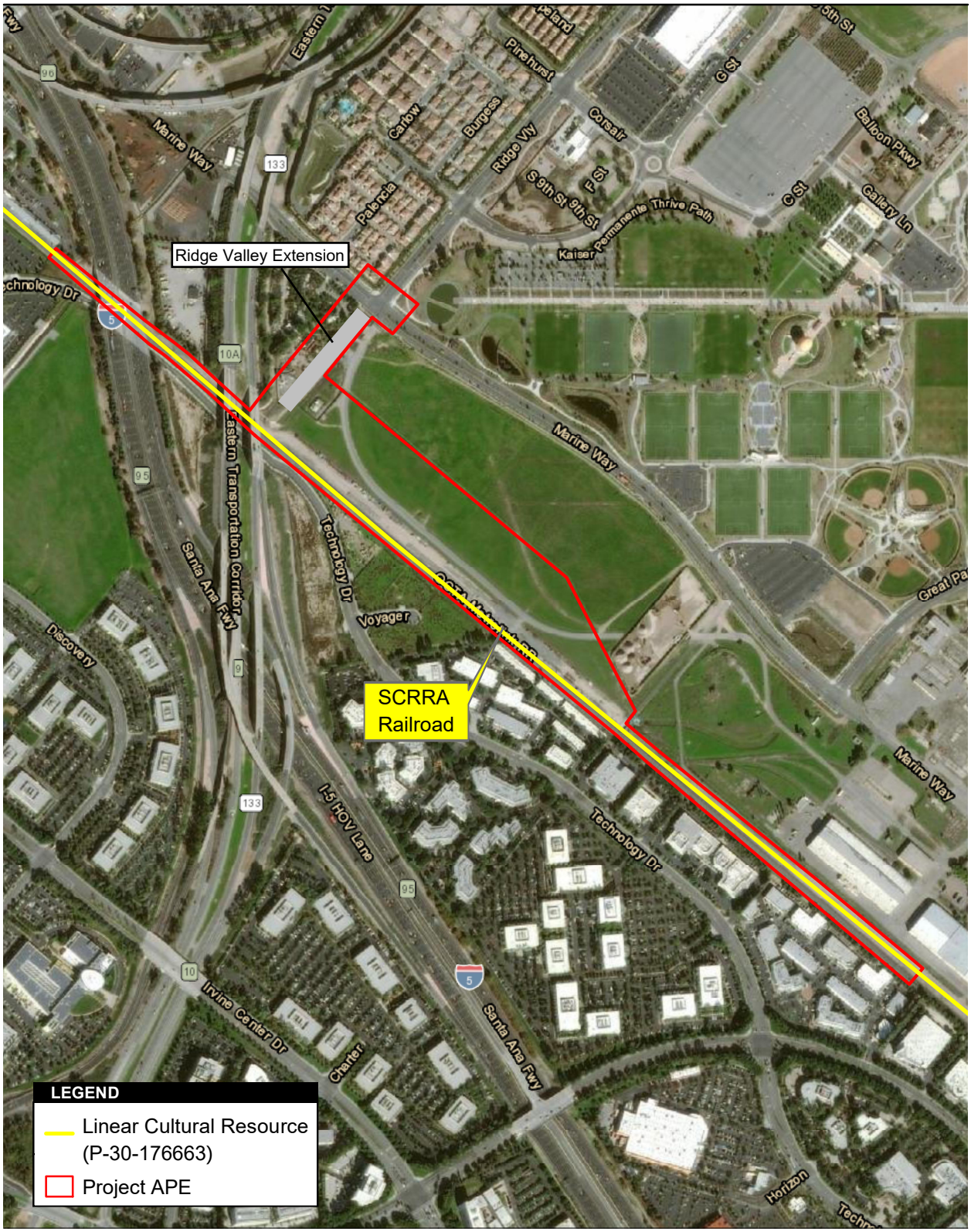
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Attachment A

Area of Potential Effects Map



Source: ESRI, AECOM

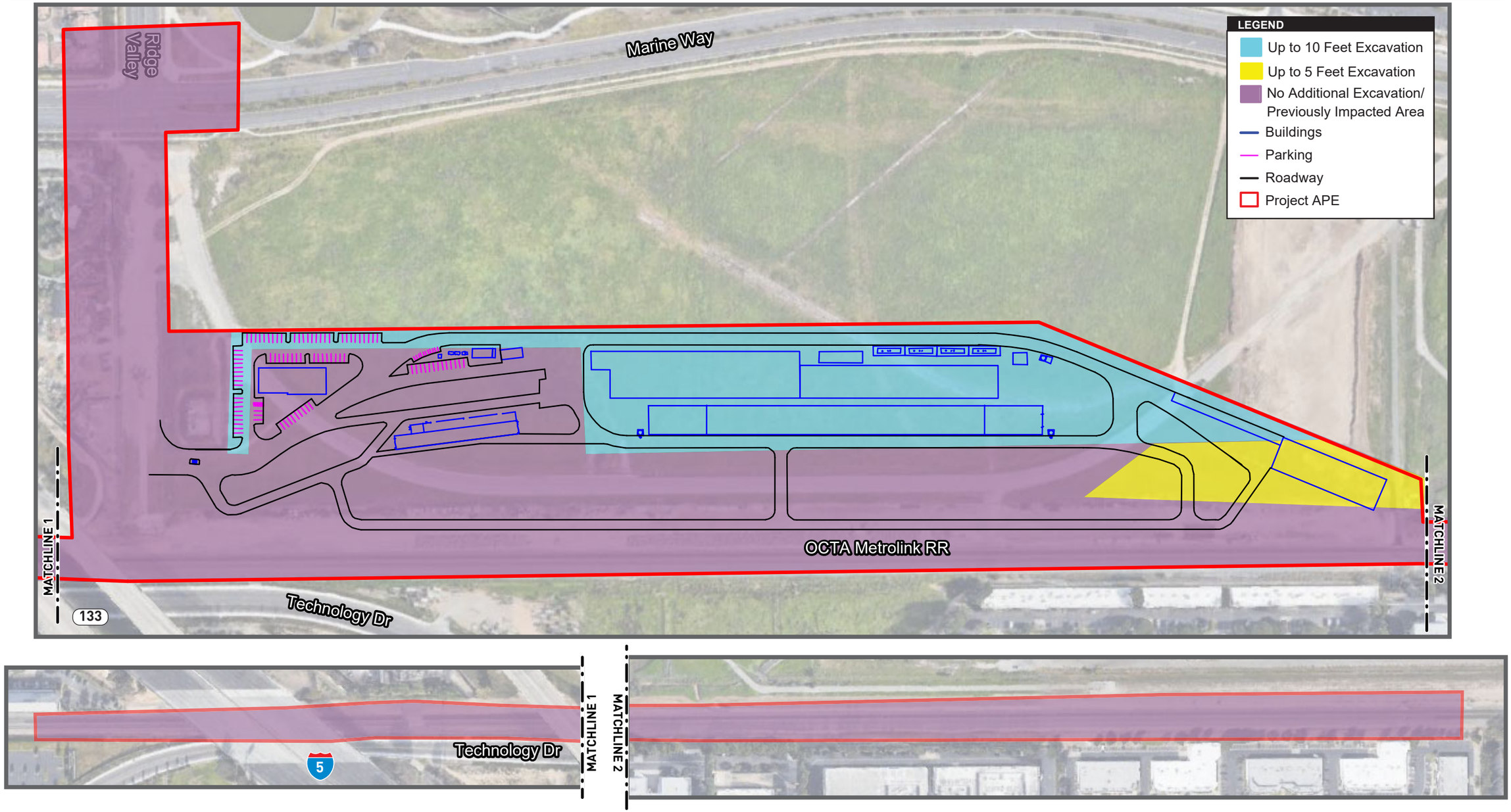
0 842 1,684 Feet

1 inch = 842 feet 1:10,100

FIGURE A1: RECORDS SEARCH RESULTS WITHIN APE

Metrolink Orange County Maintenance Facility

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Source: GoogleEarth 2021, AECOM

0 250 500 Feet

FIGURE A2: PROPOSED EXCAVATION DEPTHS WITHIN APE

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Attachment B

Records Search Results
Confidential

Attachment C

AB 52 Consultation
Confidential

Attachment D

DPR 523 Forms
Confidential

Attachment E

Extended Phase I

Technical Memorandum

To:	Lora Cross, Project Manager, Orange County Transportation Authority
From:	Daniel Leard, Archaeologist, HDR
Date:	November 29, 2021
Subject:	**OCTA OCMF Extended Phase I Cultural Resource Survey**

1. Introduction

HDR completed Extended Phase I (XPI) cultural resources identification work in support of Orange County Transit Authority's (OCTA) Orange County Maintenance Facility (OCMF) Project (Project). In compliance with the requirements of the California Environmental Quality Act and Section 106 of the National Historic Preservation Act, AECOM cultural resources specialists completed a Phase I cultural resources investigation of the designated Area of Potential Effects (APE) as defined in 36 CFR 800.16(d), that included archival research at the California Historical Resources Information System records search from the South Central Coastal Information Center, a search of the Sacred Lands File, Native American Consultation, and completion of archaeological and built environment field surveys. The results of the cultural resources investigations were presented in a technical memorandum prepared for OCTA by AECOM in 2021. Archaeological field survey was limited to pedestrian surface inspection of the APE. Based on the results of the survey, no historic properties, historical resources, or unique archaeological resources were identified within the APE. However, the Project area was determined to have a moderate sensitivity to encounter buried cultural resources.

The purpose of the XPI was to determine the presence or absence of buried historic or prehistoric cultural resources and to further assess the overall archaeological sensitivity in portions of the OCMF project area where deep Project-related excavations are proposed. Cultural resource presence-and-absence testing was conducted by HDR from October 25 to November 4, 2021. This technical memorandum documents the results of the XPI to append to the archaeological survey report previously prepared by AECOM.

2. Study Area

The proposed OCMF is planned to be located on a 21.3-acre parcel owned by OCTA in the City of Irvine. The site is adjacent to the Metrolink Orange subdivision between mileposts 183.50 and 184.00 and the future Ridge Valley Road extension, and approximately 400 feet south of Marine Way (**Figure 1**). The APE includes the Project Site (which includes access roads and construction staging areas) and adjacent areas. The vertical extent of the APE encompasses the maximum depth of excavation and grading, which may extend up to 10 feet beneath the existing ground surface. Scoping for the XPI effort was based an aerial exhibit showing anticipated areas of

Project cut (deeper than 2 feet) produced by OCTA consultant Gannett Fleming and transmitted to the Project Delivery Team on October 14, 2021. The XPI area includes approximately 8.4 acres where ground excavation was expected, primarily along the northeast side of the 21.3-acre Project APE (**Figure 1** and **Figure 2**).

3. Methods

Professional services were performed by individuals who meet the Secretary of the Interior's Professional Qualification Standards for Archaeology (48 Federal Register 44716). Field efforts were led by Daniel Leonard, PhD, and Daniel Leard, both of whom are Registered Professional Archaeologists. Katherine Lemberg provided geographical information system and global positioning system support.

XPI investigations consisted of excavation of subsurface shovel test probes (STPs) to confirm the presence or absence of buried cultural materials. STPs were placed at 30-meter (100-foot) intervals across the 8.4-acre XPI area and numbered sequentially (**Figure 1**). Initially, 41 STPs were planned within the 30 m grid. Each STP measured approximately 50 centimeters (cm) in diameter and was excavated with hand tools (e.g., picks, shovels, trowels, augers) to a maximum depth of 2 meters (6.5 feet) below surface level or upon reaching culturally sterile sediments. Shovels were primarily used to excavate to a maximum workable depth of approximately 80 cm. Hand augers, using either a 4-inch diameter (sand auger) or 6-inch diameter (clay auger) bucket depending on the soil texture, were used for deeper testing. All soils recovered were dry-sifted through 1/8-inch wire mesh screens. All cultural material discovered during testing was recorded and reburied. Data from the testing—including location, depth of excavation, soil type and consistency, stratigraphy, and descriptions of any cultural materials recovered—was recorded on standardized forms. Photographs were taken of each STP prior to backfilling with the excavated soils. The location of each STP was recorded using a hand-held global positioning system unit with sub-meter accuracy capabilities.

4. Results

As a result of the survey, HDR archaeologists completed 40 STPs within the 8.4-acre XPI area. STP 4 was planned between STP 3 and STP 5 but not excavated because of the existing roadway at this location. Full descriptions of each test are presented in Error! Reference source not found.. Soil types varied from silty or sandy loams to dense clays or silty clay loam with varying trace gravels. Layers of fine loamy silt or sand and loose gravelly sands were found at depths below approximately 150 cm. As expected, moderate to significant soil disturbance was observed across the testing area, likely resulting from the development of Marine Corps Air Station El Toro between 1942 and 1999 or previous historic plowing. Depth of visible disturbance varied from 20 cm to as much as 80 cm below surface level depending on location. Areas with the most significant disturbance were found at the southeastern and northwestern ends of the XPI area at STPs 1-5, 10 11, 18, 19, and 33-41. These tests exhibited top layers of highly compacted artificial fill consisting of mixed sandy sediments with concrete slurry and imported gravel with chunks of asphalt and concrete/mortar, or, in some cases loose sand and gravel road base (**Figure 3** and

Figure 4). In the remaining tests, disturbance was less obvious; however, possible grading or historic plowing and compaction of the soil was still evident to depths varying between 15 cm and 40 cm below surface level. Natural disturbance from rodent burrowing was also visible across the site. Soil disturbance at STPs 16 (**Figure 5**), 17 and 20-30 appeared relatively minimal.

All tests were negative for the presence of prehistoric cultural material. A small amount of likely modern debris was identified in eighteen of the tests (STPs 2, 5, 7, 8, 12, 13, 14, 19, 23, 24, 25, 32, 36, 37, 38, 39, 40, and 41). This included small bottle glass fragments, window glass fragments, several plastic fragments, green PVC pipe pieces, several wire nails, an aluminum can tab, one piece of wire, and one possible piece of asbestos, all found at shallow depths and within disturbed soils. All material was analyzed in the field and reburied upon completion of the test. None of the material recovered could be identified as older than 50 years in age.

5. Recommendations

No historic properties, historic resources, or unique archaeological resources were identified during the XPI. Based on the results of the XPI, it is not anticipated that the Project will impact buried cultural resources. Implementation of mitigation measures MM-CUL-1 through MM-CUL-3 recommended in the *Technical Memorandum Cultural Resources* for the Metrolink Orange County Maintenance Facility completed by AECOM in 2021 would reduce any impacts to unknown archaeological resources encountered during excavations to a less than significant level.

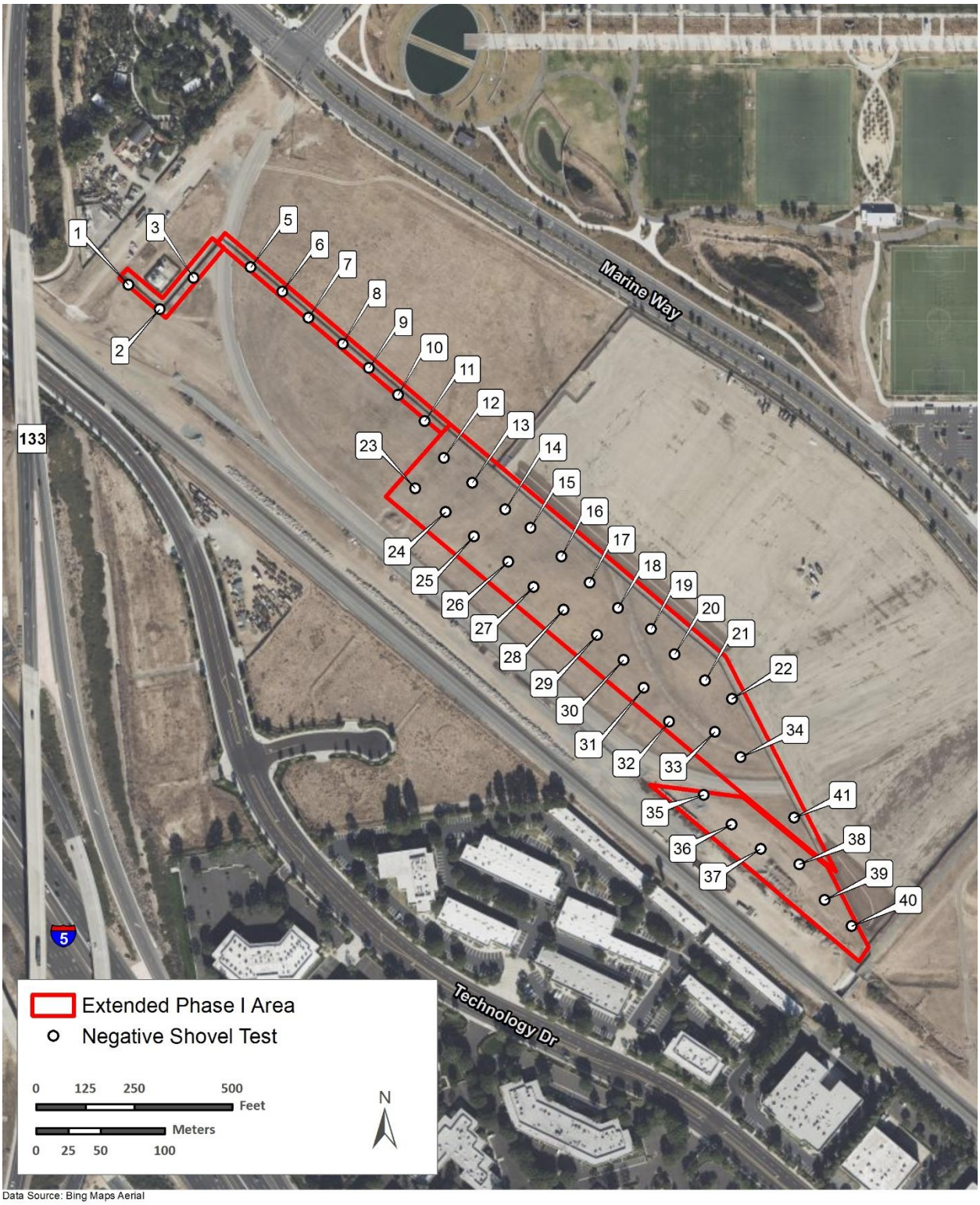


Figure 1. Extended Phase I Study Area and Subsurface Test Locations



Figure 2. Overview of XPI area from location of STP 34, viewing northwest



Figure 3. Soil profile at STP 36 showing layer of compacted fill beneath loose overburden



Figure 4. Soil profile at STP 3 showing deep layer of road base



Figure 5. Soil profile at STP 16

Table 1. Excavation notes for STPs 1 through 41

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
1	0-22	10YR5/3 brown	Sandy loam, high compaction, with 40-50% poorly sorted gravels	None	Possible artificial fill or reworked and compacted topsoil	None noted
	22-55	10YR4/2 dark grayish brown	Clayey silt loam, very compact	None	None noted	None noted
	55-120	10YR4/3 brown	Silty loam, moderate compaction	None	None noted	Gradual soil transition; sand auger after 80 cm
	120-160	10YR3.5/2 very dark grayish brown	Silty clay loam	None	None noted	None noted
	160-200	10YR4/3 brown	Clayey silt loam, less compact	None	None noted	None noted
2	0-9	10YR4/3 brown	Sandy loam, moderate compaction with 15% gravel	None	None noted	None noted
	9-45	10YR5/3 brown	Sandy loam, rock hard fill with slurry mix, 20-25% gravel	Bits of asphalt; colorless glass fragments; 1 wire nail	None noted	None noted
	45-80	10YR3/2 very dark grayish brown	Sandy Clay, high compaction	None	None noted	None noted
3	0-60		Coarse sand and gravel road base	None	Artificial fill	None noted

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
	60-75	10YR3/2 very dark grayish brown	Loamy clay	None	None noted	None noted
	75-80	10YR4/3 brown	Gravelly coarse sand with clay	None	None noted	Too much large gravel to auger through
4	Not excavated because of the existing roadway at this location					
5	0-7	10YR4/2 dark grayish brown	Loamy loose sediments	None	Recently spread dirt	None noted
	7-45	10YR5/3 brown	Sandy clay loam, rock hard, dry, with 30-50% gravel content	Several small pieces of asphalt	Appears to be artificial fill with slurry/gravel mix	None noted
	45-80	10YR3/3 dark brown	Sandy loam, compact, with varying amounts of gravel	Small bits of asphalt and several pieces of green PVC plastic from 45-60cm	Likely disturbed to 60 cm depth	No clear soil transition
	80-180	10YR3/3 dark brown	Silty clay loam getting sandier after 150 cm; medium compaction	None	None noted	Sand auger after 80 cm
	180-200	10YR4/4 dark yellowish brown	Silty loam to very fine sandy loam	None	None noted	None noted
6	0-30	10YR4/3 brown	Sandy loam, high compaction	None	None noted	None noted

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
	30-60	10YR3/3 dark brown	Silty clay loam, medium compaction	None	None noted	None noted
	60-80	10YR4/3 brown	Loam, medium compaction	None	None noted	Subtle soil transition
7	0-20		Mix of wood chip debris and loose sediments	None	Not natural	None noted
	20-35	10YR3/2 very dark grayish brown	Very compact sandy clay loam with small gravels	1 possible asbestos tile	Likely artificial fill or plowed and recompacted	None noted
	35-100	10YR3/2 very dark grayish brown	Clay loam or loamy clay, speckled with light sand or carbonates	None	None noted	None noted
	100-160	10YR5/3 brown	Clayey loam to silty clay loam, getting gradually lighter in color and less compact	None	None noted	None noted
	160-200	10YR6/3 pale brown	Sandy silt, loosely compacted	None	None noted	None noted
8	0-25	10YR4/3 brown	Clayey loam with imported shale gravel, compact	Plastic	Likely previously plowed or graded and recompacted	None noted
	25-80	10YR4/3 brown	Loam, medium compaction	None	None noted	Appears to be natural horizon
	80-130	10YR3/3 dark brown	Loamy clay with carbonate stringers	None	None noted	None noted

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
9	0-30	10YR4/3 brown	Clayey loam with imported shale gravel, compact	None	Likely previously plowed or graded and recompacted	None noted
	30-90	10YR3/3 dark brown	Clayey loam, medium compaction	None	None noted	Appears to be natural horizon
	90-130	10YR3/2 very dark grayish brown	Loamy clay with speckles of light sand or carbonates	None	None noted	None noted
	130-150	10YR3/3- 4/3 dark brown	Mottled loamy clay with carbonate stringers	None	None noted	None noted
	150-190	10YR5/3 brown	Clayey silt loam	None	None noted	None noted
	190-200	10YR6/3 pale brown	Silt, very soft	None	None noted	Possible E horizon
10	0-37	10YR7/3 very pale brown	60-70% imported gravel with compact sand and silt	None	Looks like slurry fill	None noted
	37-75	10YR4/3 brown	Clayey silt loam, very compact	None	None noted	<10% gravel
	75-120	10YR4/3 brown	Silty loam, moderate compaction	None	None noted	Sand auger after 80 cm
11	0-30		Crushed shale base (no soil)	None	Artificial fill	None noted
	30-80	10YR4/3 brown	Clayey sandy loam, compact	None	None noted	None noted

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
	80-100	10YR5/3 brown	Fine sandy silt, loosely compacted	None	None noted	Sand auger after 80 cm
	100-150	10YR4/3 brown	Clayey loam, compact	None	None noted	Too difficult to auger past 150 cm
12	0-5	10YR4/2 dark grayish brown	Loose loamy sediments	1 piece of window glass; lumber pieces	Loose dirt spread over surface	None noted
	5-25	10YR5/3 brown	Silty clay loam, compact, with 25% large gravels	None	Likely artificial fill or plowed and recompacted	None noted
	25-150	10YR4/3 - 3/2 dark brown	Clayey silt loam, medium compaction	None	None noted	Sand auger after 80 cm
	150-200	10YR4/4 - 5/4 yellowish brown	Fine sandy silt, loosely compacted; changing to 5/4 after 180 cm	None	None noted	Gradual soil transition
13	0-10	10YR5/3 brown	Loose mixed sediments	10-15 pieces of tinted flat glass; 1 piece of colorless glass; 2 pieces of white plastic	Loose dirt spread over surface	None noted
	10-25	10YR4/3 brown	Compacted mixed sand and silt with some clay	Several pieces of plastic	Reworked and compacted soil	None noted
	25-70	10YR3/4 dark yellowish brown	Silty loam, medium compaction	None	None noted	Appears to be natural horizon
	70-120	10YR3/2 very dark grayish brown	Loamy clay or clay loam, compact	None	None noted	Sand auger after 80 cm

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
	120-150	10YR5/4 yellowish brown	Sandy silt loam, loosely compacted	None	None noted	Gradual soil transitions
	150-200	7.5YR5/4 brown	Loose, dry silty sand	None	None noted	None noted
14	0-20	10YR5/3-4/3 brown	Mixed sediments, very compact but lacks structure	Plastic PVC pipe fragment	Reworked and compacted soil	None noted
	20-75	10YR4/3 brown	Sandy clay loam, medium compaction	None	None noted	Appears to be natural horizon
	75-170	10YR5/3 brown	Silty sand loam, medium compaction. A greenish mudstone surface is present at around 110 cm with pockets of clay beneath.	None	None noted	None noted
	170-200	10YR5/4 yellowish brown	Silty sand, loosely compacted	None	None noted	None noted
15	0-25	10YR5/3 brown	Mixed sediments, very compact but lacks structure	None	Reworked and compacted soil	None noted
	25-70	10YR4/3 brown	Silty loam, compact	None	None noted	Appears to be natural horizon
	70-90	10YR4.5/3 brown	Sandy silt loam, medium compaction	None	None noted	Sand auger after 80 cm

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
	90-200	10YR5/4 yellowish brown	Fine silty sand, loosely compacted, transitioning to lighter color and sandier with depth	None	None noted	None noted
16	0-25	10YR5/3 brown	Silty loam, very compact	None	Likely plowed or graded and recompacted	None noted
	25-80	10YR4/3 brown	Sandy silt loam, medium compaction	None	None noted	Appears to be natural horizon
	80-180	10YR4/4 dark yellowish brown	Clayey sand, loosely compacted	None	None noted	Sand auger after 80 cm
	180-200	10YR5/4 yellowish brown	Gravelly fine sand	None	None noted	None noted
17	0-65	10YR4/3 brown	Silty sand loam, dry and compact from 0-20 cm; slightly less compact 20-65 cm	None	Appears minimal but likely historically plowed (0-20 cm)	None noted
	65-100	10YR4/4 dark yellowish brown	Loamy sand, low compaction	None	None noted	Sand auger after 80 cm
	100-130	7.5YR5/3 brown	Clayey silt, compact, with carbonate stringers after 120 cm	None	None noted	None noted

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
18	0-15		Loose sand and large gravel overburden	None	Road berm buildup	None noted
	15-40		75% gravel cemented with yellow sand/slurry mix	None	Road base	None noted
	40-60		75% gravel with compact sand and clay	None	Road base	Impenetrable with hand tools
19	0-10	10YR5/3 brown	Gravelly loose loam	None	Rodent burrowing	None noted
	10-40	10YR5/3 brown	Silty loam, very compact	1 colorless glass fragment	Likely plowed or graded and recompacted	None noted
	40-75	10YR4/3 brown	Silty loam, compact	None	None noted	Appears to be natural horizon
	75-160	10YR4/4 dark yellowish brown	Clayey silt, getting lighter in color with depth	None	None noted	None noted
	160-200	10YR5/4 yellowish brown	Fine sand, loosely compacted	None	None noted	None noted
20	0-50	10YR5/3 brown	Silty loam, very compact, dry	None	Likely plowed/recompacted	None noted
	50-75	10YR4/3 brown	Silty loam, compact	None	None noted	None noted

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
	75-130	10YR4/3 brown	Sandy loam, medium compaction	None	None noted	None noted
	130-200	10YR5/4 yellowish brown	Fine sand, loosely compacted	None	None noted	None noted
21	0-40	7.5YR3/2 dark brown	Silty loam, damp and soft	None	Rodent burrowing	Appears relatively undisturbed
	40-100	7.5YR3/3 dark brown	Silty loam, damp and soft	None	None noted	Sand auger after 90 cm
	100-120	7.5YR4/4 brown	Clayey sand loam, moist and loosely compacted	None	None noted	None noted
	120-160	7.5YR5/4 brown	Loamy sand, low compaction	None	None noted	None noted
	160-200	10YR5/4 yellowish brown	Fine sandy silt, loosely compacted	None	None noted	None noted
22	0-90	10YR4/3 brown	Silty loam, compact	None	None noted	Sand auger after 80 cm
	90-180	10YR5/4 yellowish brown	Sandy silt	None	None noted	None noted
	180-200	10YR6/4 light yellowish brown	Loamy silt, loose compaction	None	None noted	15% angular shale gravel

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
23	0-15	10YR4/3 brown	Gravelly sand and silt, very compact, lacks soil structure	Modern plastic and glass fragments	Graded and recompacted dirt	None noted
	15-40	7.5YR3/2 dark brown	Clayey loam, compact	None	None noted	None noted
	40-70	10YR5/3 brown	Loamy silt, medium compaction	None	None noted	None noted
	70-120	10YR3/2 very dark grayish brown	Clay loam to loamy clay with carbonate stringers below 90 cm, compact	None	None noted	Hand auger after 80 cm
	120-200	7.5YR5/4 brown	Loamy silt, compact	None	None noted	None noted
24	0-20	10YR4/3 brown	Gravelly sand and silt, very compact, lacks soil structure	None	Graded and recompacted dirt	None noted
	20-150	7.5YR3/2 dark brown	Silty clay loam to clayey silt, compact	1 piece of plastic that may have fallen from above	None noted	Hand auger after 80 cm
	150-120	10YR5/4 yellowish brown	Fine sandy silt, loosely compacted	None	None noted	None noted
25	0-28	10YR5/3 brown	Sandy loam to sandy clay loam, dry with moderate compaction	Piece of plastic	None noted	<10% gravel
	28-50	10YR4/3 brown	Silty clay loam, moderate compaction	None	None noted	None noted

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
	50-70	10YR3/2 - 5/3	Compact silty loam mottled with 20% soft silt	None	None noted	None noted
	70-80	10YR4/2 dark grayish brown	Silty clay loam, moderate compaction	None	None noted	None noted
	80-180	10YR4/3 brown	Fine sandy loam, low compaction	None	None noted	Sand auger after 80 cm
	180-200	10YR4/4 dark yellowish brown	Fine sandy loam with increasing gravel content, loose	None	None noted	None noted
26	0-30	10YR4/3 brown	Silty loam, dry and compact	None	Likely plowed or graded and recompacted	None noted
	30-80	7.5YR4/2 brown	Clayey loam, compact	None	None noted	None noted
	80-150	10YR5/4 yellowish brown	Clayey sand, loosely compacted	None	None noted	None noted
	150-200	10YR6/3 pale brown	Gravelly sand, loosely compacted	None	None noted	None noted
27	0-80	10YR4/3 brown	Clayey silt loam, compact	None	Bioturbation from 0-30 cm	None noted
	80-140	7.5YR6/3 pale brown	Loamy silt, compact	None	None noted	Hand auger after 80 cm

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
28	0-5	10YR4/2 dark grayish brown	Loose loamy sediments	None	None noted	None noted
	5-30	10YR4/3 brown	Silty clay loam, medium compaction	None	None noted	None noted
	30-70	10YR4/2 dark grayish brown	Silty loam, medium compaction	None	None noted	None noted
	70-150	10YR5/4 yellowish brown	Silty loam, medium compaction	None	None noted	Sand auger after 80 cm
	150-180	10YR4/3 brown	Silty loam, transitioning to 10YR5/3 -6/3 with depth	None	None noted	None noted
	180-200	10YR5/4 yellowish brown	Fine sand, loosely compacted	None	None noted	None noted
29	0-30	10YR4/3 brown	Gravelly silty loam, very compact	None	Likely graded and recompacted soil	None noted
	30-80	10YR3/2 very dark grayish brown	Silty clay loam, compact	None	None noted	Unable to auger through clay
30	0-100	10YR4/3 brown	Sandy Clay Loam or clayey loam; very compact but softens after 60 cm	pieces of asphalt and concrete and 1 large cobble between 0 and 40 cm	Likely plowed and possible reworked and compacted dirt from 0-40 cm	None noted

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
	100-150	10YR5/4 yellowish brown	Silty clay loam, low compaction, with calcium carbonates	None	None noted	Sand auger after 80 cm
	150-200	10YR5/4 yellowish brown	Loam transitioning to gravelly loamy sand after 170 cm	None	None noted	30% gravel at 190 cm
31	0-40	10YR5/3 brown	Gravelly silty loam, very compact	None	Heavy bioturbation.	None noted
	40-110	10YR4/3 brown	Clayey silt loam, compact	None	None noted	None noted
	110-180	10YR5/3 - 5/4 yellowish brown	Loamy silt, dry and compact	None	None noted	None noted
	180-200	10YR6/3 pale brown	Silt, loosely compacted	None	None noted	None noted
32	0-40	10YR5/3 brown	Sandy loam, dry, very compact with 40% mixed gravel	Small concrete chunks and some plastic	Likely graded and recompacted soil	None noted
	40-120	10YR4/3 - 5/3 brown	sandy silty loam, transitioning to loamy silt, medium compaction	None	None noted	Sand auger after 80 cm
	120-160	10YR6/3 pale brown	Fine silty sand with approx. 25% gravel	None	None noted	Terminated at gravelly layer

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
33	0-10	10YR4/3 brown	Loose sand and silt	None	Artificial fill	None noted
	10-30		Gravel and sand road base	None	Artificial fill	None noted
	30-60	10YR4/3 to 3/2 brown	Sandy loam or clayey sand loam, very compact	None	Mottled and lacks structure. Likely reworked or plowed soil and recompacted	Not uniform
	60-120	10YR4/3 brown	Silty clay loam, moderate compaction	None	Looks like natural A horizon	Sand auger after 80 cm
	120-200	10YR5/3 - 6/3 pale brown	Silty loam, low compaction, getting lighter with depth	None	None noted	None noted
34	0-15	10YR4/3 brown	Gravelly sand, loose compaction, 25% poorly sorted gravels	None	Looks like road base	None noted
	15-27	10YR5/3 brown	Gravelly sand continuation, but high compaction	None	Road base	None noted
	27-37	10YR5/4 yellowish brown	Sand and gravel, rock hard, with 60-70% poorly sorted gravel	None	Road base	None noted
	37-100	10YR3/2 very dark grayish brown	clay loam, high to moderate compaction	None	Tiny bits of asphalt down to 80 cm	Sand auger after 80 cm

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
	100-185	10YR4/4 dark yellowish brown	Silty clay loam, low compaction	None	None noted	None noted
	185-200	10YR4/4 dark yellowish brown	Fine powdery sandy loam	None	None noted	None noted
35	0-25	10YR5/3 brown	Highly compacted sandy loam	Several small pieces of asphalt and concrete	Reworked and compacted soil	None noted
	25-70	10YR4/3 brown	sandy clay loam to sandy loam, very compact	Several small asphalt bits down to approx. 40 cm	Does not appear to be natural soil stratum. Lacks soil structure	Mottled soil color between 10YR4/2 and 3/2. Very compact but breaks up easy.
	70-170	10YR3/3 dark brown	Sandy loam, moderate compaction; transitions to 10YR4/4 after 120 cm	None	None noted	Sand auger after 80 cm
	170-200	10YR5/4 yellowish brown	Loamy sand, low compaction	None	None noted	None noted
36	0-25	10YR6/3 pale brown	Sandy loam, very compact, with 40% large gravels/ballast	1 metal wire piece; 1 large asphalt chunk	Appears to be artificial fill with slurry/gravel mix	None noted
	25-55	10YR5/3 brown	Loamy sand, dry and compact	None	None noted	None noted
	55-100	10YR4/2 dark grayish brown	Clayey sand loam to silty loam, medium compaction	None	None noted	Clay auger after 60 cm

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
	100-150	10YR4/3 brown	Silty loam, medium compaction	None	None noted	None noted
	150-200	10YR6/4 light yellowish brown	Fine sandy silt	None	None noted	Sand auger
37	0-65	10YR4/2 dark grayish brown	Fine sandy loam, medium compaction, 60% large gravel from 0-10 cm decreasing to 20% gravel below 10cm	1 wire nail; 1 colorless glass fragment; 1 piece of asphalt	Gravel consists of ballast from nearby stockpile to the south. Likely all artificial fill	None noted
	65-80	10YR4/3 brown	Loamy sand, medium compaction, with 10% small gravels	Aluminum pull tab and a few small, rusted metal fragments	None noted	None noted
38	0-40	10YR5/3 brown	Loamy sand, very compact, with poorly sorted gravel	Small pieces of asphalt and 1 Styrofoam chunk	Probable overburden with possible slurry mix	None noted
	40-80	10YR4/3 brown	Loamy coarse sand, moderate compaction, with 40-50% mixed gravel	2 rusted iron pieces and 1 piece of cement/mortar	Continuation of above disturbed layer, less dry	None noted
	80-200	10YR4/3 brown	Fine sand, loosely compacted	None	None noted	Hand auger after 80 cm
39	0-50	10YR5/3 brown	Sandy with clay, very compact, with 40-50% gravel	Several small glass and asphalt fragments	Appears to be artificial fill with slurry/imported gravel mix	None noted
	50-75	10YR4/3 brown	Sandy loam, very compact, minimal gravel	None	None noted	None noted

STP#	Depth (cm)	Munsell Soil Color	Soil Description	Cultural Material	Disturbance	Comments
	75-90	10YR4/3 brown	Gravelly loamy sand with 20% poorly sorted gravel	None	None noted	Sand auger after 75 cm. Unable to excavate past 90 cm
40	0-50	10YR5/3 brown	Sandy with clay, compact, with 50-60% gravel	Several green glass fragments and chunks of asphalt and concrete	Appears to be artificial fill with slurry/gravel mix	None noted
	50-80	10YR4/3 brown	Sandy loam, very compact, 5% gravel	None	None noted	None noted
	80-110	10YR4/3 brown	Loamy sand with 20% gravel	None	None noted	Sand auger after 80 cm. Terminated at large rock obstruction
41	0-5	10YR4/3 brown	Loose sand and silt	None	Loose overburden	None noted
	5-30	10YR6/3 pale brown	Sandy silt loam with 40-50% gravel	1 piece of colorless glass; several chunks of asphalt	Compacted artificial fill	None noted
	30-70	10YR5/3 brown	Silty loam, dry, very compact	None	Possibly compacted	None noted
	70-180	10YR5/3 - 4/3 brown	Silty loam to fine sandy silt, gradually less compact	None	None noted	Sand auger after 70 cm
	180-200	10YR6/4 light yellowish brown	Fine loamy sand, dry and loose	None	None noted	None noted

Appendix E
Technical Memorandum
Hazards and Hazardous Materials

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority

550 S. Main St.
Orange, CA 92868
and

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

Prepared by:

AECOM
300 S. Grand Ave.
Los Angeles, CA 90071

September 2023

REVISION	DESCRIPTION	DATE
0	Draft Hazards & Hazardous Materials Technical Memorandum	01/06/21
1	Draft Hazards & Hazardous Materials Technical Memorandum (Incorporating OCTA's comments)	02/25/21
2	Final Hazards & Hazardous Materials Technical Memorandum	09/22/2023

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1. INTRODUCTION

The Southern California Regional Railroad Authority (SCRRA) Metrolink Commuter Rail System (Metrolink) is proposing to construct a new Orange County Maintenance Facility (hereafter referred to as "OCMF" or "the Project"). The Project would include several facilities including a transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth, sand silos, a maintenance facility, a maintenance facility extension, and 11 tracks. Approximately 80 employees would report to the Project. The Project consists of buildings that would have a total building area of approximately 90,000 square feet when combined. Metrolink currently operates two maintenance facilities across its service area: Central Maintenance Facility (CMF) in Los Angeles and Eastern Maintenance Facility (EMF) in San Bernardino County. Due to projected population expansion within its service area and the agency's goal to be prepared for the 2028 Los Angeles Summer Olympic Games, Metrolink will require an increased number of commuter rail services, as well as additional train storage and maintenance facilities associated with an increased fleet size. As a significant proportion of the expanded services will operate in Orange County, the Project would provide an optimal location for a new Metrolink maintenance facility. Metrolink's member agency, the Orange County Transportation Authority (OCTA), proposes to build this facility on an OCTA-owned parcel in the City of Irvine. OCTA is the lead agency under the California Environmental Quality Act (CEQA). The City of Irvine and SCRRA are the responsible agencies under CEQA.

The purpose of this memorandum is to present the results of a Hazardous Materials investigation and to describe the potential impacts to the proposed OCMF project.

2. PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

As a result of the projected population expansion within the five-county area (Orange County, Los Angeles County, San Bernardino County, Riverside County, and Ventura County) currently served by the SCRRA, Metrolink will require an increased number of commuter rail services to support the growth. Consequently, the Metrolink system (Figure 2.1-1) would require additional train storage and maintenance facilities to support an increased fleet size.

Figure 2.1-1 Metrolink System Map



Source: SCRRA (2019)

Metrolink's CMF facility is located on the east bank of the Los Angeles River near the Interstate 5 (I-5) and Interstate 10 (I-10) highways, just south of the location of the former Southern Pacific Taylor Yard. The CMF is currently near capacity, which will impact the ability to provide the necessary train servicing for planned service-expansion of various Metrolink lines throughout the system under the Southern California Optimized Rail Expansion (SCORE) program. By transferring a portion of the current fleet from CMF to the proposed OCMF (specifically the Orange County Line trains), capacity for the non-Orange County trains will be increased at CMF. The Orange County Line has the highest ridership within the Metrolink system; therefore, a maintenance facility to serve the Orange County area with sufficient storage and servicing capabilities for both locomotives and rail cars is critical to controlling operating costs. In order to optimize rail service in the region, the proposed facility development would need to be completed by 2028. The SCORE program may also require heavy overhaul capabilities at OCMF, subject to pending decisions regarding fleet technology and management.

The expansion of Orange County and overall Metrolink commuter rail service will ultimately require additional or expanded equipment servicing capabilities for both locomotives and rail cars. Since a significant portion of the fleet will be in Orange County, a maintenance facility located along the Metrolink route through Orange County would be the optimal location as it would reduce operating costs by limiting non-revenue moves to the existing SCRRA storage and maintenance facilities in the cities of Los Angeles and San Bernardino. The proposed maintenance facility would provide equipment to inspect, clean, and maintain cars and locomotives on a regular and efficient basis. Much of the inspection and maintenance activity is federally mandated and must be performed at specific intervals. The OCMF will also provide refueling services thus reducing fuel costs, reducing fuel consumption, and will reduce emissions. Currently trains operating in the Orange County Region must travel either the CMF or EMF for refueling, which are sometimes non-revenue runs. The location of the Project is on a 21.3-acre OCTA-owned parcel on Ridge Valley south of Marine Way in the City of Irvine (Project Site). The Project Site is located within the boundaries of a closed military base (Marine Corps Air Station [MCAS] El Toro) formerly owned by the United States Department of the Navy (DON). After MCAS El Toro was closed, the site was quitclaimed by the Navy to Heritage Fields El Toro, LLC in 2011, and then by way of grant deed conveyed by Heritage Fields to the City of Irvine that same year. OCTA then purchased the fee ownership of the Project Site from the City of Irvine. Regional vehicle access to the Project Site is from I-5 at Sand Canyon Avenue. Local vehicle access is via Marine Way to Ridge Valley.

Prior to the current construction of the storage/set-out track, the Project Site was mostly vacant. The site currently includes 1,000-foot-long storage for miscellaneous rail equipment including temporary railroad bridges, signal houses, railroad ties, and signal components. Although not part of the Project, OCTA is currently installing a single 1,000-foot-long, single-ended storage track and fencing of the perimeter of the property to provide temporary storage of two trainsets and/or track maintenance equipment when necessary. There is a segment of an abandoned road, stormwater drains, and underground water transfer vault with a network of pipelines, valves and associated vents, that are currently not in use.

2.2 PROJECT DESCRIPTION

The OCMF would be located in the City of Irvine, on a 21.3-acre parcel owned by OCTA and adjacent to Marine Way and the Metrolink Orange subdivision between mileposts 183.50 and 184.00 on Metrolink's "Orange" Subdivision (Figure 2.2-1). The Project Site is located within Planning Area 51 of the updated City of Irvine General Plan, adopted in June 2015, and designated for the Great Park (formerly known as the Orange County Great Park (OCGP)) land use under the General Plan. Per the City's zoning ordinance, the proposed use is a conditionally allowable use under the existing zone; therefore, OCTA is submitting a Conditional Use Permit to the City of Irvine for approval.

The Project would be developed in two phases with an anticipated completion date of 2028. Phase 1 focuses on developing facilities needed for the storage and routine cleaning, inspection and servicing of the anticipated trainsets. The total area of the Phase 1 buildout would be approximately 20,996 square feet and would be comprised of the following facilities: the transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth and sand silos (Table 2.2-1). A total of 11 tracks would be built. The Phase 1 layout situates the train wash, fueling/sanding, and service and inspection tracks on the two tracks with the greatest tangent length, which are the ones nearest the railroad right of way ("ROW"). This is important in fitting a second fueling/sanding facility so that there is one at each end of the service and inspection platform to support having the locomotive at either end, all within tangent track. Additionally, six storage tracks and appurtenant features (air, water, head end power and toilet dump facilities) would be constructed. The storage tracks would be built near the middle of the site east of the service and inspection tracks. Phase 1 of the buildout would anticipate approximately 52 employees total throughout the entire day, split across three eight-hour shifts.

Table 2.2-1 Building Specifications

Building/Facility/Item	Building Area	Building Height
Transportation Building	7,495 sq. ft.	20 ft
Train Wash Building	11,110 sq. ft.	21 ft
Maintenance Building	40,392 sq. ft.	48 ft
Maintenance Building Expansion	27,880 sq. ft.	---
Utility Building	981 sq. ft.	20 ft
Pump House	750 sq. ft.	14 ft
Guard Booth	36 sq. ft.	---
Equipment Booth	48 sq. ft.	---
Sand Silos (2 Total)	576 sq. ft.	---
Total	89,268 sq. ft.	

Source: Gannett Fleming, Metrolink (February 2022)

Note: sq. ft. = square feet; ft = feet

A runaround track would be provided between the service and inspection tracks and storage tracks. Additionally, two temporary stub-ended set out tracks would be provided in the Phase 1 layout that occupies the footprint of the future shop tracks (one at the north and one at the south end of the yard). These set out tracks would be converted to shop access tracks in Phase 2 and, therefore, would no longer be available as set out tracks. A new set out track would then be provided as part of Phase 2.

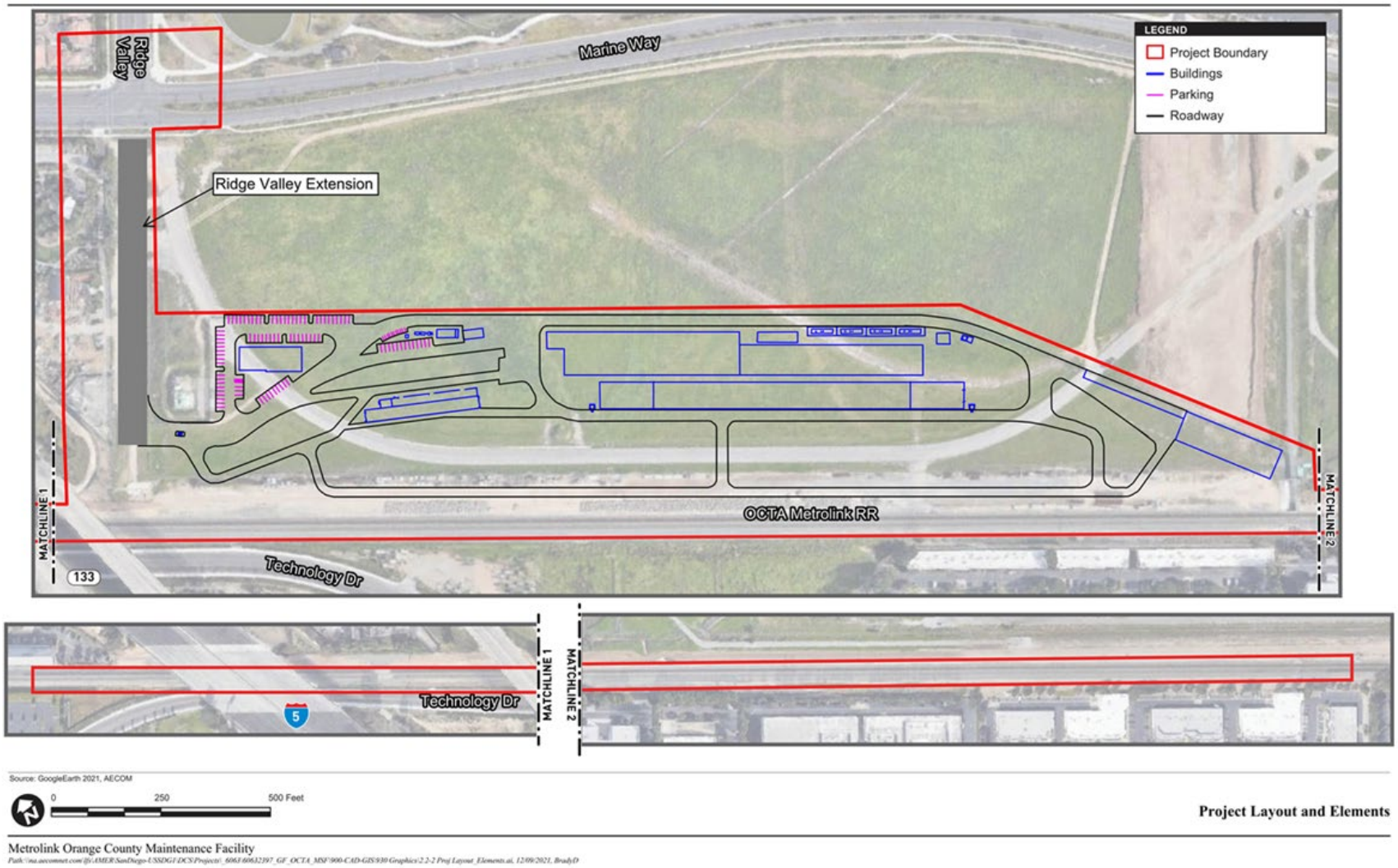
A transportation building that would be utilized for administrative purposes is also included in Phase 1. This building would house managerial offices, welfare spaces for train crews and on-site personnel. This facility would include restrooms, showers, locker rooms, a break/day room, vending space and a kitchenette. Approximately 120 automobile parking spaces would be provided for staff reporting to the site. Fire department compliant roadways would be developed to permit circulation of the site for Metrolink vehicles as well as delivery trucks (sand and fuel).

Phase 2 completes the full buildout of the Project. It would include development of the maintenance shop building and its future extension that would comprise of a total buildout area of 68,272 square feet (Table 2.2-1). The shop would have capabilities to perform regular three-month, six-month, and one-year preventive maintenance cycles on trainsets. Phase 2 of the buildout would consist of approximately 28 employees. With the full buildout of Phase 1 and Phase 2, approximately 80 employees are expected to access the Project Site daily, split across three eight-hour shifts.

Access to the OCMF would require a roadway extension along Ridge Valley from the intersection of Ridge Valley and Marine Way. The Project includes the southern extension of Ridge Valley Road from Marine Way and associated traffic signal improvements to provide access to the OCMF.

The 11 new east and west lead tracks, as discussed in this section above, would be constructed within the existing railroad corridor between MP 183.0 and MP 184.00 on Metrolink's "Orange" Subdivision to connect the existing mainline railroad to the proposed OCMF rail yard. A new single span concrete bridge over the Bee Canyon Channel (Channel) would be built for the east lead track. A segment of the Channel and utilities that are found to be in conflict would be lowered by approximately 2.5 feet to facilitate the construction of the bridge.

Figure 2.2-1 Project Layout and Elements



Source: ESRI (2021), OCTA (2021)

3. ENVIRONMENTAL SETTING

3.1 EXISTING CONDITIONS

The Project Site is located within a portion of the former MCAS El Toro, which was decommissioned in 1999, which is a Superfund site [(U.S. Environmental Protection Agency (EPA), 2020]. Hazardous materials, including chemicals and jet fuels, were stored and used on various portions of the former MCAS, including the OCMF site. These chemicals resulted in contamination of the soils, for which the DON was required to perform environmental remediation. From records provided by the DON, it appears only two groundwater monitoring wells were installed within the Project Site after the closure of MCAS El Toro. One of the wells is located in the middle of the proposed storage yard (between storage tracks) and would require relocation. The other well is located near the south entrance of the site and appears out of conflict with any major proposed improvements. The site will be developed to provide for periodical access to the wells by the DON. Previous analysis related to hazardous materials have been prepared to address contamination on the Project Site. Figure 3.2-1 shows the location of the known hazardous materials sites in the vicinity of the Project Site. A Phase I Site Assessment completed in 2014 did not find any recognized environmental condition (REC) sites (Kleinfelder 2014). There is an updated Phase I Environmental Site Assessment that is currently being finalized, which has been used to supplement this information.

As mentioned in the Wildfire portion of Chapter 5 of the Baseline Analysis, the Project Site is not located within or in proximity to an area designated as “High Fire Severity Rating & Open Space with Fire Potential” according to the City of Irvine General Plan’s Safety Element.

Moreover, the Project Site is not located within two miles of a public airport or public use airport. The closest airport to the Project Site is John Wayne Airport, which is located in Santa Ana adjacent to the City of Irvine boundary. This airport is approximately seven miles to the west of the Project Site and, thus, the Project Site is located outside of the John Wayne Airport Clear Zones according to the City of Irvine General Plan’s Safety Element. No private airstrip exists in the vicinity of the Project, either.

In addition, there are no existing schools or educational institutions within one-quarter mile of the Project Site (refer to Table 3.15-1 Public Service Facility Summary, in Chapter 3.15 Public Services).

3.2 REGULATORY FRAMEWORK

3.2.1 Federal

Hazardous Materials Resources

The USEPA is the lead federal agency responsible for enforcing federal regulations regarding hazardous materials. The primary legislation governing hazardous materials includes the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Superfund Amendments and Reauthorization Act (SARA), and the Toxic Substances Control Act (TSCA).

Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA, also known as Superfund, created a tax on the chemical and petroleum industries to provide for response and cleanup of hazardous substances that may endanger public health or the environment. CERCLA established requirements for abandoned hazardous waste sites and provided for liability of persons responsible for releases of hazardous waste at these sites.

Figure 3.2-1 Known Hazardous Material Sites



Superfund Amendments and Reauthorization Act

SARA amended CERCLA to increase state involvement and required Superfund actions to consider state environmental laws and regulations. SARA also established a regulatory program for underground storage tanks (USTs) and the Emergency Planning and Community Right-to-Know Act (EPCRA).

3.2.2 State

In case of any chemical release of hazardous materials, the project will comply with the Hazardous Materials Release Notification, including the following:

- Health and Safety Codes Sections 25270.7, 25270.8, and 25507
- Vehicle Code Section 23112.5
- Public Utilities Code Section 7673 (PUC General Orders #22-B, 161)
- Government Code Sections 51018, 8670.25.5 (a)
- Water Codes Sections 13271, 13272
- Labor Code Section 6409.1(b)10

If hazardous materials or extremely hazardous materials are to be handled at the project site more than a specified amount ("reporting quantity"), the project will need to develop and submit a Hazardous Materials Business Plan (HMBP) as mandated both by the federal government (Code of Federal Regulations) and the State of California (Health and Safety Code) to the Orange County Health Care Agency (OCHCA).

3.2.3 Local

The project will need to comply with the Irvine Municipal Code, especially Division 9 (Emergency Services) and Division 17 (Hazardous Materials) of Title 4 (Public Safety), as well as the Irvine Zoning Ordinance, Chapter 2-13 (Hazardous Waste Facility Procedure).

The project will also need to comply with the Hazardous Materials Disclosure Program and the Accidental Release Prevention Program. The Unified Program is implemented at the local government level by the OCHCA. The Hazardous Materials Division of OCHCA is designated by the State Secretary for Environmental Protection as the CUPA for Orange County. Inspections and business plans are managed by the Orange County Fire Authority (OCFA) on behalf of OCHCA.

Assembly Bill (AB) 1130 authorized CUPAs to administer and implement programs related to the Aboveground Petroleum Storage Act (APSA) for any business with a total aboveground storage capacity of 1,320-gallons of petroleum products in tanks or containers larger than 55 gallons. APSA defines "Petroleum" as crude oil, or any fraction thereof, which is liquid at 60 degrees Fahrenheit temperature and 14.7 pounds per square inch absolute pressure. Tank facilities that are regulated under APSA are also regulated by the U.S. EPA Region 9 Oil Program Clean Water Act Compliance Office. Since the Project will consider building underground storage tanks or aboveground storage tanks (ASTs) for petroleum products/fuels, the plan will need to comply with the California Code of Regulations for underground and aboveground tanks, respectively, as oversight by OCHCA. APSA would require the following of the Project if

storage of petroleum tanks meets or exceeds the 1,320-gallon aboveground petroleum products/fuels storage threshold:

- Complete and submit to OCHCA an initial Aboveground Petroleum Storage Tank Facility Statement Form.
- Prepare and implement an Spill Prevention Control and Countermeasures (SPCC) Plan in accordance with U.S. Code of Federal Regulations, Title 40, Part 112 (40 CFR 112).
- Conduct periodic inspections of ASTs to ensure compliance with the 40 CFR 112.
- Allow OCHCA to conduct periodic inspections.
- Immediately notify the California Emergency Management Agency (EMA) and OCHCA upon discovery of a spill or release of 42 gallons or more of petroleum.

Facilities regulated under APSA or the Federal SPCC Rule must prepare and implement a Spill Prevention Control and Countermeasures Plan (SPCC Plan) or Spill Prevention and Counter Measure Plan. Regulated facilities fall into three categories:

- Aboveground storage capacity more than 10,000 gallons who must prepare a full plan that has been certified by a Professional Engineer and be approved by the facility or corporation management.
- Aboveground storage capacity more than 1,320-gallons and less than 10,000-gallons, and with no history of release, can prepare and self-certify an abbreviated plan. These businesses are known as "Qualified Facilities". There are in turn two types of Qualified Facilities, Tier I and Tier II Qualified Facilities:
    - Tier I Qualified Facility: has between 1,320 and 10,000 gallons with no single container greater than 5,000-gallons and have no single discharge to navigable waters or adjacent shorelines exceeding 1,000 gallons and no two discharges, each exceeding 42 gallons within any twelve-month period in the past three years.
    - Tier II Qualified Facility: has between 1,320 and 10,000 gallons with a single container greater than 5,000 gallons and have no single discharge to navigable waters or adjacent shorelines exceeding 1,000 gallons and no two discharges, each exceeding 42 gallons within any twelve-month period in the past three years.

The Project will need to notify the appropriate State and local agencies (e.g., OCHCA, DTSC, or the Regional Water Quality Board) since soil and groundwater contamination is present due to the MCAS site. Notification to these State and local regulatory oversight agencies will simultaneously satisfy coverage under the applicable Federal agencies under Superfund (refer back to Section 3.2.1 above). If requested as follow-up by the State and/or local regulatory oversight agency(ies), then an environmental site assessment or a risk assessment (e.g., human health risk assessment) shall be prepared to ensure that future site activities and/or uses pose no risks to human health and/or the environment.

In accordance with the State Water Board's requirements for construction sites greater than one acre, a stormwater pollution prevention plan (SWPPP) must be prepared and implemented during construction for coverage under the National Pollution Discharge Elimination System (NPDES) Construction General Permit. Similarly, construction sites subject to the Construction General Permit are required to implement SWPPP in the City of Irvine. While Santa Ana Regional Water Quality Board issues the Construction General Permit, Water Quality Ordinance (No. 10-06) gives the City of Irvine adequate legal authority as may be necessary to carry out the requirements of the NPDES Permit and accomplish the requirements of the Clean Water Act.

4. METHODOLOGY

A Draft Phase I Environmental Site Assessment (ESA) was prepared for the Project Site by Diaz, Yourman & Associates, on behalf of OCTA, dated November 12, 2020. The assessment was performed in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Standard E1527-13. During the assessment, the Project Site was observed currently vacant, with the exception of a segment of an abandoned road, stormwater drains, an underground bunker with a network of pipelines, valves and associated vents, and including miscellaneous rail equipment observed stored on site. The following hazardous materials were identified in the assessment to be potentially encountered at the Project Site from historical and/or current uses:

1) Hydrocarbons, volatile organic compounds (VOCs) including chlorinated solvents such as trichloroethylene (TCE), and metals to soil, soil vapor and/or groundwater from historical former MCAS El Toro operations, adjacent oil and gas pipelines, and soil and other debris stockpiles observed on site;
2) Pesticides/herbicides to soil from historical agricultural crop land use;
3) Polychlorinated biphenyls (PCBs)-containing equipment remaining on site, if any including potential impacts to soils due to leaks;
4) Asbestos-containing material (ACM) and lead-based paint from existing structures;
5) Treated wood waste (TWW) from materials remaining on site (e.g., railroad ties); LBP/chromium from yellow thermoplastic striping from road materials remaining on site; and, aerially deposited lead in soil due to adjacent and onsite roadways.

5. IMPACTS ANALYSIS

Based on the above-described proposed project information, the following hazards and hazardous materials impacts analysis is provided for the Project Site:

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

   Determination: **Less Than Significant Impact**

   Construction and operation of the Project Site would require the routine handling and storage of petroleum products and hazardous materials. Wastes including used oils and hazardous wastes generated from the Project Site would be properly managed, transported and disposed resulting in less than significant hazard to the public or environment. The Project shall comply to regulatory standards specified under the California Code of Regulations (CCR), Title 22, Division 4.5 during the transport, use, or disposal of hazardous materials to make this a less than significant impact. Criteria for identifying characteristics of hazardous waste are also designated in CCR Title 22 Division 4.5.

2) 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?

   Determination: **Less Than Significant Impact**

   Construction Impacts

   Due to the routine handling and use of petroleum products and hazardous materials to be used during the construction of the proposed project, the potential for environmental impacts from hazardous material incidents is less than significant. The most likely incidents involving these materials are associated with minor drips, leaks or spills. Impacts from such incidents would be avoided by thoroughly cleaning up minor drips, leaks or spills as soon as they occur. A site-specific SWPPP would be developed and implemented to ensure quick response to minor drips, leaks or spills.

   Operational Impacts

   The Project Site would conduct routine handling and use of petroleum products and hazardous materials that could leak or spill if equipment such as tanks are damaged from a seismic event, fire or other unforeseen incident. To minimize potential impacts, the design of the proposed project would provide containment and/or diversionary structures or equipment to prevent illicit discharge of an oil or hazardous materials spill. Furthermore, the facility would develop and implement a HMBP and SPCC Plan before reportable quantities of hazardous materials/wastes or

tanks/oil-filled equipment are handled or stored on site. The HMBP includes an Emergency Response Plan element.

If the Project has aboveground petroleum products/fuel tanks larger than 55-gallons with the storage capacity of 1,320-gallons or more, the SPCC Plan would be required to comply with the regulatory framework set forth by the Aboveground Storage Tank Act. Tank facilities that are regulated under APSA are also regulated by the U.S. EPA Region 9 Oil Program Clean Water Act Compliance Office. The Project would be required to prepare and implement an SPCC Plan in accordance with U.S. Code of Federal Regulations, Title 40, Part 112 (40 CFR 112). In addition, SCRRA would be required to immediately notify the California Emergency Management Agency (EMA) and OCHCA upon discovery of a spill or release of 42 gallons or more of petroleum.

These programs and plans would be developed to be consistent with other Metrolink maintenance facilities.

3) 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?

Determination: **No Impact**

There are no existing schools or educational institutions within one-quarter mile of the Project Site.

4) Would the project be 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?

Determination: **Less Than Significant Impact**

The Project Site is located within a portion of the MCAS El Toro Superfund site, situated within a portion of Operating Unit (OU) 2A - IRP Site 24 - water transfer facility. According to the Phase I ESA, one groundwater monitoring well (18BGMW101A) and one groundwater extraction well (24EX11) in connection with IRP Site 24 are located within the Project Site boundaries. According to additional information provided in site documents available in the online California Department of Toxic Substances Control's (DTSC's) Envirostor database and on the EPA's Superfund Site El Toro MCAS web page, buried water transfer conveyance lines associated with these wells are also located within the Project Site boundaries. An Institutional Control (IC) is in effect in connection with IRP Site 24, which includes the following land use restrictions and/or requirements:

- Activities prohibited which disturb the remediation and monitoring systems without approval;
- Annual inspection and/or report;
- No drilling for drinking water, oil or gas without approval;
- Notify damages to remedy and monitoring systems no later than 10 days upon discovery;
- Notify no later than 30 days after change of property owner; and
- Only extraction of groundwater for site remediation and/or construction dewatering permitted.

Prior to construction of the project and also following construction of the project, proper notifications to the required parties will be made in accordance with the IRP Site 24 IC in order to maintain compliance with the site management requirements/IC in connection with the ongoing military clean-up site operations.

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

Determination: **No Impact**

The Project Site is not located within two miles of a public airport or public use airport. The closest airport to the Project Site is John Wayne Airport, which is located in Santa Ana adjacent to the City of Irvine boundary. This airport is approximately seven miles to the west of the Project Site and, thus, the Project Site is located outside of the John Wayne Airport Clear Zones according to the City of Irvine General Plan's Safety Element. No private airstrip exists in the vicinity of the Project, either.

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

Determination: **No Impact**

Construction Impacts

In places where the components of the Proposed Project span a road or require a lane closure, construction activities would be coordinated with the local jurisdiction so as not to cause closure of any emergency access route. Flaggers may briefly hold traffic back while conductor is pulled across a roadway, but emergency vehicles would be provided access even in the event of temporary road closures. Therefore, emergency access would not be directly impacted by construction of the proposed project because all streets would remain open to emergency vehicles at all times during construction activities.

Operational Impacts

The Project Site design will be constructed in a configuration that complies with required emergency response plan or emergency evacuation plan elements in accordance with project design and permitting requirements.

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

Determination: **No Impact**

The Project Site is not located within or in proximity to an area designated as "High Fire Severity Rating & Open Space with Fire Potential" according to the City of Irvine General Plan's Safety Element. Additionally, the Project Site would be grubbed of vegetation and graded prior to the staging of equipment, further minimizing the potential for wildland fires.

6. MITIGATION MEASURES

Mitigation measures were described in Section 5 above where a less than significant impact to the Project Site was identified. The mitigation measures for the Project Site are summarized as follows:

MM-HAZ-1 The Project applicant shall notify the appropriate agencies (e.g., OCHCA, DTSC, USEPA, or the Regional Water Quality Board) regarding soil, soil gas and/or groundwater contamination in connection with the ongoing military clean-up site associated with the former El Toro MACS Superfund site.

MM-HAZ-2 Where the Project Site construction and operational activities coincide with the current groundwater monitoring systems (e.g., wells, water transfer conveyance lines) the requirements of the IC in connection with IRP Site 24 for the ongoing military clean-up site associated with the former El Toro MACS Superfund site shall be adhered to in order to protect human health and the environment from potential hazardous materials exposures.

MM-HAZ-3 Prior to construction activities at the Project, if required by the State or local regulatory oversight agencies, then further assessment including soil, soil vapor and/or groundwater investigations shall be conducted to reveal the presence, if any, of potential hazardous materials at the Project Site that were identified as a result of the Phase I ESA, and would assist in determining further mitigations required to address human health and/or the environment impacts due to potential hazardous materials exposures.

MM-HAZ-4 The Project shall need to adhere to all required permit applications and permit conditions, and local, state and federal requirements (e.g., regulatory framework, site-specific environmental permits and plans).

7. IMPACTS AFTER MITIGATION MEASURES

Impacts after implementing mitigation measures MM-HAZ-1 through MM-HAZ-4 would result in less than significant impact related to hazards and hazardous materials during construction and operations.

8. REFERENCES

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Appendix F
Technical Memorandum
Noise and Vibration

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority
550 S. Main St.
Orange, CA 92868

and

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

Prepared by:

AECOM

401 West A Street
Suite 1200
San Diego, CA 92101

September 2023

REVISION	DESCRIPTION	DATE
0	Draft Noise & Vibration Technical Memorandum	01/14/2021
1	Draft Noise & Vibration Technical Memorandum (Incorporating OCTA's comments)	02/25/2021
2	Final Noise & Vibration Technical Memorandum	09/23/2023

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Glossary

Term	Abbreviation	Description
A-Weighted Decibels	dBA	A-weighted sound levels represent the overall noise at a receiver that is adjusted in frequency to approximate typical human hearing sensitivity. This is expressed as A-weighted decibels (dBA), the basic noise unit for transit noise analyses.
Community Noise Equivalent Level	CNEL	CNEL is a single number result that is calculated for a complete 24-hour period and usually made up of results taken at shorter intervals such as 5 minutes or 1 hour and then averaged over the whole 24 hours. This measurement is similar to L_{dn} except with a 5 dBA penalty added for hours between 7 PM and 10 PM. The logic behind this applied penalty is that since most residents in a given area are somewhat sensitive to noise during evening hours, a weighting factor is applied.
Day-Night Sound Level	L_{dn}	L_{dn} describes a receiver's cumulative noise exposure from all events over 24 hours. Events between 10 PM and 7 AM are increased by 10 dB to account for humans' greater nighttime sensitivity to noise. L_{dn} is used to assess transit noise for residential land uses.
Equivalent Sound Level	$L_{eq(t)}$	The equivalent sound level $L_{eq(t)}$ describes a receiver's cumulative noise exposure from all events normalized to a specified period of time "t". $L_{eq(t)}$ represents a hypothetical, constant sound level and contains the same overall sound energy as the actual varying sound energy during the time period "t". For transit noise impact assessments, the equivalent sound level metric is A-weighted and all events are normalized over a one-hour time period, $L_{eq(1hr)}$. For transit noise assessments, this metric is appropriate for non-residential land uses and is computed for the loudest hour of project related activity during hours of noise sensitivity.
Maximum Sound Level	L_{max}	The maximum level describes the maximum noise level reached during a single noise event. For transit noise impact assessments, it is appropriate to consider the A-weighted maximum level (L_{max}) to understand the full context of the scenario. It is not appropriate to use this metric for transit noise impact assessments. This metric is commonly used in vehicle noise specifications and commonly measured for individual vehicles.
Peak Particle Velocity	PPV	The peak signal value of an oscillating vibration velocity waveform. Usually expressed in inches/second in the United States. Often used to assess potential building damage due to ground-borne vibration.
Sound Exposure Level	SEL	SEL is the cumulative noise exposure from a single noise event, normalized to one second. SEL contains the same overall sound energy as the actual varying sound energy during the event. It is the primary metric for the measurement of transit vehicle noise emissions and is an intermediate metric in the measurement and calculation of both $L_{eq(t)}$ and L_{dn}.
Vibration Decibels	VdB	The vibration velocity level in decibel scale. Often used to assess annoyance due to ground borne-vibration.

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1. INTRODUCTION

The Southern California Regional Railroad Authority (SCRRA) Metrolink Commuter Rail System (Metrolink) is proposing to construct a new Orange County Maintenance Facility (hereafter referred to as "OCMF" or "the Project"). The Project would include several facilities including a transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth, sand silos, a maintenance facility, a maintenance facility extension, and 11 tracks. Approximately 80 employees would report to the Project. The Project consists of buildings that would have a total building area of approximately 90,000 square feet when combined. Metrolink currently operates two maintenance facilities across its service area: Central Maintenance Facility (CMF) in Los Angeles and Eastern Maintenance Facility (EMF) in San Bernardino County. Due to projected population expansion within its service area and the agency's goal to be prepared for the 2028 Los Angeles Summer Olympic Games, Metrolink will require an increased number of commuter rail services, as well as additional train storage and maintenance facilities associated with an increased fleet size. As a significant proportion of the expanded services will operate in Orange County, the Project would provide an optimal location for a new Metrolink maintenance facility. Metrolink's member agency, the Orange County Transportation Authority (OCTA), proposes to build this facility on an OCTA-owned parcel in the City of Irvine. OCTA is the lead agency under the California Environmental Quality Act (CEQA). The City of Irvine and SCRRA are the responsible agencies under CEQA.

This technical memo provides the summary results of the noise and vibration analysis associated with the construction and operation of the proposed OCMF. This document provides concise sections regarding the project description, environmental setting, noise and vibration prediction methodology, impact analysis and recommended mitigation measures associated with the Project.

2. PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

As a result of the projected population expansion within the five-county area (Orange County, Los Angeles County, San Bernardino County, Riverside County, and Ventura County) currently served by the SCRRA, Metrolink will require an increased number of commuter rail services to support the growth. Consequently, the Metrolink system (Figure 2.1-1) would require additional train storage and maintenance facilities to support an increased fleet size.

Figure 2.1-1 Metrolink System Map



Source: SCRRA (2019)

Metrolink's CMF facility is located on the east bank of the Los Angeles River near the Interstate 5 (I-5) and Interstate 10 (I-10) highways, just south of the location of the former Southern Pacific Taylor Yard. The CMF is currently near capacity, which will impact the ability to provide the necessary train servicing for planned service-expansion of various Metrolink lines throughout the system under the Southern California Optimized Rail Expansion (SCORE) program. By transferring a portion of the current fleet from CMF to the proposed OCMF (specifically the Orange County Line trains), capacity for the non-Orange County trains will be increased at CMF. The Orange County Line has the highest ridership within the Metrolink system; therefore, a maintenance facility to serve the Orange County area with sufficient storage and servicing capabilities for both locomotives and rail cars is critical to controlling operating costs. In order to optimize rail service in the region, the proposed facility development would need to be completed by 2028. The SCORE program may also require heavy overhaul capabilities at OCMF, subject to pending decisions regarding fleet technology and management.

The expansion of Orange County and overall Metrolink commuter rail service will ultimately require additional or expanded equipment servicing capabilities for both locomotives and rail cars. Since a significant portion of the fleet will be in Orange County, a maintenance facility located along the Metrolink route through Orange County would be the optimal location as it would reduce operating costs by limiting non-revenue moves to the existing SCRRA storage and maintenance facilities in the cities of Los Angeles and San Bernardino. The proposed maintenance facility would provide equipment to inspect, clean, and maintain cars and locomotives on a regular and efficient basis. Much of the inspection and maintenance activity is federally mandated and must be performed at specific intervals. The OCMF will also provide refueling services thus reducing fuel costs, reducing fuel consumption, and will reduce emissions. Currently trains operating in the Orange County Region must travel either the CMF or EMF for refueling, which are sometimes non-revenue runs. The location of the Project is on a 21.3-acre OCTA-owned parcel on Ridge Valley south of Marine Way in the City of Irvine (Project Site). The Project Site is located within the boundaries of a closed military base (Marine Corps Air Station [MCAS] El Toro) formerly owned by the United States Department of the Navy (DON). After MCAS El Toro was closed, the site was quitclaimed by the Navy to Heritage Fields El Toro, LLC in 2011, and then by way of grant deed conveyed by Heritage Fields to the City of Irvine that same year. OCTA then purchased the fee ownership of the Project Site from the City of Irvine. Regional vehicle access to the Project Site is from I-5 at Sand Canyon Avenue. Local vehicle access is via Marine Way to Ridge Valley.

Prior to the current construction of the storage/set-out track, the Project Site was mostly vacant. The site currently includes 1,000-foot-long storage for miscellaneous rail equipment including temporary railroad bridges, signal houses, railroad ties, and signal components. Although not part of the Project, OCTA is currently installing a single 1,000-foot-long, single-ended storage track and fencing of the perimeter of the property to provide temporary storage of two trainsets and/or track maintenance equipment when necessary. There is a segment of an abandoned road, stormwater drains, and underground water transfer vault with a network of pipelines, valves and associated vents, that are currently not in use.

2.2 PROJECT DESCRIPTION

The OCMF would be located in the City of Irvine, on a 21.3-acre parcel owned by OCTA and adjacent to Marine Way and the Metrolink Orange subdivision between mileposts 183.50 and 184.00 on Metrolink's "Orange" Subdivision (Figure 2.2-1). The Project Site is located within Planning Area 51 of the updated City of Irvine General Plan, adopted in June 2015, and designated for the Great Park (formerly known as the Orange County Great Park (OCGP)) land use under the General Plan. Per the City's zoning ordinance, the proposed use is a conditionally allowable use under the existing zone; therefore, OCTA is submitting a Conditional Use Permit to the City of Irvine for approval,

The Project would be developed in two phases with an anticipated completion date of 2028. Phase 1 focuses on developing facilities needed for the storage and routine cleaning, inspection and servicing of the anticipated trainsets. The total area of the Phase 1 buildout would be approximately 20,996 square feet and would be comprised of the following facilities: the transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth and sand silos (Table 2.2-1). A total of 11 tracks would be built. The Phase 1 layout situates the train wash, fueling/sanding, and service and inspection tracks on the two tracks with the greatest tangent length, which are the ones nearest the railroad right of way ("ROW"). This is important in fitting a second fueling/sanding facility so that there is one at each end of the service and inspection platform to support having the locomotive at either end, all within tangent track. Additionally, six storage tracks and appurtenant features (air, water, head end power and toilet dump facilities) would be constructed. The storage tracks would be built near the middle of the site east of the service and inspection tracks. Phase 1 of the buildout would anticipate approximately 52 employees total throughout the entire day, split across three eight-hour shifts.

Table 2.2-1 Building Specifications

Building/Facility/Item	Building Area	Building Height
Transportation Building	7,495 sq. ft.	20 ft
Train Wash Building	11,110 sq. ft.	21 ft
Maintenance Building	40,392 sq. ft.	48 ft
Maintenance Building Expansion	27,880 sq. ft.	---
Utility Building	981 sq. ft.	20 ft
Pump House	750 sq. ft.	14 ft
Guard Booth	36 sq. ft.	---
Equipment Booth	48 sq. ft.	---
Sand Silos (2 Total)	576 sq. ft.	---
Total	89,268 sq. ft.	

Source: Gannett Fleming, Metrolink (February 2022)

Note: sq. ft. = square feet; ft = feet

A runaround track would be provided between the service and inspection tracks and storage tracks. Additionally, two temporary stub-ended set out tracks would be provided in the Phase 1 layout that occupies the footprint of the future shop tracks (one at the north and one at the south end of the yard). These set out tracks would be converted to shop access tracks in Phase 2 and, therefore, would no longer be available as set out tracks. A new set out track would then be provided as part of Phase 2.

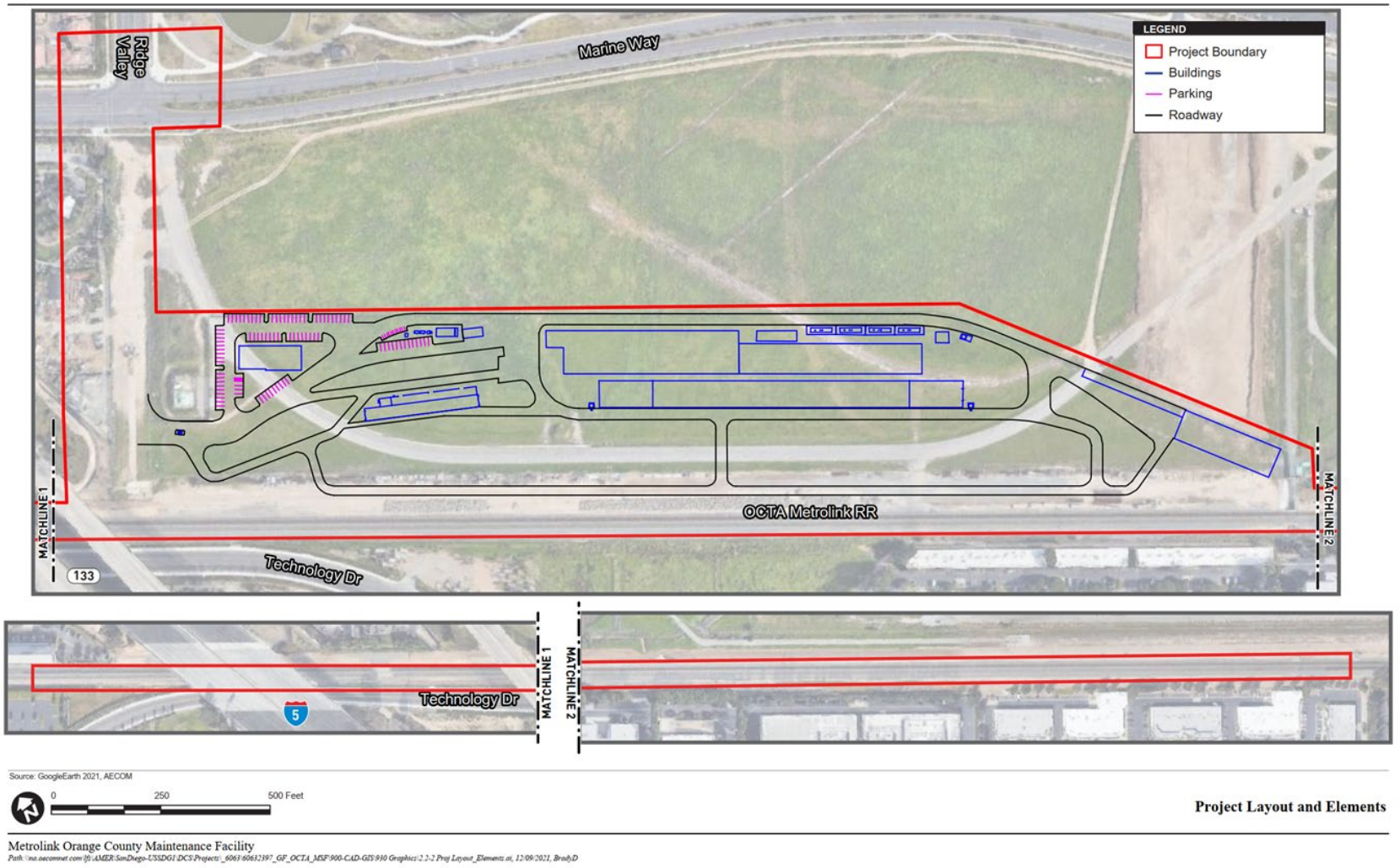
A transportation building that would be utilized for administrative purposes is also included in Phase 1. This building would house managerial offices, welfare spaces for train crews and on-site personnel. This facility would include restrooms, showers, locker rooms, a break/day room, vending space and a kitchenette. Approximately 120 automobile parking spaces would be provided for staff reporting to the site. Fire department compliant roadways would be developed to permit circulation of the site for Metrolink vehicles as well as delivery trucks (sand and fuel).

Phase 2 completes the full buildout of the Project. It would include development of the maintenance shop building and its future extension that would comprise of a total buildout area of 68,272 square feet (Table 2.2-1). The shop would have capabilities to perform regular three-month, six-month, and one-year preventive maintenance cycles on trainsets. Phase 2 of the buildout would consist of approximately 28 employees. With the full buildout of Phase 1 and Phase 2, approximately 80 employees are expected to access the Project Site daily, split across three eight-hour shifts.

Access to the OCMF would require a roadway extension along Ridge Valley from the intersection of Ridge Valley and Marine Way. The Project includes the southern extension of Ridge Valley Road from Marine Way and associated traffic signal improvements to provide access to the OCMF.

The 11 new east and west lead tracks, as discussed in this section above, would be constructed within the existing railroad corridor between MP 183.0 and MP 184.00 on Metrolink's "Orange" Subdivision to connect the existing mainline railroad to the proposed OCMF rail yard. A new single span concrete bridge over the Bee Canyon Channel (Channel) would be built for the east lead track. A segment of the Channel and utilities that are found to be in conflict would be lowered by approximately 2.5 feet to facilitate the construction of the bridge.

Figure 2.2-1 Project Layout and Elements



Source: ESRI (2021), OCTA (2021)

3. ENVIRONMENTAL SETTING

3.1 Existing Conditions

Noise measurements were conducted at the Project Site and selected nearby noise sensitive locations on July 30-31, 2020. The measurements were conducted with American National Standards Institute (ANSI) Type 1 sound level meters within their manufacturer's recommended 1-year calibration period. Measurements were conducted and documented in keeping with standard environmental noise measurement procedures. Weather conditions during the measurement period were generally typical for this location during this time of year, with observed temperatures between 70° and 80° F (degrees Fahrenheit) and wind speeds generally less than 5 miles per hour (mph).

Noise measurements were conducted at five locations in the vicinity of the Project Site, including one Long-Term (LT) measurement location for an entire 24-hour duration, and four short-term (ST) locations with durations of approximately 20 to 30 minutes each. The noise measurement locations are shown in Figure 3.1-1.

The noise measurement locations were selected to represent the following acoustical environments:

- LT-1. This location was conducted at the Project's northern fence line and was intended to represent the typical hour to hour variation of noise levels in the general Project Area over the course of an entire day. Contributing sound sources here included traffic from highways I-5 and State Route 133 (SR-133) and local roads, and occasional rail activity on the nearby Metrolink/Amtrak mainline tracks as well as occasional, short-term contributions for other miscellaneous local sound sources (aircraft overflights, individual vehicle pass-bys, trash collection, etc.).
- ST-1. This measurement location represented the residential development to the north of the Marine Way and Ridge Valley intersection. The contributing sound sources here included traffic on SR-133 and local roadways, with lesser contributions from traffic on I-5, rail activity, and other local noise sources.
- ST-2. This location represents a passive use area within the park (quiet area near the reflecting pond) and with direct exposure to the Project Area. Contributing sound sources here were similar to LT-1.
- ST-3. This location represents an active sports area within the park (soccer field) with direct exposure to the Project Area. Noise sources here were similar to those observed at LT-1 and ST-2.
- ST-4. This measurement location represents an informal exterior use area in a commercial area south of the mainline tracks (a bench within a grassy median in the parking area, presumably used as a short-term break area for employees).

Figure 3.1-1 Noise Measurement Locations



Figure 3.1-2 provides the LT noise measurement data displaying the equivalent average (L_{eq}), maximum (L_{max}) and minimum (L_{min}) value for each 10-minute measurement interval over the entire 24-hour measurement period (between 10:00 AM on 7/30/2020 and 10:00 AM on 7/31/2020). The L_{eq} values range mostly between 45 A weighted decibels (dBA) (during the early morning hours) and 60 dBA (during peak morning and afternoon periods). Individual spikes in the L_{eq} and L_{max} data are mostly caused by train pass-by events (the LT location was situated about 450 feet from the mainline tracks).

Figure 3.1-2 Long-Term Noise Measurement Data

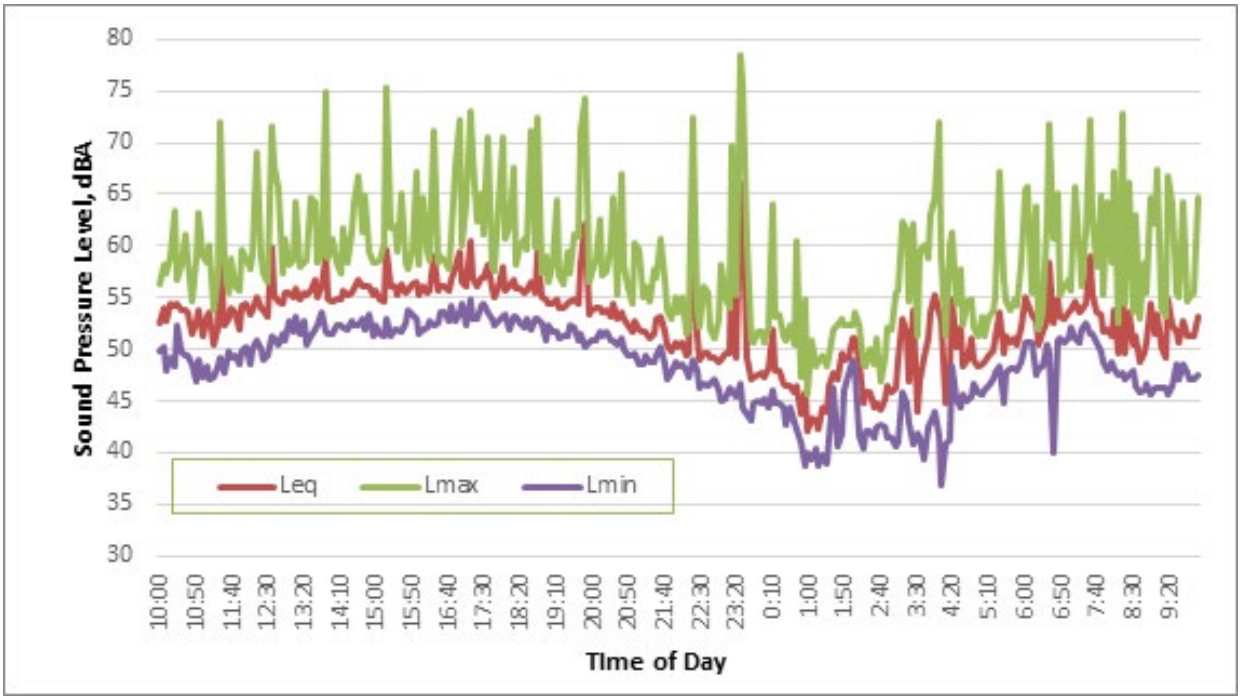


Table 3-1 provides a summary of the collected ST measurement data. Measurements were conducted twice at each ST location and the long-term metrics (L_{eq}-day, L_{dn}, and community noise equivalent level [CNEL]) at each ST location were calculated by using a relative comparison to the 24-hour data collected at the central LT measurement location.

Table 3.1-1 Short-term Noise Measurement Summary

Measurement Time and Duration				Duration	Measured or Calculated[2] Sound Level, dBA			
ID	Date	Start	End		L_{eq}-ST	L_{eq}-Day	L_{dn}	CNEL
ST-1[1]	7/30/20	10:58	11:30	0:32	61	63	67	68
	7/31/20	10:00	10:24	0:24	62			
ST-2	7/30/20	12:46	13:12	0:26	55	55	59	59
	7/31/20	9:45	10:04	0:19	53			
ST-3	7/30/20	13:25	13:52	0:27	63	60	64	65
	7/31/20	9:05	9:24	0:19	58			
ST-4	7/30/20	14:10	14:40	0:30	52	52	56	56
	7/31/20	8:30	8:50	0:20	50			

Source: AECOM, 2020.
Notes:
[1] Reported ambient noise levels for Measurement location ST-1 were reduced by 5 dBA to estimate the influence of an existing 8- to-10-foot-high noise wall between the actual exterior sidewalk noise measurement location near Marine Way and the residential backyards for the adjacent homes. This reduction was limited to 5 dBA due to traffic noise contributions from nearby elevated ramps and lanes on SR-133.
[2] L_{eq}-day, LDN and CNEL values were calculated by comparing measured ST noise measurement values to calculated L_{eq}-day, L_{dn} and CNEL from LT measurement location.

3.2 Regulatory Framework

Federal

Federal Transit Administration: As a transit Project, the primary source used for the prediction and assessment impacts associated with noise and vibration for the Project would come from the Federal Transit Administration (FTA) Noise and Vibration Impact Assessment Manual (2018), which provides prediction methodology and impact assessment guidance for both construction and operational phases of the Project as outlined below.

Construction Noise and Vibration

FTA-recommended construction noise impact criteria are presented in Table 3-2 below, as a function of land use.

Table 3.2-1 Construction Noise Impact Criteria

Land Use	$L_{eq\text{-}equip.(8hr)}$, dBA		$L_{dn\text{-}equip.(30\ day)}$, dBA
	Day	Night	30-day Average
Residential	80	70	75
Commercial	85	85	80*
Industrial	90	90	85*

Note: *Use a 24-hour $L_{eq(24hr)}$ instead of $L_{dn\text{-}equip(30day)}$
Source FTA 2018, Table 7-3

For construction vibration, FTA guidance provides impact criteria for two different impact types, potential building damage and potential human annoyance, both categorized by building type or land use, which are presented in Table 3-3 and Table 3-4, respectively.

Table 3.2-2 Construction Vibration Damage Criteria

Building/ Structural Category	PPV, in/sec	Approximate L_v*
I. Reinforced-concrete, steel or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

*RMS velocity in decibels, VdB re 1 micro-in/sec
Source FTA 2018, Table 7-5

Table 3.2-3 Indoor Ground-Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact Criteria for General Vibration Assessment

Land Use Category	GBV Impact Levels (VdB re 1 micro-inch /sec)			GBN Impact Levels (dBA re 20 micro Pascals)		
	Frequent Events†	Occasional Eventsα	Infrequent Eventsβ	Frequent Events†	Occasional Eventsα	Infrequent Eventsβ
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB *	65 VdB *	65 VdB *	N/A **	N/A **	N/A **
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

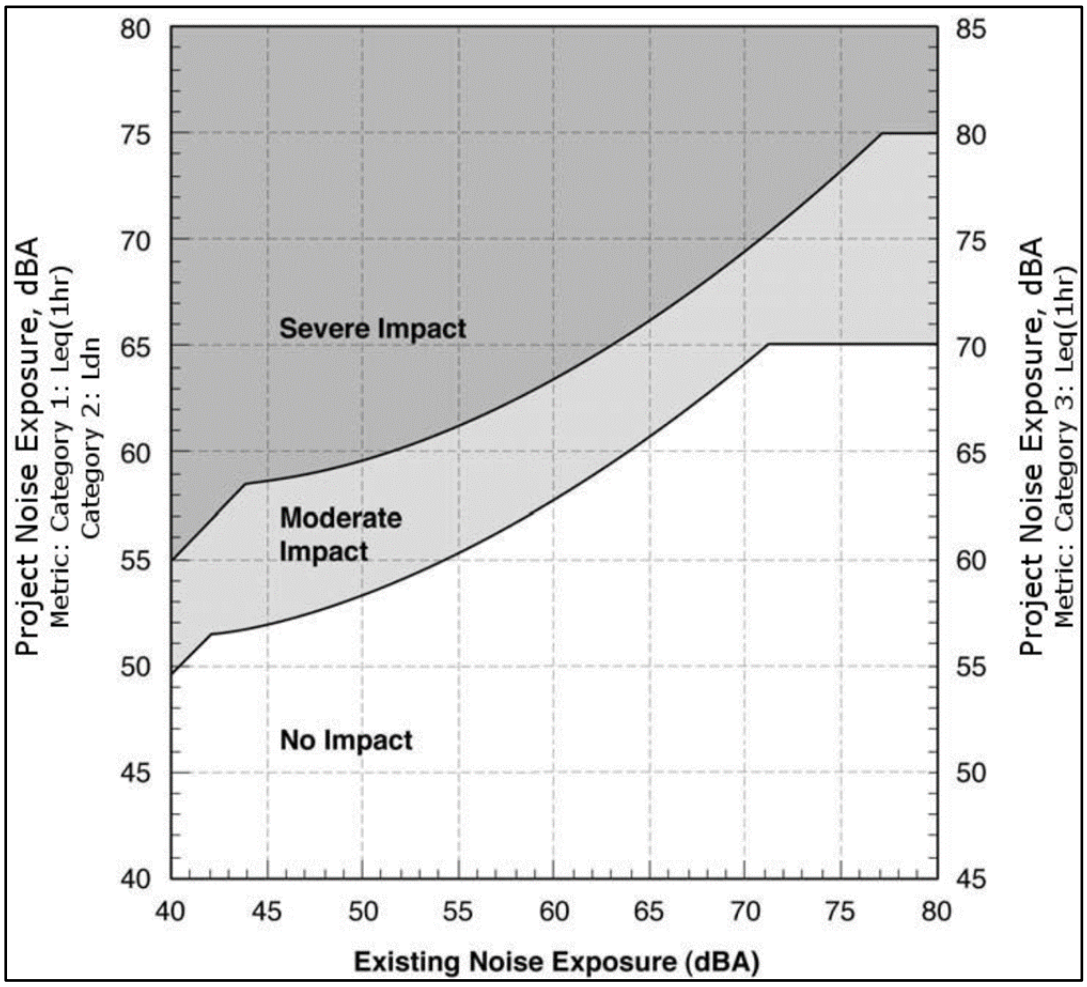
*This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. For equipment that is more sensitive, a Detailed Vibration Analysis must be performed.
** Vibration-sensitive equipment is generally not sensitive to ground-borne noise; however, the manufacturer's specifications should be reviewed for acoustic and vibration sensitivity.
†Frequent events- More than 70 events per day (most rapid transit)
αOccasional events- 30-70 events per day (most commuter trunk lines)
βInfrequent events- Fewer than 30 events per day (most commuter rail branch lines)
Source: FTA 2018, Table 6-3.

Operational Noise and Vibration

FTA operational noise impacts are determined as a function of the predicted project noise, existing noise exposure, and land use category, as shown in Figure 3.2-1. Generally, the higher the existing noise exposure, the higher the noise level threshold for moderate and severe impacts. For example, at a Category 2 (residential) receptor location with an existing noise exposure level of 55 dBA L_{dn}, a moderate noise

impact would be triggered with a project-only noise exposure of 56 dBA L_{dn} and a severe impact at a project-only noise level of 61 dBA L_{dn}. However, for the same receiver location with an existing exposure of 60 dBA L_{dn}, a moderate impact would occur at a project-only noise level of 58 dBA L_{dn}, and a severe impact at 63 dBA, L_{dn}. Operational ground-borne vibration impact criteria are the same as for construction activity, as shown in Tables 3-3 and 3-4.

Figure 3.2-1 FTA Operational Noise Impact Criteria



Source: FTA 2018, Figure 4-2

Local

City of Irvine General Plan, Noise Element- The noise standards specified in the City's General Plan, 2015, Section F, Noise Element (shown in Table 3-5) are used as a guideline to evaluate the acceptability of the noise levels generated by the traffic flow. These standards are for the assessment of long-term vehicular traffic noise impacts. The City has exterior noise criteria for outdoor living areas associated with residential uses and requires that interior areas of new residential homes not exceed 45 dBA CNEL and that exterior active use areas not exceed 65 dBA CNEL. Other short-term noise impacts (e.g., construction activities or on-site stationary sources) are regulated by the noise ordinance.

Table 3.2-4 City of Irvine Interior and Exterior Noise Standards

Land Use Categories		Energy Average (CNEL)	
Categories	Uses	Interior[1]	Exterior[2]
Residential	Single-Family, Multiple-Family	45[3], 55[4]	65[7]
	Mobile Home	—	65[5]
Commercial/ Industrial	Hotel, Motel, Transient Lodging	45	65[6]
	Commercial, Retail, Bank, Restaurant	55	—
	Office Building, Professional Office, Research & Development	50	—
	Amphitheater, Concert Hall, Auditorium, Meeting Hall	45	—
	Gymnasium (Multipurpose)	50	—
	Health Clubs	55	—
	Manufacturing, Warehousing, Wholesale, Utilities	65	—
	Movie Theater	45	—
Institutional	Hospital, School Classroom	45	65
	Church, Library	45	—
Open Space	Parks	—	65

Notes:
[1] Interior environment excludes bathroom, toilets, closets, and corridors.
[2] Outdoor environment limited to private yard of single-family or multifamily residences private patio which is accessed by a means of exit from inside the unit; mobile home park; hospital patio; park picnic area; school playground; and hotel and motel recreation area.
[3] Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided pursuant to Appendix Chapter 12, Section 1208 of UBC.
[4] Noise level requirement with open windows, if they are used to meet natural ventilation requirement.
[5] Exterior noise level shall be such that interior noise level will not exceed 45 dBA CNEL.
[6] Except those areas affected by aircraft noise.
[7] Multifamily developments with balconies that do not meet the 65 dBA CNEL are required to provide occupancy disclosure notices to all future tenants regarding potential noise impacts.
CNEL = Community Noise Equivalent Level, UBC = Uniform Building Code
Source: City of Irvine General Plan Supplement No. 3, Noise Element, Table F-1 (2005).

Municipal Code. Section 6-8-204 of the City's Municipal Code (City of Irvine, 2015b) establishes the maximum permissible noise level that may intrude into a neighbor's property. The Noise Ordinance (adopted in 1975 and revised in 2015) establishes noise level standards for various land use categories affected by stationary noise sources. Land use categories in the City are defined in four noise zones, as listed below. Table 3-6 provides the City's maximum noise standard based on the noise zone, the assessment location (exterior/interior), and the time period. As shown in Table 3-6, the City's noise standards do not apply to multifamily residence private balconies (City of Irvine 2015b).

1. Noise Zone 1: All hospitals, libraries, churches, schools, and residential properties.
2. Noise Zone 2: All professional office and public institutional properties.
3. Noise Zone 3: All commercial properties excluding professional office properties.
4. Noise Zone 4: All industrial properties.

Table 3.2-5 City of Irvine Maximum Noise Level Standards

Noise Zone	Exterior/ Interior	Time Period	L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
1	Exterior	7:00 AM to 10:00 PM	55	60	65[1]	70	75
		10:00 PM to 7:00 AM	50	55	60	65[1]	70
	Interior	7:00 AM to 10:00 PM	—	—	55	60	65
		10:00 PM to 7:00 AM	—	—	45	50	55
2	Exterior	Anytime	55	60	65	70	75
	Interior	Anytime	—	—	55	60	65
3	Exterior	Anytime	60	65	70	75	80
	Interior	Anytime	—	—	55	60	65
4	Exterior	Anytime	70	75	80	85	90
	Interior	Anytime	—	—	55	60	65

Note:
It shall be unlawful for any person at any location within the City to create any noise or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level when measured on any property within designated noise zones either within or without the City to exceed the applicable noise standard. Each of the noise standards specified above shall be reduced by 5 dBA for impact, or predominant tone noise or for noises consisting of speech or music. In the event the noise source and the affected property are within different noise zones, the noise standards of the affected property shall apply.
[1] This standard does not apply to multifamily residence private balconies. Multifamily developments with balconies that do not meet the 65 dBA CNEL are required to provide occupancy disclosure notices to all future tenants regarding potential noise impacts.
Source: City Municipal Code (City 2015a).

The City's Municipal Code Noise Ordinance has not established any upper limits for construction noise because construction noise is temporary and will stop after project construction is complete. Section 6-8-205a of the City's Municipal Code Noise Ordinance regulates the timing of construction activities and includes special provisions for sensitive land uses. *Construction activities shall occur only between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday and between 9:00 a.m. and 6:00 p.m. on Saturday. No construction shall be permitted outside of these hours or on Sundays and federal holidays, except for Columbus Day, unless a temporary waiver is granted by the Chief Building Official or his or her authorized representative. Trucks, vehicles, and equipment that are making or are involved with material deliveries, loading, or transferring materials, equipment service, maintenance of any devices or appurtenances for or within any construction project in the City shall not be operated or driven on City streets outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the City. Any waiver granted shall take into consideration the potential impact on the community. No construction activity will be permitted outside of these hours except in emergencies, including maintenance work on the City rights-of-way that might be required.*

Zoning Ordinance. Sections 5-8-4.A.5a and 5-8-4.A.5b of the City's Zoning Ordinance (City of Irvine, 2015b) establish requirements to minimize construction noise and vibration impacts. Although these requirements are intended for residential and mixed-use spaces in the Irvine Business Complex, the requirements listed below are applicable for the Project. Section 5-8-4.A.5a of the City's Zoning Ordinance requires that before the issuance of grading permits, the Project applicants shall incorporate the following measures as a note on the grading plan cover sheet to ensure that the greatest distance between noise sources and sensitive receptors during construction activities has been achieved:

- Construction equipment, fixed or mobile, shall be equipped with properly operating and maintained noise mufflers consistent with manufacturer's standards.
- Construction staging areas shall be located away from off-site sensitive uses during the later phases of project development.
- The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the Project Site, whenever feasible.
- For construction of sound walls that have been incorporated into the project design, prior to construction of the building foundation, installation of temporary sound blankets (fences typically composed of poly-vinyl-chloride-coated outer shells with absorbent inner insulation) shall be placed along the boundary of the Project Site during construction activities.

Section 5-8-4.A.5b of the City's Zoning Ordinance requires that before the issuance of a grading permit, applicants for individual projects that involve vibration-intensive construction activities (e.g., pile drivers, jackhammers, and vibratory rollers) near sensitive receptors shall submit a noise and vibration analysis. If construction-related vibration is determined to exceed the FTA vibration annoyance criterion of 78 vibration decibels (VdB) for residential uses during the daytime (FTA, 2018), additional requirements, such as the use of less vibration-intensive equipment or construction techniques, shall be implemented during construction (e.g., drilled piles to eliminate use of a vibration-intensive pile driver). In the same FTA guidelines, 84 VdB is the vibration annoyance criterion for offices and non-sensitive areas.

4. METHODOLOGY

The methodologies for predicting noise and vibration levels from Project construction and operation are taken primarily from the general assessment methodology of the FTA Noise and Vibration Impact Assessment Manual with additional information from FHWA Roadway Construction Noise Model (RCNM) and Traffic Noise Model (TNM), as discussed in the following section.

4.1 Construction Noise and Vibration

Construction noise and vibration prediction procedures are covered in Section 7 of the FTA Manual and supplemented by reference information from the FHWA RCNM.

Construction Noise Prediction Procedure

Construction noise impacts were assessed by predicting construction noise levels using methods consistent with the FTA Noise and Vibration Manual and comparing these values to identified impact thresholds. This methodology starts with the reference noise level for each piece of construction equipment to be used under conservative worst-case conditions for each identified construction phase. This value is adjusted for the distance from the source to the noise-sensitive receptor, the fractional portion of time that the equipment is operating at full power (acoustical usage factor), and any acoustical shielding that may be present (such as buildings or terrain), and then summing together the contributed noise from all sources.

Construction equipment rosters and usage are provided by the Project contractors to represent typical worst-case noise conditions. The acoustical contribution for each piece of equipment at each activity area is calculated using the following equation:

$$L_{eq} = L_{max(ref)} - 20\log\left(\frac{D}{D_{ref}}\right) + 10\log\left(\frac{AUF\%}{100}\right) + 10\log(N) - S$$

Where:

- L_{eq} = the equivalent sound level energy-averaged over the period of time over which the equipment is operating, in dBA
- $L_{max(ref)}$ = the maximum operating equipment sound level operating at full power as measured at the reference distance
- D = the distance between the operating equipment and the noise-sensitive receptor location (distances conservatively assumed to be from the receiver location to the acoustic center of the construction site)
- D_{ref} = the reference distance for the $L_{max(ref)}$, typically 50 feet
- AUF = the Acoustic Use Factor (typical fractional value of time that equipment is operating at full power)
- N = number of similar pieces of equipment operating in the same area
- S = the estimated noise reduction shielding value between that source and noise-sensitive receptor, in dBA

The acoustic contribution for all equipment assumed to be operating during the defined construction phase is summed together on an energy basis to determine the combined construction noise level for each studied noise-sensitive receptor. The equipment to be used for the various construction phases of the

Project, selected from the RCNM equipment list, the reference maximum noise level (L_{max}) and acoustic use factor (AUF) are shown in Table 4.1-1 below.

Table 4.1-1 Acoustical Properties of Construction Equipment

Equivalent Type	L_{max} Ref dBA (50 feet)	AUF%
Auger Drill	84	20
Backhoe	78	40
Boring Jack Power Unit	83	50
Chain Saw	84	20
Compactor (ground)	83	20
Compressor (air)	78	40
Concrete Mixer Truck	79	40
Concrete Pump Truck	81	20
Concrete Saw	90	20
Crane	81	16
Dozer	82	40
Drill Rig Truck	79	20
Drum Mixer	80	50
Dump Truck	76	40
Excavator	81	40
Flat Bed Truck	74	40
Front End Loader	79	40
Generator (>25KVA)	81	50
Generator (<25KVA)	73	50
Gradall	83	40
Grader	85	40
Horizontal Boring Jack	82	25
Hoe Ram	90	20
Impact Pile Driver	101	20
Jackhammer	89	20
Man Lift	75	20
Pavement Scarafier	90	20
Paver	77	50
Pickup Truck	75	40
Pneumatic Tools	85	50
Pumps	81	50
Roller	80	20
Scraper	84	40
Shears (on backhoe)	96	40
Tractor	84	40
Vacuum Excavator	85	40
Vacuum Street Sweeper	82	10
Ventilating Fan	79	100
Vibrating Hopper	87	50
Vibratory Concrete Mixer	80	20
Warning Horn	83	5
Welder/Torch	74	40

Source: RCNM User Guide 2006, Table 1 (actual measured L_{max}), FTA 2018, Table 7-1.

Construction Vibration Prediction Procedure

Construction-related vibration is assessed using two different metrics. Peak Particle Velocity (PPV) in inches per second (in/sec) is used to assess potential structural damage from vibration, and Vibration Velocity Level (L_v) in VdB is used to assess human annoyance from vibration. These are calculated using the following equations.

Structural Damage Equation (PPV):

$$\mathrm{PPV} = \mathrm{PPV_{ref}} * \left(\frac{25}{\mathrm{D}}\right)^{1.5}$$

Where:

PPV = Peak Particle Velocity at the nearest structure

PPV_{ref} = the reference PPV value for a piece of equipment at reference distance of 25 feet

D = the distance from the construction equipment to the structure

Human Annoyance Equation (L_v)

$$\mathrm{L_v} = \mathrm{L_{v(ref)}} - 30\log\left(\frac{\mathrm{D}}{25}\right)$$

Where:

L_v = the Vibration Velocity Level at the nearest structure

$L_{v(ref)}$ = the reference L_v value for a piece of equipment at a reference distance of 25 feet

D = the distance from the construction equipment to the receiver

Not all construction equipment produces significant ground-borne vibration. Of the equipment listed to be used on this Project shown in Table 4-1, the equipment with the highest reference vibration level would be "Impact Pile Driver" which has a upper range reference PPV ref value of 1.518 in/sec at 25 feet and Lv(ref) equal to 112 VdB at 25 feet. Other construction equipment types expected to be used on the Project that generate ground borne vibration are listed in Table 4.1-2 (from FTA 2018, Table 7-4).

Potential vibration impacts for both damage and human annoyance are typically assessed using the closest distance to the potentially impacted structure.

Table 4.1-2 Reference Vibration Properties of Selected Construction Equipment

Equipment Type		PPV at 25 ft, in/sec	L_v, VdB at 25 ft.
Pile Driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile Driver (sonic)	Upper range	0.734	105
	Typical	0.17	93
Vibratory Roller		0.21	94
Hoe-Ram		0.089	87
Large Bulldozer		0.089	87
Caisson/Auger Drilling		0.089	87
Loaded Trucks		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58

Source: FTA 2018, Table 7-4

4.2 Operational Noise and Vibration

Operational Noise Prediction Procedure

Operational noise prediction for this Project follows the general noise prediction techniques identified in Section 4.4 of the FTA Transit Noise and Vibration Impact Assessment Manual, 2018, as detailed below.

The FTA manual includes procedures for the computation of noise levels for various types of stationary rail noise sources, including "Rail Yards and Shops". For this computation, it is assumed that the resulting noise level is inclusive of the typical variety of activities and noise sources normally associated with "Rail Yards and Shops" including rail vehicle movements coming in and out of revenue service, vehicle storage and inspection tracks, routine rail vehicle maintenance and refueling areas, vehicle wash stations, shop and storage building, and internal movement of worker and delivery vehicles. Existing mainline rail activity is considered part of the existing environment and therefore is excluded from the noise impact analysis. The equations used to calculate the L_{eq} and L_{dn} values at the various receptor locations are presented below.

$$L_{eq(1hr)} \text{ at } 50 \text{ feet} = SEL_{ref} + 10*\text{Log}(N_T/20) - 35.6$$

Where:

$L_{eq(1hr)}$ = the Equivalent Sound Level over 1-hour (peak)
SEL_{ref} = Reference Sound Exposure Level (118 dBA for Rail Yard and Shops)
N_T = Train Movements During Peak Hour

The Day-Night Noise level (L_{dn}) is calculated from Daytime and Nighttime L_{eq} levels at 50 feet given number of train movements and then converted to L_{dn} with the following equation:

$$L_{dn} = 10*\log(15*10^{(L_d/10)} + 9*10^{((L_n+10)/10)}) - 13.8$$

Where:

Ldn = Day-Night Noise Level
Ld = Daytime L_{eq}
Ln = Nighttime L_{eq}

Finally, the distance correction for Stationary Sources is estimated using the following equation:

$$L_{rec} = L_{50ft} - 25*\log(D_{rec}/50) - S$$

Where:

Lrec = the resulting sound level at the receiver location, dBA
L50ft = the calculated source level at 50 feet (L_{eq} or L_{dn}), dBA
Drec = the distance from the source to the receiver, in feet
S = the shielding between the source and receiver locations, in dBA

In addition to the sound levels predicted from Yards and Shops as described above, operational traffic noise, including sound from staff trips and some heavy truck deliveries, was calculated for receivers along the haul route using the FHWA Traffic Noise Model Version 2.5, and those values added to the Yards and Shops noise source for impact assessment.

Operational Vibration Prediction Procedure

While operational ground vibration may be generated by some types of operational rail or industrial activity, no significant ground vibrations sources are anticipated from the operation of the maintenance facility.

5. IMPACT ANALYSIS

5.1 Construction Noise and Vibration

Construction activity for the Project was defined in terms of two construction phases. Phase 1 would consist of the primary build-out of the facility and would last up to 30 months in duration. Phase 2 is a secondary build-out of up to 24 months in duration. Both phases identify 13 sub-phases, including Survey, Clear and Grub, Site Utility/Electric, Demo, Earthwork, Foundations, Roadway/Paving, Buildings, Trackwork (ballasted and direct fixation), Major Equipment, and Commissioning, each with a defined set of equipment to be used (with combined total of over 50 individual types of equipment listed). It was assumed that all construction activity would be restricted to daytime hours between 7 AM and 7 PM as required by the City noise ordinance.

Resulting noise levels for each of the four identified noise-sensitive receptors were calculated in accordance with the procedures outlined in Section 4 and are reported in Table 5.1-1, below.

Table 5.1-1 Construction Noise Levels and Impacts Summary (Worst Case for All Phases)

Receiver ID/ Land Use	Impact Metric	Impact Threshold (L_{dn}/L_{eq})	Distance to Project Center (ft)	Acoustical Shielding (dBA)	Predicted Range (L_{dn}/L_{eq})	Impact
ST-1/Residential	L_{dn}	75	1275	5[1]	50-68	None
ST-2/Park	L_{eq}	80	1100	0	57-74	None
ST-3/Park	L_{eq}	80	1220	0	56-73	None
ST-4/Commercial	L_{eq}	80	650	5[2]	56-73	None

Notes:
[1] ST-1 receives estimated minimum 5 dBA shielding from construction activity due to existing 8-to-10-foot-high noise wall.
[2] ST-4 receives estimated minimum 5 dBA shielding due to intervening row of buildings.

The range of predicted construction values presented in Table 5-1 represent the predicted noise levels over the 30-month Phase 1 schedule (i.e. for ST-1, 50 dBA during the least noisy month up to 68 dBA during the noisiest month).

Construction vibration typically only generates potential impacts at existing structures within a maximum of a few hundred feet, and only then with the use of equipment with particularly high vibration levels such as vibratory roller and impact pile drivers. Of these, impact pile drivers were identified for potential use on just two construction sub-phases, Foundations and Bridges. The exact locations of the potential pile driving activity is currently unknown, but if pile driving is conducted within approximately 250 feet of an occupied commercial building, a short-term significant impact could occur with a predicted vibration level of 75 VdB or greater (corresponding to vibration annoyance for “frequent” events). Only the commercial buildings on the south/west side of the existing mainline tracks could potentially be within this distance.

Ground-borne vibration for construction activity would not be expected to approach potential damage thresholds at any nearby structures. The closest distance at which a pile driver might be to an existing building would be approximately 120 feet at existing commercial building south of mainline tracks, with an estimated vibration level from impact pile driving of 0.144 in/sec PPV, well below the damage threshold of 0.5 in/sec PPV for modern commercial buildings.

5.2 Operational Noise and Vibration

The following operations assumptions were used in calculating potential noise levels and impacts for the noise-sensitive land-uses near the Project.

- Train movements in and out of Maintenance Facility: Peak Hour, 10 daytime (9-10 PM) and 10 nighttime (6-7 AM)
- Vehicle Trips: Average hourly traffic volumes of 10 autos/hour + 1 heavy truck/hour daytime (7 AM to 10 PM), 3 autos/hour + 0 Heavy Trucks/hour nighttime (10 PM to 7 AM)

Table 5.2-1 below provides a summary of the operational noise level prediction and impact assessment. The Total Project noise level includes contributions from both on-site operational noise sources associated with Rail Shops and Yard as well as automobile and truck traffic in and out of the sight.

Table 5.2-1 Operational Noise Levels and Impacts Summary

Receiver info						Impact Thresholds (dBA)		Prediction (dBA)
ID	Land Use	Distance to Project Center (feet)	Analysis Metric	Existing Noise Level	Total Project-Only Sound Level	Moderate Impact Threshold	Severe Impact Threshold	Impact
ST-1	Residential	1275	L_{dn}	67	52*	63	67	None
ST-2	Park	1100	$L_{eq\text{-}1hr}$	55	41	61	66	None
ST-3	Park	1220	$L_{eq\text{-}1hr}$	60	39	63	68	None
ST-4	Industrial	650	$L_{eq\text{-}1hr}$	52	51	60	65	None

*Predicted project-only noise level at ST-1 includes contributions from both facility site and project-related traffic on adjacent local roads.

6. MITIGATION MEASURES

All operational noise and vibration levels as well as construction noise associated with the Project would not result in any impacts. The only construction impacts that could be considered significant would be construction vibration annoyance resulting from pile-driving equipment if these are used within 250 feet of an existing structure during Project construction. Only the commercial buildings on the south/west side of the existing mainline tracks could potentially be within this distance. The following mitigation measures should be implemented to reduce or eliminate vibration impacts associated with the use of impact pile drivers during construction:

MM-NOI-1 If feasible, relocate Project elements requiring pile driving to locations greater than 250 feet from occupied buildings.

MM-NOI-2 If MM-NOI-1 is not feasible, use a less intrusive form of pile insertion, such as pre-augured piling.

MM-NOI-3 Arrange to conduct pile driving activities during a period when the affected building(s) are not in use (such as Saturdays).

7. IMPACTS AFTER MITIGATION MEASURES

The only potential Project impacts are associated with vibration annoyance impacts associated with Pile Driving activity. Upon implementation of MM-NOI-1 through MM-NOI-3, all impacts can be reduced to less than significant.

8. REFERENCES

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, 2018. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.

City of Irvine, 2015a, Noise Element of the Irvine General Plan, 2015 https://legacy.cityofirvine.org/civica/filebank/blobdload.asp?BlobID=20695#:~:text=maximum%20interior%20noise%20levels%20of,7%20a.m.%20for%20typical%20occupancy.

_____, 2015b,Municipal Code Irvine, Chapter 2, NOISE, https://library.municode.com/ca/irvine/codes/code_of_ordinances?nodeId=TIT6PUWO_DIV8PO_CH2NO

SCRRA, Metrolink System Map, October 2019, Available at: https://metrolinktrains.com/about/agency/

Appendix G
Technical Memorandum
Paleontological Resources

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority

550 S. Main St.
Orange, CA 92868

And

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

Prepared by:

AECOM
300 S. Grand Ave.
Los Angeles, CA 90071

September 2023

REVISION	DESCRIPTION	DATE
0	Draft Paleontological Resources Technical Memorandum	01/08/2021
1	Draft Paleontological Resources Technical Memorandum (Incorporating OCTA's comments)	4/27/2021
2	Final Paleontological Resources Technical Memorandum	09/22/2023

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1. INTRODUCTION

The Southern California Regional Railroad Authority (SCRRA) Metrolink Commuter Rail System (Metrolink) is proposing to construct a new Orange County Maintenance Facility (hereafter referred to as "OCMF" or "the Project"). The Project would include several facilities including a transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth, sand silos, a maintenance facility, a maintenance facility extension, and 11 tracks. Approximately 80 employees would report to the Project. The Project consists of buildings that would have a total building area of approximately 90,000 square feet when combined. Metrolink currently operates two maintenance facilities across its service area: Central Maintenance Facility (CMF) in Los Angeles and Eastern Maintenance Facility (EMF) in San Bernardino County. Due to projected population expansion within its service area and the agency's goal to be prepared for the 2028 Los Angeles Summer Olympic Games, Metrolink will require an increased number of commuter rail services, as well as additional train storage and maintenance facilities associated with an increased fleet size. As a significant proportion of the expanded services will operate in Orange County, the Project would provide an optimal location for a new Metrolink maintenance facility. Metrolink's member agency, the Orange County Transportation Authority (OCTA), proposes to build this facility on an OCTA-owned parcel in the City of Irvine. OCTA is the lead agency under the California Environmental Quality Act (CEQA). The City of Irvine and SCRRA are the responsible agencies under CEQA.

The purpose of this memorandum is to present the results of a paleontological resources investigation and to describe the potential impacts to paleontological resources as defined by CEQA that may be associated with the Project.

2. PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

As a result of the projected population expansion within the five-county area (Orange County, Los Angeles County, San Bernardino County, Riverside County, and Ventura County) currently served by the SCRRA, Metrolink will require an increased number of commuter rail services to support the growth. Consequently, the Metrolink system (Figure 2.1-1) would require additional train storage and maintenance facilities to support an increased fleet size.

Figure 2.1-1 Metrolink System Map



Source: SCRRA (2019)

Metrolink's CMF facility is located on the east bank of the Los Angeles River near the Interstate 5 (I-5) and Interstate 10 (I-10) highways, just south of the location of the former Southern Pacific Taylor Yard. The CMF is currently near capacity, which will impact the ability to provide the necessary train servicing for planned service-expansion of various Metrolink lines throughout the system under the Southern California Optimized Rail Expansion (SCORE) program. By transferring a portion of the current fleet from CMF to the proposed OCMF (specifically the Orange County Line trains), capacity for the non-Orange County trains will be increased at CMF. The Orange County Line has the highest ridership within the Metrolink system; therefore, a maintenance facility to serve the Orange County area with sufficient storage and servicing capabilities for both locomotives and rail cars is critical to controlling operating costs. In order to optimize rail service in the region, the proposed facility development would need to be completed by 2028. The SCORE program may also require heavy overhaul capabilities at OCMF, subject to pending decisions regarding fleet technology and management.

The expansion of Orange County and overall Metrolink commuter rail service will ultimately require additional or expanded equipment servicing capabilities for both locomotives and rail cars. Since a significant portion of the fleet will be in Orange County, a maintenance facility located along the Metrolink route through Orange County would be the optimal location as it would reduce operating costs by limiting non-revenue moves to the existing SCRRA storage and maintenance facilities in the cities of Los Angeles and San Bernardino. The proposed maintenance facility would provide equipment to inspect, clean, and maintain cars and locomotives on a regular and efficient basis. Much of the inspection and maintenance activity is federally mandated and must be performed at specific intervals. The OCMF will also provide refueling services thus reducing fuel costs, reducing fuel consumption, and will reduce emissions. Currently trains operating in the Orange County Region must travel either the CMF or EMF for refueling, which are sometimes non-revenue runs. The location of the Project is on a 21.3-acre OCTA-owned parcel on Ridge Valley south of Marine Way in the City of Irvine, (Project Site). The Project Site is located within the boundaries of a closed military base (Marine Corps Air Station [MCAS] El Toro) formerly owned by the United States Department of the Navy (DON). After MCAS El Toro was closed, the site was quitclaimed by the Navy to Heritage Fields El Toro, LLC in 2011, and then by way of grant deed conveyed by Heritage Fields to the City of Irvine that same year. OCTA then purchased the fee ownership of the Project Site from the City of Irvine. Regional vehicle access to the Project Site is from I-5 at Sand Canyon Avenue. Local vehicle access is via Marine Way to Ridge Valley.

Prior to the current construction of the storage/set-out track, the Project Site was mostly vacant. The site currently includes 1,000-foot-long storage for miscellaneous rail equipment including temporary railroad bridges, signal houses, railroad ties, and signal components. Although not part of the Project, OCTA is currently installing a single 1,000-foot-long, single-ended storage track and fencing of the perimeter of the property to provide temporary storage of two trainsets and/or track maintenance equipment when necessary. There is a segment of an abandoned road, stormwater drains, and underground water transfer vault with a network of pipelines, valves and associated vents, that are currently not in use.

2.2 PROJECT DESCRIPTION

The OCMF would be located in the City of Irvine, on a 21.3-acre parcel owned by OCTA and adjacent to Marine Way and the Metrolink Orange subdivision between mileposts 183.50 and 184.00 on Metrolink's "Orange" Subdivision (Figure 2.2-1). The Project Site is located within Planning Area 51 of the updated City of Irvine General Plan, adopted in June 2015, and designated for the Great Park (formerly known as the Orange County Great Park (OCGP)) land use under the General Plan. Per the City's zoning ordinance, the proposed use is a conditionally allowable use under the existing zone; therefore, OCTA is submitting a Conditional Use Permit to the City of Irvine for approval,

The Project would be developed in two phases with an anticipated completion date of 2028. Phase 1 focuses on developing facilities needed for the storage and routine cleaning, inspection and servicing of the anticipated trainsets. The total area of the Phase 1 buildout would be approximately 20,996 square feet and would be comprised of the following facilities: the transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth and sand silos (Table 2.2-1). A total of 11 tracks would be built. The Phase 1 layout situates the train wash, fueling/sanding, and service and inspection tracks on the two tracks with the greatest tangent length, which are the ones nearest the railroad right of way ("ROW"). This is important in fitting a second fueling/sanding facility so that there is one at each end of the service and inspection platform to support having the locomotive at either end, all within tangent track. Additionally, six storage tracks and appurtenant features (air, water, head end power and toilet dump facilities) would be constructed. The storage tracks would be built near the middle of the site east of the service and inspection tracks. Phase 1 of the buildout would anticipate approximately 52 employees total throughout the entire day, split across three eight-hour shifts.

Table 2.2-1 Building Specifications

Building/Facility/Item	Building Area	Building Height
Transportation Building	7,495 sq. ft.	20 ft
Train Wash Building	11,110 sq. ft.	21 ft
Maintenance Building	40,392 sq. ft.	48 ft
Maintenance Building Expansion	27,880 sq. ft.	---
Utility Building	981 sq. ft.	20 ft
Pump House	750 sq. ft.	14 ft
Guard Booth	36 sq. ft.	---
Equipment Booth	48 sq. ft.	---
Sand Silos (2 Total)	576 sq. ft.	---
Total	89,268 sq. ft.	

Source: Gannett Fleming, Metrolink (February 2022)
Note: sq. ft. = square feet; ft = feet

A runaround track would be provided between the service and inspection tracks and storage tracks. Additionally, two temporary stub-ended set out tracks would be provided in the Phase 1 layout that occupies the footprint of the future shop tracks (one at the north and one at the south end of the yard). These set out tracks would be converted to shop access tracks in Phase 2 and, therefore, would no longer be available as set out tracks. A new set out track would then be provided as part of Phase 2.

A transportation building that would be utilized for administrative purposes is also included in Phase 1. This building would house managerial offices, welfare spaces for train crews and on-site personnel. This facility would include restrooms, showers, locker rooms, a break/day room, vending space and a kitchenette.

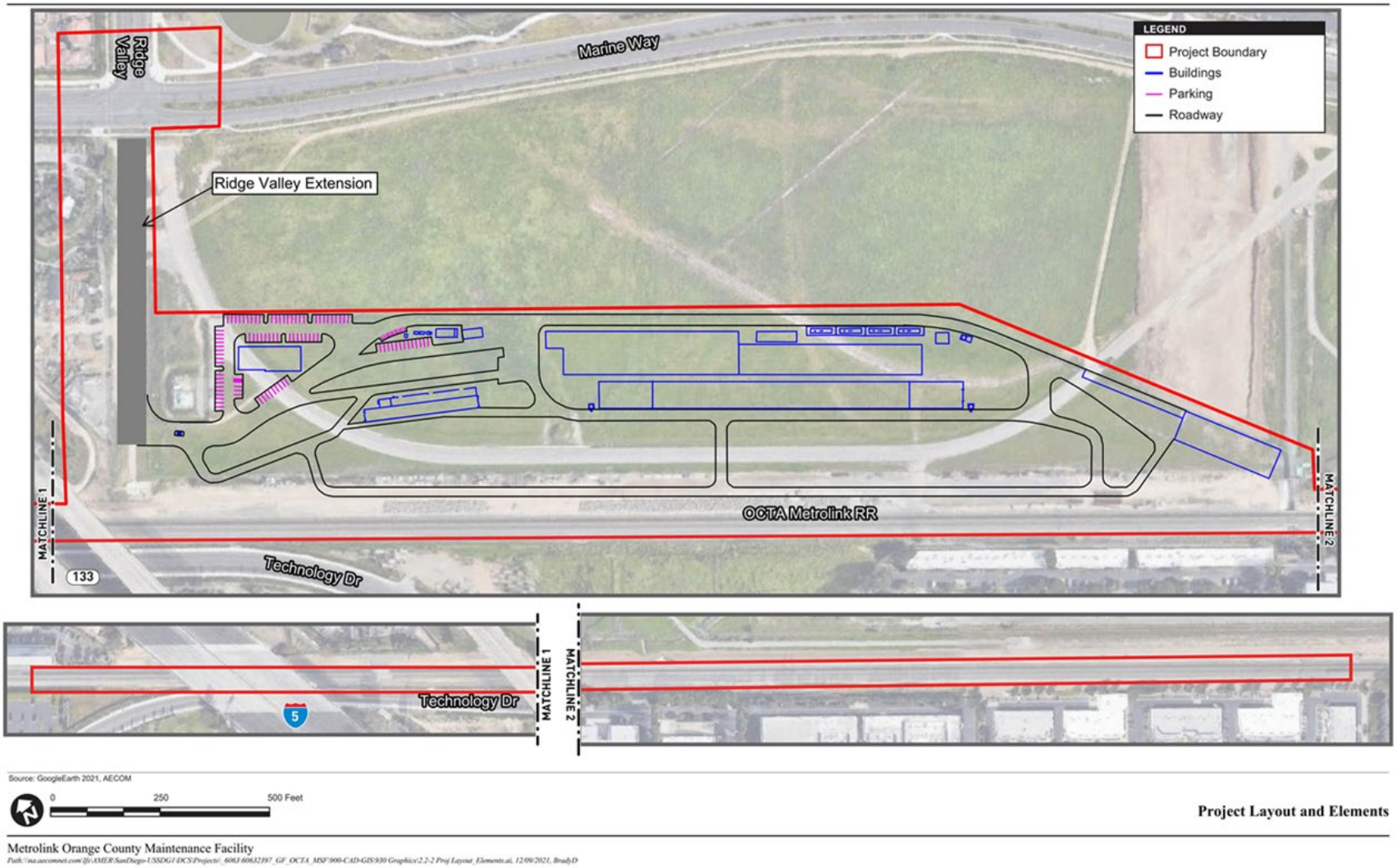
Parking would be provided for staff reporting to the site. Fire department compliant roadways would be developed to permit circulation of the site for Metrolink vehicles as well as delivery trucks (sand and fuel).

Phase 2 completes the full buildout of the Project. It would include development of the maintenance shop building and its future extension that would comprise of a total buildout area of 68,272 square feet (Table 2.2-1). The shop would have capabilities to perform regular three-month, six-month and one-year preventive maintenance cycles on trainsets. Phase 2 of the buildout would consist of approximately 28 employees. With the full buildout of Phase 1 and Phase 2, approximately 80 employees are expected to access the Project Site daily, split across three eight-hour shifts.

Access to the OCMF would require a roadway extension along Ridge Valley from the intersection of Ridge Valley and Marine Way. The Project includes the southern extension of Ridge Valley Road from Marine Way and associated traffic signal improvements to provide access to the OCMF.

The 11 new east and west lead tracks, as discussed in this section above, would be constructed within the existing railroad corridor between MP 183.0 and MP 184.00 on Metrolink's "Orange" Subdivision to connect the existing mainline railroad to the proposed OCMF rail yard. A new single span concrete bridge over the Bee Canyon Channel (Channel) would be built for the east lead track. A segment of the Channel and utilities that are found to be in conflict would be lowered by approximately 2.5 feet to facilitate the construction of the bridge.

Figure 2.2-1 Project Layout and Elements



Source: ESRI (2021), OCTA (2021)

3. REGULATORY FRAMEWORK

3.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA (Public Resources Code [PRC] Sections 21000–21177) is intended to prevent significant avoidable impacts to the environment by requiring feasible alternatives or mitigation measures. If cultural resources are identified within the Project Site, the sponsoring agency must take those resources into consideration when evaluating the Project's effects. The level of consideration may vary with the importance of the cultural resource.

Paleontological resources are not explicitly mentioned in the text of California Register of Historical Resources (CRHR) (PRC Section 5024.1, Title 14 California Code of Regulations [CCR], Section 4852). However, they are specifically identified for protection in Section V(c) of Appendix G, the "Environmental Checklist Form," which asks whether the Project would "Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?"

A paleontological resource is typically considered "unique" if it provides significant information about past environments or ancient life.

3.2 PUBCIC RESOURCES CODE SECTION 5097.5

PRC Section 5097.5 states that no person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological, or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor. "Public lands" refers to land owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

4. METHODOLOGY

A paleontological resources assessment was obtained for this Project from the Natural History Museum of Los Angeles County (LACM). Pertinent geological information was reviewed for the Project extent, including a review of paleontological literature; no paleontological field survey was performed. Paleontological sensitivity of the Project Site was addressed, and potential paleontological mitigation measures offered, as appropriate.

5. ENVIRONMENTAL SETTING

5.1 GEOLOGIC OVERVIEW

Geologic maps indicate that the entire Project Site is covered with surficial deposits of Qyf, (Morton and Miller, 2006). These deposits consist of young Quaternary alluvial fan deposits. They consist of slightly consolidated to cemented deposits of unsorted boulders, cobbles, gravels, and sands deposited by fluvial

processes. Shallow Qyf deposits date to the Holocene (approximately 11,650 calibrated radiocarbon years before present to today). The guidelines of the Society of Vertebrate Paleontology state that fossils as young as 5,000 years can be significant paleontological resources. But older Qyf deposits may date to the late Pleistocene (approximately 129,000 to 11,650 calibrated radiocarbon years before present). Thus, the sensitivity of Qyf deposits for significant paleontological remains increases with depth. Moreover, in this vicinity Qof deposits, which consist of older Quaternary alluvium dating to the late to middle Pleistocene, typically underlies the Qyf younger Quaternary alluvium at varying depths. Older Quaternary alluvium, which also dates to the Pleistocene, has yielded significant fossils in the Irvine area.

5.2 ARCHIVAL RESEARCH

Archival research included a records search conducted by the Los Angeles County Museum of Natural History (NHM) and a review of reports in AECOM's library. AECOM requested a paleontological records search be conducted by the NHM on July 8, 2020. Dr. Samuel MacLeod responded on behalf of the museum in a letter dated July 22, 2020. The records search found that no paleontological localities are documented within the Project Site. However, fossil localities are documented nearby in older Quaternary deposits (Table 5.2-1).

The closest NHM vertebrate fossil locality from older Quaternary deposits is LACM 7867, approximately 0.6-mile northeast of the Project Site near the intersection of C Street and 5th Street, that produced fossil specimens of pocket gopher, *Thomomy*s, at a depth of 25 feet below the surface.

The next closest vertebrate fossil from older Quaternary deposits is in Borrego Canyon, located approximately one mile east of the Project Site. Two fossil localities are found there. The lower one, 7.5 feet below the surface, produced remains of ground sloth, reptiles, amphibians, and freshwater fish (Stewart, 2006). Directly over that horizon is another that produces fossils of Pleistocene plants including manzanita and has been radiocarbon dated at about 28,000 calibrated radiocarbon years before present.

The next closest vertebrate locality is LACM 7713, located approximate 1.5 miles southwest of the Project Site on the western side of the Laguna Freeway (State Route 133 [SR-133]) at the southern end of the interchange with the San Diego Freeway (I-405), that produced a fossil specimen of ground sloth, *Mylodontidae*, from unstated but shallow depth.

Table 5.2-1 Previously Recorded Paleontological Resources Closest to the Project

Locality	Location	Age/ Formation	Findings
LACM 7867	Immediately northeast of the Project Site near the intersection of C Street and 5th Street, 25 feet below surface.	Quaternary deposit	*Thomomys* (pocket gopher)
LACM 7713	Southwest of the Project Site on the western side of the Laguna Freeway (SR-133) at the southern end of the interchange with the San Diego Freeway (I-405), from unstated but shallow depth.	Quaternary deposit	*Mylodontidae* (ground sloth)
Borrego Canyon Wash	Immediately east of the Project Site in Borrego Canyon Wash at a depth of 5 feet.	Quaternary deposit	*Arctostaphylos* manzanita)
Borrego Canyon Wash	Immediately east of the Project Site in Borrego Canyon Wash at a depth of 7.5 feet.	Quaternary deposit	Freshwater fish, amphibians, reptiles, ground sloth

Source: NHM (2020)

6. IMPACTS ANALYSIS

The sensitivity of the Project to encounter significant fossil remains appears high. Geologic maps indicate that the surficial deposits at the Project Site consist of younger Quaternary alluvium. These Holocene deposits are too young to typically contain significant fossils. The depth of excavations required for the Project could encounter Pleistocene horizons as shallow as 5 feet from the existing surface elevation. Moreover, soils at very shallow depths can reasonably be assumed to have been disturbed in the recent past by grading, by utilities excavations, and by activities related to the railroad and Marine Corps Station El Toro. However, the conditions at the Project Site are unknown.

Nevertheless, it is possible that the Project would encounter older Qyf deposits or Qof deposits during excavations. Unknown fossil resources may exist within these deposits, which have yielded significant fossils in the near vicinity of the Project. The sensitivity for the Project to encounter significant fossils increases with depth.

7. MITIGATION MEASURES

It is not anticipated that the Project would impact known paleontological resources. However, the possibility exists for the Project to encounter unknown paleontological resources in the course of excavation, if excavations exceed a depth of 5 feet. The following mitigation measures are recommended to reduce any impacts to unknown paleontological resources encountered during excavations to a less than significant level.

MM-PAL-01 **Worker Environmental Awareness Program.** Prior to construction, OCTA shall retain a qualified paleontologist who meets the requirements to be included in Orange County's list of qualified paleontologists. The qualified paleontologist shall prepare a Worker Environmental Awareness Program (WEAP). The WEAP will describe the types of resources that may be encountered during construction, the laws protecting those resources, and the procedures to follow when finds are encountered. The WEAP will be presented either in person or in video form to all construction employees involved in ground-disturbing activities before they begin work at the Project Site. If Project excavations are expected to exceed a depth of 5 feet below the surface, the qualified paleontologist shall prepare a Paleontological Resources Monitoring and Mitigation Plan that includes sampling and wet screening of sediment samples.

MM-PAL-02 **Response to Unanticipated Paleontological Finds.** If buried paleontological resources are uncovered during construction, all work shall be halted in the vicinity of the discovery until a qualified paleontologist can visit the site of discovery and assess the significance of the resource and, if necessary, recommend treatment.

8. IMPACTS AFTER MITIGATION

There are no known paleontological resources that would be impacted by the Project. Implementation of Mitigation Measure MM-PAL-01 would contribute to the successful identification of unanticipated fossil deposits that are encountered during construction. In the event that any unknown paleontological resources are found during construction, implementation of Mitigation Measure MM-PAL-02 would reduce any potential impacts to less than significant.

9. PREPARER'S QUALIFICATIONS

Dr. Marc Beherec has worked in the field of cultural resources management for approximately 20 years. He obtained his B.A. in Anthropology with a Geology minor from the University of Texas, Austin, and his M.A. and Ph.D. in Anthropology from the University of California, San Diego. He coordinated paleontological monitoring for various local agencies and assisted in the preparation of paleontological impact studies for the purposes of CEQA, as well as paleontological monitoring plans and memoranda documenting the results of paleontological monitoring.

Dr. Joe Stewart is a vertebrate paleontologist with over 40 years of experience in paleontology and 30 years of experience in the geology and paleontology of California, particularly in Merced, Fresno, Kern, Santa Barbara, Los Angeles, Orange, San Bernardino, Riverside, Imperial, and San Diego counties. Dr. Stewart has been involved in the permitting or construction of more than ten power plants and has directed the paleontological monitoring and mitigation program for Path 15, a major transmission line Project. He is also a certified paleontologist for the Counties of Orange and Riverside. His publications include 40 peer-reviewed articles in books and journals. His research specialties are fossil fishes and Pleistocene vertebrate faunas.

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SCRRA, Metrolink System Map, October 2019, Available at: https://metrolinktrains.com/about/agency/

Appendix H
Technical Memorandum
Traffic

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority

550 S. Main St.
Orange, CA 92868
And

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

AECOM
One California Plaza
300 S. Grand Ave.
Los Angeles, CA 90071

September 2023

REVISION	DESCRIPTION	DATE
0	Draft Traffic Technical Memorandum	01/26/2021
1	Draft Traffic Technical Memorandum (Incorporating OCTA's comments)	03/17/2021
2	Draft Traffic Technical Memorandum (Incorporating OCTA's comments)	10/4/2021
3	Draft Traffic Technical Memorandum (Incorporating City of Irvine's comments on the Conditional Use Permit)	02/7/2022
4	Draft Traffic Technical Memorandum (Incorporating City of Irvine's comments on the Conditional Use Permit)	02/16/2022
5	Final Traffic Technical Memorandum	09/22/2023

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Attachment B Project Plans
Attachment C ICU Level of Service Calculations
Attachment D HCM Level of Service Calculations

1. INTRODUCTION

The Southern California Regional Railroad Authority (SCRRA) Metrolink Commuter Rail System (Metrolink) is proposing to construct a new Orange County Maintenance Facility (hereafter referred to as "OCMF" or "the Project"). The Project would include several facilities including a transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth, sand silos, a maintenance facility, a maintenance facility extension, and 11 tracks. The Project consists of buildings that, when combined, would have a total building area of approximately 90,000 square feet. Approximately 80 employees would report to the Project. Metrolink currently operates two maintenance facilities across its service area: Central Maintenance Facility (CMF) in Los Angeles and Eastern Maintenance Facility (EMF) in San Bernardino County. Due to projected population expansion within its service area and the agency's goal to be prepared for the 2028 Los Angeles Summer Olympic Games, Metrolink will require an increased number of commuter rail services, as well as additional train storage and maintenance facilities associated with an increased fleet size. As a significant proportion of the expanded services will operate in Orange County, the Project would provide an optimal location for a new Metrolink maintenance facility. Metrolink's member agency, the Orange County Transportation Authority (OCTA), proposes to build this facility on an OCTA-owned parcel in the City of Irvine. OCTA is the lead agency under the California Environmental Quality Act (CEQA). The City of Irvine and SCRRA are the responsible agencies under CEQA.

This traffic study has been prepared to identify the short-term traffic deficiencies (level of service [LOS]) and CEQA transportation impacts (vehicle miles travelled [VMT]) resulting from the Project. The study meets the requirements of a Limited Scope Traffic Study as defined by the City of Irvine (City) and has been prepared in accordance with applicable sections of the City of Irvine Traffic Study Guidelines (November 2021) and the City of Irvine Transportation Design Procedures (February 2007).

2. PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

As a result of the projected population expansion within the five-county area (Orange County, Los Angeles County, San Bernardino County, Riverside County, and Ventura County) currently served by the SCRRA, Metrolink will require an increased number of commuter rail services to support the growth. Consequently, the Metrolink system (Figure 2.1-1) will require additional train storage and maintenance facilities to support an increased fleet size.

Figure 2.1-1 Metrolink System Map



Source: SCRRA (2019)

Metrolink's CMF facility is located on the east bank of the Los Angeles River near the Interstate 5 (I-5) and Interstate 10 (I-10) highways, just south of the location of the former Southern Pacific Taylor Yard. The CMF is currently near capacity, which will impact the ability to provide the necessary train servicing for planned service-expansion of various Metrolink lines throughout the system under the Southern California Optimized Rail Expansion (SCORE) program. By transferring a portion of the current fleet from CMF to the proposed OCMF (specifically the Orange County Line trains), capacity for the non-Orange County trains will be increased at CMF. The Orange County Line has the highest ridership within the Metrolink system; therefore, a maintenance facility to serve the Orange County area with sufficient storage and servicing capabilities for both locomotives and rail cars is critical to controlling operating costs. In order to optimize rail service in the region, the proposed facility development would need to be completed by 2028. The SCORE program may also require heavy overhaul capabilities at OCMF, subject to pending decisions regarding fleet technology and management.

The expansion of Orange County and overall Metrolink commuter rail service will ultimately require additional or expanded equipment servicing capabilities for both locomotives and rail cars. Since a significant portion of the fleet will be in Orange County, a maintenance facility located along the Metrolink route through Orange County would be the optimal location as it would reduce operating costs by limiting non-revenue moves to the existing SCRRA storage and maintenance facilities in the cities of Los Angeles and San Bernardino. The proposed maintenance facility would provide equipment to inspect, clean, and maintain cars and locomotives on a regular and efficient basis. Much of the inspection and maintenance activity is federally mandated and must be performed at specific intervals. The OCMF will also provide refueling services thus reducing fuel costs, reducing fuel consumption, and will reduce emissions. Currently trains operating in the Orange County Region must travel either the CMF or EMF for refueling, which are sometimes non-revenue runs. The location of the Project is on a 21.3-acre OCTA-owned parcel on Ridge Valley south of Marine Way in the City of Irvine (Project Site). The Project Site is located within the boundaries of a closed military base (Marine Corps Air Station [MCAS] El Toro) formerly owned by the United States Department of the Navy (DON). After MCAS El Toro was closed, the site was quitclaimed by the Navy to Heritage Fields El Toro, LLC in 2011, and then by way of grant deed conveyed by Heritage Fields to the City of Irvine that same year. OCTA then purchased the fee ownership of the Project Site from the City of Irvine. Regional vehicle access to the Project Site is from Interstate 5 (I-5) at Sand Canyon Avenue. Local vehicle access is via Marine Way to Ridge Valley.

Prior to the current construction of the storage/set-out track, the Project Site was mostly vacant. The site currently includes 1,000-foot-long storage for miscellaneous rail equipment including temporary railroad bridges, signal houses, railroad ties, and signal components. Although not part of the Project, OCTA is currently installing a single 1,000-foot-long, single-ended storage track and fencing of the perimeter of the property to provide temporary storage of two trainsets and/or track maintenance equipment when necessary. There is a segment of an abandoned road, stormwater drains, and underground water transfer vault with a network of pipelines, valves and associated vents, that are currently not in use.

2.2 PROJECT DESCRIPTION

The OCMF would be located in the City of Irvine, on a 21.3-acre parcel owned by OCTA and adjacent to Marine Way and the Metrolink Orange subdivision between mileposts 183.50 and 184.00 on Metrolink's "Orange" Subdivision (Figure 2.2-1). The Project Site is located within Planning Area 51 of the updated City of Irvine General Plan, adopted in June 2015, and designated for the Great Park (formerly known as the Orange County Great Park (OCGP)) land use under the General Plan. Per the City's zoning ordinance, the proposed use is a conditionally allowable use under the existing zone; therefore, OCTA is submitting a Conditional Use Permit to the City of Irvine for approval.

The Project would be developed in two phases with an anticipated completion date of 2028. For traffic analysis purposes, the Project is assumed to be fully built-out by short-term interim year. Phase 1 focuses on developing facilities needed for the storage and routine cleaning, inspection and servicing of the anticipated trainsets. The total area of the Phase 1 buildout would be approximately 20,996 square feet and would be comprised of the following facilities: the transportation building, employee parking area, train-wash building, pump house, utility building, guard booth, equipment booth and sand silos (Table 2.2-1). A total of 11 tracks would be built. The Phase 1 layout situates the train wash, fueling/sanding, and service and inspection tracks on the two tracks with the greatest tangent length, which are the ones nearest the railroad right of way ("ROW"). This is important in fitting a second fueling/sanding facility so that there is one at each end of the service and inspection platform to support having the locomotive at either end, all within tangent track. Additionally, six storage tracks and appurtenant features (air, water, head end power and toilet dump facilities) would be constructed. The storage tracks would be built near the middle of the site east of the service and inspection tracks. Phase 1 of the buildout would anticipate approximately 52 employees total throughout the entire day, split across three eight-hour shifts.

Table 2.2-1 Building Specifications

Building/Facility/Item	Building Area	Building Height
Transportation Building	7,495 sq. ft.	20 ft
Train Wash Building	11,110 sq. ft.	21 ft
Maintenance Building	40,392 sq. ft.	48 ft
Maintenance Building Expansion	27,880 sq. ft.	---
Utility Building	981 sq. ft.	20 ft
Pump House	750 sq. ft.	14 ft
Guard Booth	36 sq. ft.	---
Equipment Booth	48 sq. ft.	---
Sand Silos (2 Total)	576 sq. ft.	---
Total	89,268 sq. ft.	

Source: Gannett Fleming, Metrolink (2022)

Note: sq. ft. = square feet; ft = feet

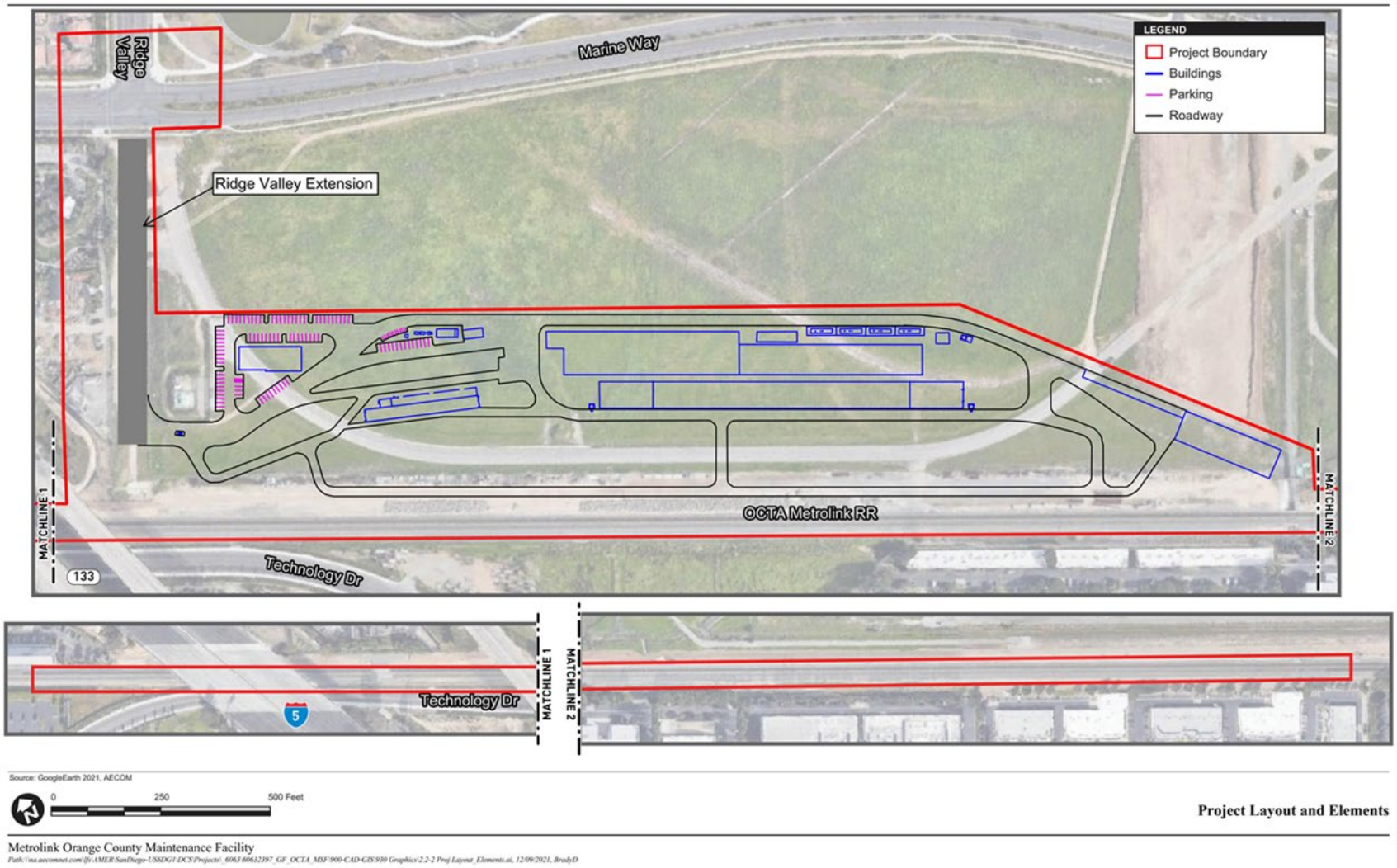
A runaround track would be provided between the service and inspection tracks and storage tracks. Additionally, two temporary stub-ended set out tracks would be provided in the Phase 1 layout that occupies the footprint of the future shop tracks (one at the north and one at the south end of the yard). These set out tracks would be converted to shop access tracks in Phase 2 and, therefore, would no longer be available as set out tracks. A new set out track would then be provided as part of Phase 2.

A transportation building that would be utilized for administrative purposes is also included in Phase 1. This building would house managerial offices, welfare spaces for train crews and on-site personnel. This facility would include restrooms, showers, locker rooms, a break/day room, vending space and a kitchenette. Approximately 120 automobile parking spaces would be provided for staff reporting to the site. Fire department compliant roadways would be developed to permit circulation of the site for Metrolink vehicles as well as delivery trucks (sand and fuel).

Phase 2 completes the full buildout of the Project. It would include development of the maintenance shop building and its future extension that would comprise of a total buildout area of 68,272 square feet (Table 2.2-1). The shop would have capabilities to perform regular three-month, six-month, and one-year preventive maintenance cycles on trainsets. Phase 2 of the buildout would consist of approximately 28 employees. With the full buildout of Phase 1 and Phase 2, approximately 80 employees are expected to access the Project Site daily, split across three eight-hour shifts. The 11 new east and west lead tracks, as discussed in this section above, would be constructed within the existing railroad corridor between MP 183.0 and MP 184.00 on Metrolink's "Orange" Subdivision to connect the existing mainline railroad to the proposed OCMF rail yard. A new single span concrete bridge over the Bee Canyon Channel (Channel) would be built for the east lead track. A segment of the Channel and utilities that are found to be in conflict would be lowered by approximately 2.5 feet to facilitate the construction of the bridge.

Regional vehicle access to and from the Project Site is provided primarily by I-5 at Sand Canyon Avenue, with supplemental access by State Route (SR) 133, which provides connections to SR-241 and I-405. Local vehicle access is provided by Marine Way and Ridge Valley. Direct access in and out of the Project Site would be provided by a driveway opening onto a dead-end (cul-de-sac) extension of Ridge Valley southwest from Marine Way. A detailed site plan showing the Ridge Valley extension and proposed driveway is included in Attachment B.

Figure 2.2-1 Project Layout and Elements



Source: ESRI (2021), OCTA (2021)

3. ANALYSIS METHODOLOGY AND APPROACH

For reference, the scope of work for this traffic analysis, as submitted to the City of Irvine, is included as Attachment A to this technical memorandum.

3.1 STUDY AREA

The roadway network in the vicinity of the Project Site is illustrated in Figure 3.2-1.

The study area includes the following four signalized study intersections (illustrated in Figure 3.2-1) and three study roadway segments:

- **Study intersections:**
    1. Sand Canyon Avenue / I-5 Northbound Ramps
    2. Sand Canyon Avenue / Marine Way
    3. Sand Canyon Avenue / I-5 Southbound Ramps
    4. Ridge Valley / Marine Way

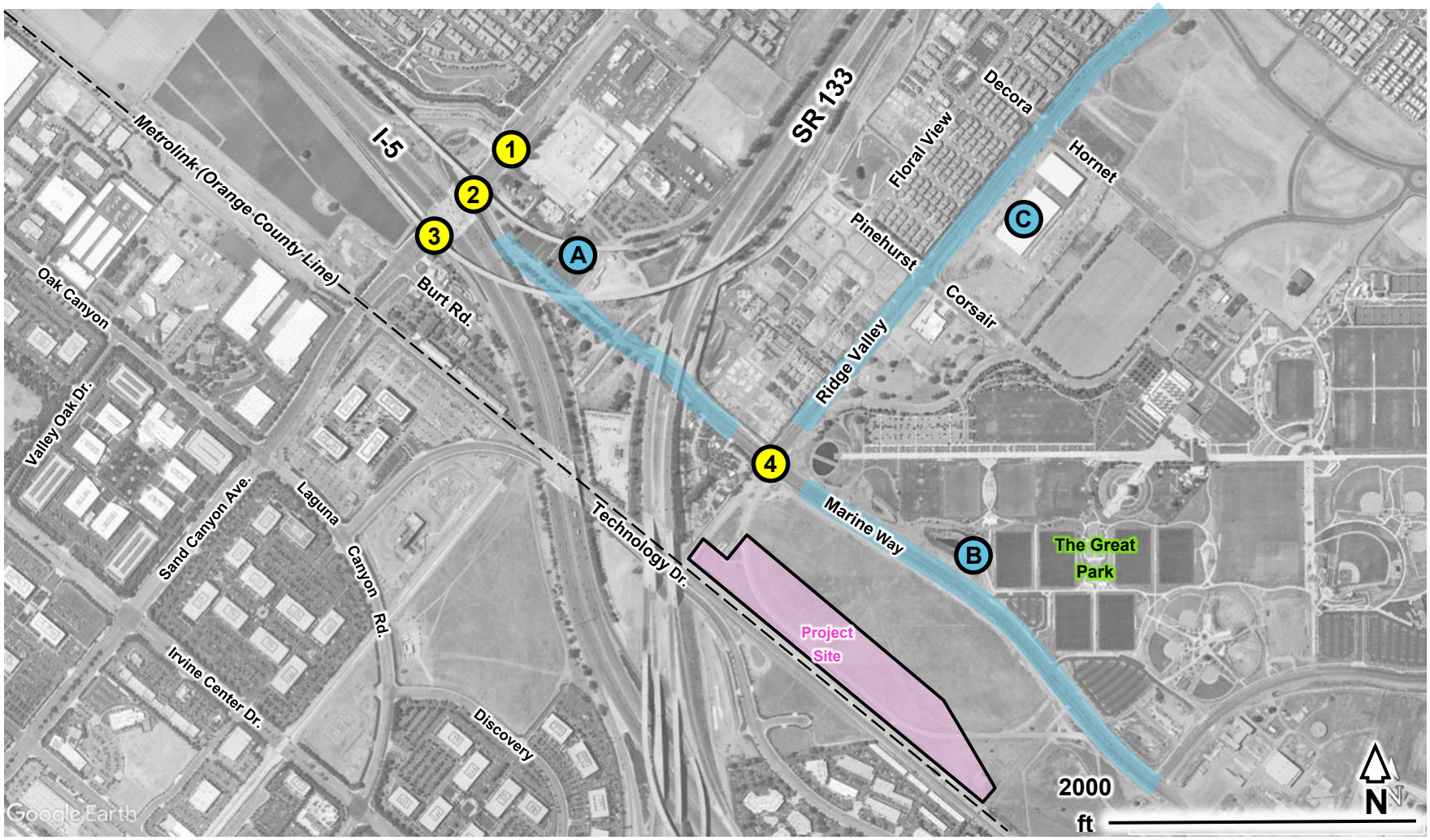
- **Study roadway segments:**
    A. Marine Way between Sand Canyon Avenue and Ridge Valley
    B. Marine Way east of Ridge Valley
    C. Ridge Valley between Great Park Boulevard and Marine Way

3.2 PERFORMANCE CRITERIA

Intersections and Roadway Segments

Peak-hour operations at the study intersections were analyzed according to the intersection capacity utilization (ICU) methodology, which compares the volume-to-capacity (v/c) ratios of conflicting turn movements at an intersection to identify the critical movements for each intersection approach. The v/c ratios for the identified critical movements are then summed together to determine the overall v/c ratio (or ICU) of the intersection, which can then be expressed in terms of LOS, where LOS A represents free-flow conditions and LOS F represents operations exceeding the capacity of the intersection. The analysis includes parameters set by the City for ICU calculations, including lane capacity, right-turn treatment, and clearance intervals.

Figure 3.2-1 Study Intersections



Source: Google Earth (2018)

The relationship between ICU and LOS is summarized in Table 3.2-1.

Table 3.2-1 Level of Service Definitions

Level of service	v/c range (ICU and roadway segments)	Delay range (HCM, signalized intersections)
A	$0.00 \leq x \leq 0.60$	$x \leq 10.0$
B	$0.61 \leq x \leq 0.70$	$10.0 < x \leq 20.0$
C	$0.71 \leq x \leq 0.80$	$20.0 < x \leq 35.0$
D	$0.81 \leq x \leq 0.90$	$35.0 < x \leq 55.0$
E	$0.91 \leq x \leq 1.00$	$55.0 < x \leq 80.0$
F	$1.00 < x$	$80.0 < x$

Source: *City of Irvine Traffic Study Guidelines* (June 2020); Transportation Research Board, *Highway Capacity Manual* (2017)

For signalized intersections under the jurisdiction of the California Department of Transportation (Caltrans), LOS was also calculated according to the Highway Capacity Manual (HCM) methodology [Transportation Research Board (TRB), 2017].[(1)] The HCM methodology determines LOS based on average delay (in seconds per vehicle) at the intersection, as summarized in Table 3.2-1.

For roadway segments, v/c ratios were calculated using theoretical daily capacities (as defined in the *City of Irvine Traffic Study Guidelines*) by roadway type (as defined in the Circulation Element of the City's General Plan), as summarized in Table 3.2-2.

According to the *City of Irvine Traffic Study Guidelines* and consistent with the City's General Plan, acceptable conditions are generally defined as LOS D or better, calculated according to the City's ICU methodology. The City applies several special exceptions for specific locations and / or development sites, but none of these exceptions apply to the study intersections and roadway segments analyzed in this study.

The City applies the following performance criteria to identify whether a project results in, or substantially contributes to, an LOS deficiency:

- A location is at an acceptable LOS in the baseline condition and the project causes the location to become deficient; or
- A location is deficient (i.e., at unacceptable LOS) in the baseline condition and the project causes the location to further deteriorate by two percent or more.[(2)]

(1) HCM-based results are presented for informational purposes only, and are not used in the determination of significant impacts.

(2) For v/c ratios, the two-percent threshold is applied as an increase of 0.02 or greater in the v/c ratio (based on the City's ICU methodology for intersections and daily capacity methodology for roadway segments).

Table 3.2-2 Theoretical Daily Capacity of Roadways

Facility type	Lanes	Capacity†
Freeway	10	210,000
	8	176,000
	6	135,000
	4	90,000
Freeway ramps	2	22,000
	1	16,000
Expressway	6	135,000
Major highway	8	72,000
	6	54,000
Primary highway	4	32,000
Secondary highway	4	28,000
Commuter	2	13,000
Commuter (rural)	2	18,000

Source: *City of Irvine Traffic Study Guidelines* (June 2020)
Notes: Capacity may be interpolated for roadways that do not specifically fall into one of the facility type–lane combinations indicated above.
† vehicles per day of the roadway

For roadway segments determined to be deficient based on daily capacity, the City requires an additional peak-hour link analysis (PHLA) to make a final LOS deficiency determination. The peak-hour link analysis determines v/c ratios for each direction of the roadway segment, for both the weekday a.m. and p.m. peak hours.[(3)] The roadway capacity is determined by multiplying the number of lanes (at an appropriate mid-block location) by a lane capacity of 1,600 vehicles per hour (vph). Where the distance between controlled intersections is one mile or more, the assumed lane capacity is increased to 2,000 vph.

Where a project is determined to result in or substantially contribute to a LOS deficiency, the given project is required to improve operations to baseline conditions or better.

Transportation Design Procedures

The proposed vehicle access—including the Project's driveway and the proposed cul-de-sac extension of Ridge Valley—were analyzed based on the design criteria described in the *City of Irvine Transportation Design Procedures* (June 2020). The Transportation Design Procedures (TDPs) establish uniform policies and procedures for reviewing traffic design plans within the City and are used in this study to evaluate roadway design as it relates to the Project. Discussion and analysis of applicable design criteria are provided in later sections of this study.

[(3)] The a.m. and p.m. peak hours are typically defined as the peak 60-minute periods (i.e., four consecutive 15-minute periods) with the highest total intersection volume within each of the a.m. and p.m. peak periods (7:00–9:00 a.m. and 4:00–6:00 p.m., respectively).

3.3 ANALYSIS SCENARIOS

Given the size and nature of the Project, this study is designed to meet the City's requirements for a Limited Scope Traffic Study, and includes analysis of the following scenarios:

- **Existing Baseline**
  This scenario represents existing conditions in 2020, assuming the continuation of traffic levels and growth trends prior to the shelter-in-place restrictions and other effects associated with the COVID-19 pandemic.
- **Existing Baseline plus Project**
  This scenario represents the Existing Baseline scenario plus the effects of the Project, including Project-generated traffic.
- **Short-Term Interim Year Baseline**
  This scenario represents a five-year horizon (2025) beyond the Existing Baseline scenario, and accounts for development projects approved by the City and expected to be completed by that time.
- **Short-Term Interim Year Baseline plus Project**
  This scenario represents the Short-Term Interim Year Baseline scenario plus the effects of the Project, including Project-generated traffic.

3.4 COMMITTED IMPROVEMENTS

Currently, Marine Way intersects Sand Canyon Avenue in between the two ramp intersections at I-5's interchange with Sand Canyon Avenue. While the portions of Marine Way approaching Sand Canyon Avenue and Ridge Valley are built to a minimum cross-section of four lanes, the mid-block portion crossing over the Marshburn Channel flood control facility only features two lanes.

The City is actively working on a future realignment of Marine Way at its northern end intersecting Sand Canyon Avenue. The new alignment would begin approximately where Marine Way passes underneath SR 133, swinging to the northeast along the south edge of the Caltrans District 12 Transportation Management Center and the OCTA's Sand Canyon Bus Base and tying into Sand Canyon Avenue as the southern leg of the existing intersection at the I-5 Northbound Ramps. The realigned segment would feature a minimum cross-section of four lanes for its entire length.

To account for the Marine Way realignment, the Short-Term Interim Year scenarios each include two alternatives: Alternative 1 assuming Marine Way as it is currently, and Alternative 2 assuming the planned realignment.

City of Irvine staff also identified a future lane striping modification at the Sand Canyon Avenue / Marine Way intersection proposed as part of a separate development on the nearby Traveland site. These modifications would convert one of the southbound left-turn lanes into a through lane, leaving only a single southbound left-turn lane.

A review of committed improvements identified in the City's latest Circulation Phasing Analysis Report (March 2020) did not find any other relevant improvements affecting the study intersections and roadway segments analyzed in this study.

4. PROJECT TRAFFIC

4.1 TRIP GENERATION

Due to the specialized nature of the Project, trip generation for the Project was estimated based on the number of employees, plus allowances to account for fleet vehicles, deliveries (e.g., fuel, sand, maintenance equipment, etc.), visitors, and other ancillary traffic.

Based on existing operations at other commuter rail maintenance facilities, approximately 80 employees are expected to access the Project Site daily, split across three eight-hour shifts. As much of the actual fleet maintenance activities would take place overnight, when locomotives and passenger cars are not in revenue service, the majority of employees are expected to work the overnight shifts, with 60 percent working the 4:00 p.m.–12:00 a.m. shift and 30 percent working the 12:00–8:00 a.m. shift. The remaining 10 percent of employees are assumed to work the daytime shift (8:00 a.m.–4:00 p.m.). The trip generation conservatively assumes an automobile mode share of 100 percent, with an average vehicle occupancy of 1.00. Thus, no reductions were taken to account for other modes—including public transit or active transportation (walking or biking)—or carpooling.

The Project would also serve as a base for approximately 10 fleet vehicles, each of which were conservatively assumed to be used for off-site duties once daily, proportionally distributed across the three work shifts based on the number of workers assigned to each shift. For both peak hours, the analysis conservatively includes fleet vehicles assigned to both the leading shift and following shift. For the a.m. peak hour, for example, the Project's trip generation includes both inbound fleet vehicles arriving back at the site (for the work shift ending at 8:00 a.m.) and departing the site (for the work shift beginning at 8:00 a.m.). The fleet vehicles are assumed to be off-site for most of the corresponding shift to conduct repair, regular maintenance, and other duties within Metrolink right-of-way and at Metrolink facilities; thus, any fleet vehicles assigned to a given peak hour are assigned to that peak hour only once.

To account for deliveries, visitors, and other ancillary traffic, an additional allowance of 20 vehicles per day, spread uniformly across the typical eight-hour workday, was assumed.

The estimated trip generation for the Project is summarized in Table 4.1-1. As the site is currently vacant, there are no existing trips or uses to be considered for this study.

Table 4.1-1 Project Trip Generation

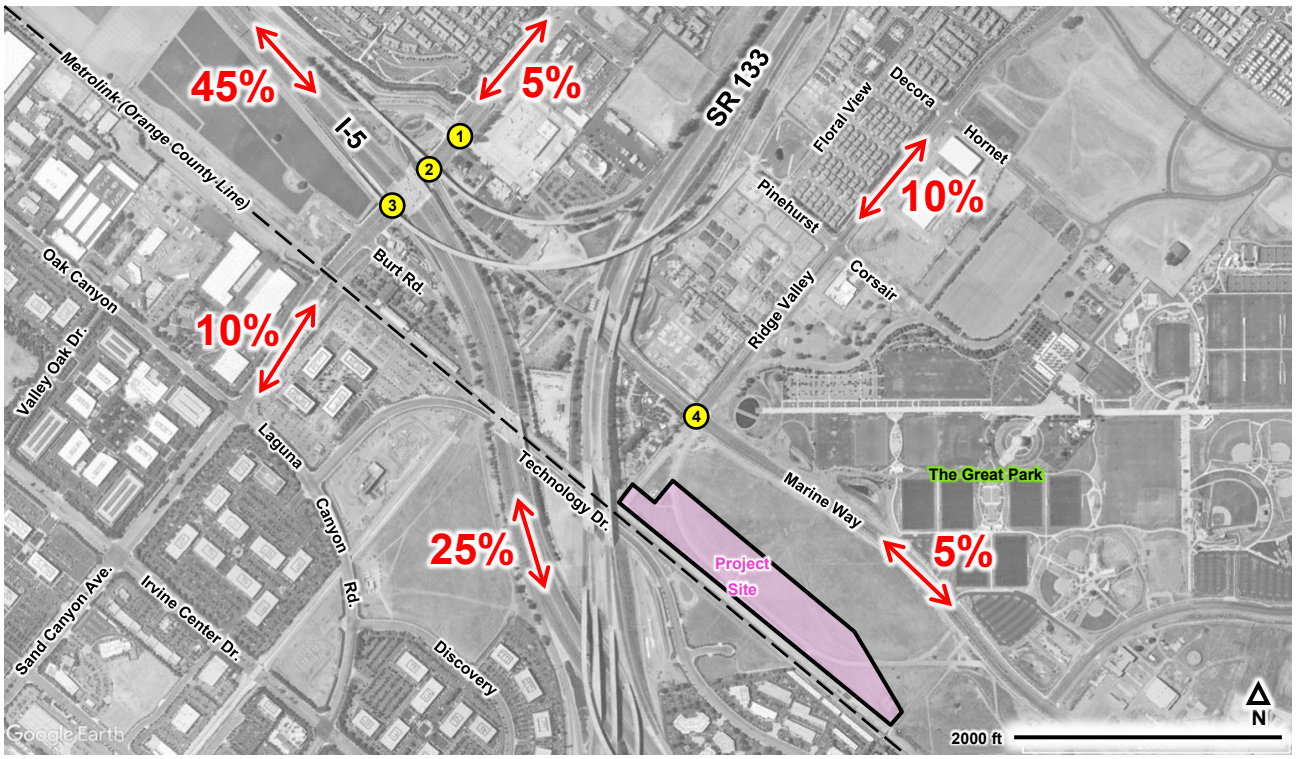
Trip category		Vehicle-trips								
		Daily			AM peak hour			PM peak hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Worker commutes	80 employees	80	80	160	8	24	32	0	8	8
Fleet vehicles	10 vehicles	10	10	20	3	1	4	1	6	7
Other		20	20	40	3	3	6	3	3	6
Total		**110**	**110**	**220**	**14**	**28**	**42**	**4**	**17**	**21**

Notes: "Other" includes deliveries, visitors, and other ancillary traffic. No "other" trips assumed during a.m. and p.m. peak hours.
Source: AECOM (2022)

4.2 TRIP DISTRIBUTION AND ASSIGNMENT

The assumed trip distribution and assignment is illustrated in Figure 4.2-1, and is based on existing travel and land use patterns. I-5 is the primary access for the regional roadway network, as it is a major north–south freeway and provides additional connections to and from I-405 (via SR-133). Smaller percentages of Project trips are distributed on major local streets, including Sand Canyon Avenue to / from the southwest and northeast, Ridge Valley to / from the northeast, and Marine Way to / from the southeast.

Figure 4.2-1 Project Trip Distribution



Source: Google Earth (2018)

The Project Site is located within Irvine, which is on the periphery of Greater Los Angeles, with areas beyond (such as southern Orange County) generally less dense and constrained by geography. As such, the trip distribution is weighted more heavily to the north, favoring the contiguous, built-up areas in northern Orange County and adjacent Los Angeles County.

5. EXISTING CONDITIONS

5.1 EXISTING ROADWAY NETWORK

Key roadways in the vicinity of the Project include Sand Canyon Avenue, Marine Way, and Ridge Valley.

Sand Canyon Avenue

According to the Circulation Element of the City's General Plan, Sand Canyon Avenue is classified as a six-lane Major Highway and functions as a Thruway. Sand Canyon Avenue is oriented in the north–south direction[(4)] and provides direct access to / from I-5, with a posted speed limit of 50 miles per hour (mph). In the vicinity of the Project Site, Class II bikeways (on-street bicycle lanes) and sidewalks are generally provided on both sides of the street but may be discontinuous in some locations. On-street parking is not permitted.

Marine Way

The Circulation Element of the City's General Plan classifies Marine Way as a Primary Highway, functioning as a Parkway. Marine Way is oriented in the east–west direction, with a posted speed limit of 45 mph. Marine Way is originally a two-lane roadway that served as an access road and perimeter road for MCAS El Toro, but it is planned to be realigned and widened to a four-lane facility. Work on the segment in the immediate vicinity of the Project Site (between Ridge Valley and Skyhawk) has been completed, but portions of Marine Way north of Ridge Valley and south of Skyhawk have not yet been improved and will retain their previous alignment and cross-section (two lanes) as a temporary scenario only. Future roadway improvements- as mentioned above in this section and not a part of the scope of this Project- plans to realign and widen this portion of Marine Way from a two-lane facility to a four-lane facility..

In the vicinity of the Project Site, Class II bikeways are provided in both directions north of Skyhawk, but sidewalks may be discontinuous, particularly north of SR-133 (where the roadway was never fully improved) and on the north side east of Ridge Valley (where construction is currently underway for the Great Park). On-street parking is not permitted.

Ridge Valley

According to the Circulation Element of the City's General Plan, Ridge Valley is classified as a Secondary Highway and functions as a Collector. Ridge Valley is a four-lane facility oriented in the north–south direction, with a posted speed limit of 45 mph. In the vicinity of the Project Site, Class II bikeways are

(4) For roadways in the vicinity of the Project Site, the City's standard convention defines I-5 and Marine Way in the east–west direction and Sand Canyon Avenue and Ridge Valley in the north–south direction.

provided in both directions, but sidewalks along the east side of the street may be discontinuous as redevelopment on the former MCAS El Toro site is still underway. On-street parking is not permitted.

5.2 LEVEL OF SERVICE ANALYSIS

Due to shelter-in-place restrictions and other effects associated with the COVID-19 pandemic, traffic levels are currently depressed, and traffic counts collected during this period would not give an accurate representation of "normal" conditions prior to the pandemic. As described in Section 3.3, an Existing Baseline scenario was therefore developed assuming the continuation of traffic levels and growth trends prior to COVID-19.

Pre-COVID count data (from May 2018 and February 2019) were provided by the City for use in the study and extrapolated to 2020 levels assuming a uniform growth rate of two percent per year. These extrapolated traffic volumes were then compared to a separate set of 2020 traffic projections obtained by interpolating between traffic volumes for 2018 and 2023 used for the City's latest Circulation Phasing Analysis Report.[(5)] For the study intersections common to this study and the Circulation Phasing Analysis Report, the latter dataset generally showed higher total intersection volumes during the a.m. and p.m. peak hours, and was therefore conservatively carried forward for use in this study.

Count data provided by the City only included a daily count for one of the three roadway segments (Marine Way between Sand Canyon Avenue and Ridge Valley). With current traffic levels substantially depressed due to COVID-19, initial estimates of daily traffic volume for the remaining two roadway segments were developed by multiplying the peak hour traffic volume (calculated as entering / exiting volumes from the adjacent study intersections) by 10, a common rule of thumb frequently used when data are not readily available. The calculation was done separately using the a.m. and p.m. peak hour volumes, with the higher of the two selected for further analysis. Separately, existing daily traffic volumes were also referenced from the Circulation Phasing Analysis Report and compared against the rule-of-thumb estimates. The approach resulting in the higher traffic volume was then conservatively carried forward for use in the v/c analysis.

The results of the intersection and roadway segment LOS analyses are summarized in Table 5.2-1 and Table 5.2-2, respectively. Detailed ICU and HCM LOS calculation worksheets for the study intersections, including traffic volume projections for each scenario, are provided in Attachment C and Attachment D, respectively.

As shown in Table 5.2-1 and Table 5.2-2, all study intersections and roadway segments would operate at acceptable LOS (LOS D or better), even with the addition of the Project. Therefore, the Project would not result in or substantially contribute to any LOS deficiencies under the Existing Baseline scenario.

[(5)] Traffic projections from the Circulation Phasing Analysis Report were developed using Model No. 18 of the City's travel demand forecasting and analysis model, the Irvine Transportation Analysis Model (ITAM). The ITAM is the OCTA-sanctioned subarea traffic model for the City of Irvine.

Table 5.2-1 Intersection Level of Service Summary: Existing

Intersection		ITAM node	Methodology	Existing Baseline				Existing Baseline plus Project				ICU change	
				AM peak hour		PM peak hour		AM peak hour		PM peak hour		AM peak hour	PM peak hour
				ICU or Delay	LOS	ICU or delay	LOS	ICU or delay	LOS	ICU or delay	LOS		
1	Sand Canyon Ave. / I-5 NB Ramps	303	ICU	0.58	A	0.68	B	0.59	A	0.68	B	0.01	0.00
			HCM	28.1	C	39.8	D	26.8	C	39.8	D	—	—
2	Sand Canyon Ave. / Marine Way	304	ICU	0.62	B	0.58	A	0.62	B	0.58	A	0.00	0.00
3	Sand Canyon Ave. / I-5 SB Ramps	305	ICU	0.60	A	0.58	A	0.61	B	0.58	A	0.01	0.00
			HCM	18.6	B	24.4	C	18.8	B	24.5	C	—	—
4	Ridge Valley / Marine Way	—	ICU	0.39	A	0.24	A	0.38	A	0.25	A	(0.01)	0.00

Source: AECOM (2022)

Table 5.2-2 Roadway Segment Level of Service Summary: Existing

	Roadway segment	Capacity	Existing Baseline			Existing Baseline plus Project			v/c change
			ADT	v/c ratio	LOS	ADT	v/c ratio	LOS	
A	Marine Way between Sand Canyon Avenue and Ridge Valley	13,000	11,400	0.88	D	11,600	0.89	D	0.01
B	Marine Way east of Ridge Valley	32,000	7,200	0.22	A	7,200	0.22	A	0.00
C	Ridge Valley between Great Park Boulevard and Marine Way	28,000	14,800	0.53	A	14,800	0.53	A	0.00

Source: AECOM (2022)

6. FUTURE CONDITIONS

6.1 LEVEL OF SERVICE ANALYSIS

Similar to the derivation of Existing Baseline traffic volumes, traffic projections for the Short-Term Interim Year scenarios were developed using two different methods: one assuming a uniform growth rate of two percent per year applied to the Existing Baseline volumes, and another applying it to the 2023 volumes from the City's Circulation Phasing Analysis Report. For intersections and roadway segments common between this study and the Circulation Phasing Analysis Report, the method resulting in the higher traffic volume was conservatively carried forward for use in this study.

Alternative 1

The results of the intersection and roadway segment LOS analyses for Alternative 1 (existing Marine Way alignment) are summarized in Table 6.1-1 and Table 6.1-2, respectively. As shown in Table 6.1-1 and Table 6.1-2, all study intersections and roadway segments would operate at acceptable LOS (LOS D or better) based on the City's LOS thresholds, even with the addition of the Project, with the exception of the segment of Marine Way between Sand Canyon Avenue and Ridge Valley, which would be deficient in terms of daily LOS. A peak-hour link analysis, however, shows that both directions of this segment would operate at LOS A under both the a.m. and p.m. peak hours, even with the addition of the Project (refer to Table 6.1-3). Therefore, the Project would not result in or substantially contribute to any LOS deficiencies under the Short-Term Interim Year scenario with Alternative 1.

Alternative 2-Realigned Marine Way

For Alternative 2, all traffic turning into or out of Marine Way under Alternative 1 was manually redistributed to the new intersection at the I-5 Northbound Ramps. The existing Marine Way ("Old Marine Way") alignment is assumed to remain to provide local access for adjacent properties, such as the Caltrans Marine Way Maintenance Station at 6641 Marine Way. To account for traffic that would continue to use Old Marine Way, volumes turning into or out of Old Marine Way at Sand Canyon Avenue were referenced from the recent traffic study for the Hoag Hospital Irvine (LSA, 2020). The referenced volumes represent 2040 traffic projections, but were conservatively taken as is, without adjustments to omit potential growth occurring after the Short-Term Interim Year horizon (2025) for this study.

Table 6.1-1 Intersection Level of Service Summary: Short-Term Interim Year Alternative 1

Intersection		ITAM node	Methodology	Short-Term Interim Year Baseline Alternative 1				Short-Term Interim Year Baseline Alternative 1 plus Project				ICU change	
				AM peak hour		PM peak hour		AM peak hour		PM peak hour		AM peak hour	PM peak hour
				ICU or Delay	LOS	ICU or delay	LOS	ICU or delay	LOS	ICU or delay	LOS		
1	Sand Canyon Ave. / I-5 NB Ramps	303	ICU	0.72	C	0.86	D	0.72	C	0.86	D	0.00	0.00
			HCM	37.8	D	69.4	E	38.5	D	73.4	E	—	—
2	Sand Canyon Ave. / Marine Way	304	ICU	0.59	A	0.77	C	0.59	A	0.78	C	0.00	0.01
3	Sand Canyon Ave. / I-5 SB Ramps	305	ICU	0.66	B	0.72	C	0.66	B	0.72	C	0.00	0.00
			HCM	19.6	B	27.9	C	19.9	B	28.0	C	—	—
4	Ridge Valley / Marine Way	—	ICU	0.44	A	0.27	A	0.45	A	0.28	A	0.01	0.01

Source: AECOM (2022)

Table 6.1-2 Roadway Segment Level of Service Summary: Short-Term Interim Year Alternative 1

Roadway segment			Capacity	Short-Term Interim Year Baseline Alternative 1			Short-Term Interim Year Baseline Alternative 1 plus Project			v/c change
				Volume	v/c ratio	LOS	Volume	v/c ratio	LOS	
A	Marine Way between Sand Canyon Avenue and Ridge Valley		13,000	17,400	1.34	F	17,600	1.35	F	—
	AM peak hour	Eastbound	1,600	364	0.23	A	376	0.24	A	0.01
		Westbound	1,600	728	0.46	A	752	0.47	A	0.01
	PM peak hour	Eastbound	1,600	875	0.55	A	878	0.55	A	0.00
		Westbound	1,600	689	0.43	A	704	0.44	A	0.01
B	Marine Way east of Ridge Valley		32,000	10,800	0.34	A	10,800	0.34	A	0.00
C	Ridge Valley between Great Park Boulevard and Marine Way		28,000	16,300	0.58	A	16,300	0.58	A	0.00

Source: AECOM (2022)

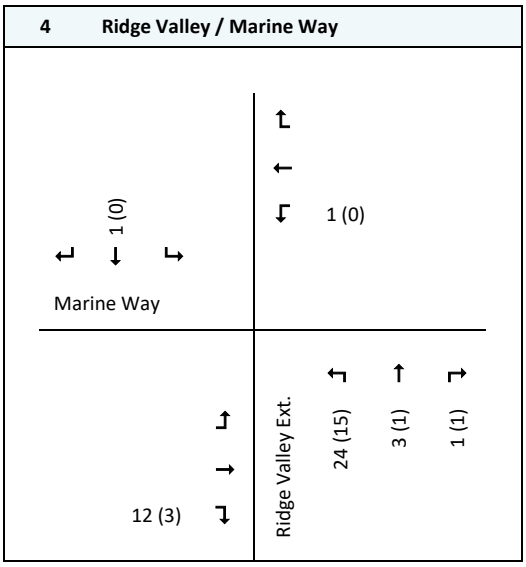
The results of the intersection and roadway segment LOS analyses for Alternative 2 (realigned Marine Way) are summarized in Table 7.1-1and Table 7.1-2, respectively. As shown in Table 7.1-1 and Table 7.1-2, all study intersections and roadway segments would operate at acceptable LOS (LOS D or better) based on the City's LOS thresholds, even with the addition of the Project. Therefore, the Project would not result in or substantially contribute to any LOS deficiencies under the Short-Term Interim Year scenario with Alternative 2.

7. SPECIAL ISSUES

7.1 SITE ACCESS ANALYSIS

Access for the Project Site would be provided by extending Ridge Valley south of Marine Way by approximately 675 feet as a cul-de-sac (dead-end street), converting the existing T-intersection at Ridge Valley / Marine Way into a four-way intersection. A turnaround would be provided at the end of the Ridge Valley extension, with a driveway providing access into and out of the Project Site. This would serve as the sole vehicle access for the Project Site, and the estimated traffic using the Project driveway and the new Ridge Valley extension would generally be as shown in the Project's trip generation in Table 4.1-1. Project trip assignments at the Ridge Valley / Marine Way intersection are illustrated in Figure 7.1-1, based on the trip distribution shown in Figure 4.2-1.

Figure 7.1-1 Project Trip Assignment at Ridge Valley / Marine Way



(##): AM (PM) peak hour volumes

Source: AECOM (2022)

Table 7.1-1 Intersection Level of Service Summary: Short-Term Interim Year Alternative 2

	Intersection	ITAM node	Methodology	Short-Term Interim Year Baseline Alternative 2				Short-Term Interim Year Baseline Alternative 2 plus Project				ICU change	
				AM peak hour		PM peak hour		AM peak hour		PM peak hour		AM peak hour	PM peak hour
				ICU or Delay	LOS	ICU or delay	LOS	ICU or delay	LOS	ICU or delay	LOS		
1	Sand Canyon Ave. / I-5 NB / Marine Way	303	ICU	0.74	C	0.73	C	0.73	C	0.73	C	(0.01)	0.00
			HCM	78.7	E	> 80	F	75.9	E	> 80	F	—	—
2	Sand Canyon Ave. / Old Marine Way	304	ICU	0.53	A	0.58	A	0.53	A	0.58	A	0.00	0.00
3	Sand Canyon Ave. / I-5 SB Ramps	305	ICU	0.66	B	0.72	C	0.66	B	0.72	C	0.00	0.00
			HCM	30.4	C	31.6	C	34.1	C	31.6	C	—	—
4	Ridge Valley / Marine Way	—	ICU	0.44	A	0.27	A	0.45	A	0.28	A	0.01	0.01

Source: AECOM (2022)

Table 7.1-2 Roadway Segment Level of Service Summary: Short-Term Interim Year Alternative 2

	Roadway segment	Capacity	Short-Term Interim Year Baseline Alternative 2			Short-Term Interim Year Baseline Alternative 2 plus Project			v/c change
			Volume	v/c ratio	LOS	Volume	v/c ratio	LOS	
A	Marine Way between Sand Canyon Avenue and Ridge Valley	32,000	17,400	0.54	A	17,600	0.55	A	0.01
B	Marine Way east of Ridge Valley	32,000	10,800	0.34	A	10,800	0.34	A	0.00
C	Ridge Valley between Great Park Boulevard and Marine Way	28,000	16,300	0.58	A	16,300	0.58	A	0.00

Source: AECOM (2022)

It should be noted that there may also be some marginal traffic associated with other properties along the Ridge Valley extension, such as the gardening / landscaping supply businesses located on the southwest quadrant of the Ridge Valley / Marine Way intersection. While the Project does not preclude driveways for other properties along the extension, such improvements are not expressly part of the Project and would be evaluated separately should the relevant property owners desire access. The design of the proposed Ridge Valley extension would, however, allow for future local access for other properties on either side of the extension via a future "A Street", intersecting the extension approximately midway between Marine Way and the cul-de-sac. As such, driveway / intersection spacing for this future A Street is evaluated where appropriate in later subsections of this memorandum.

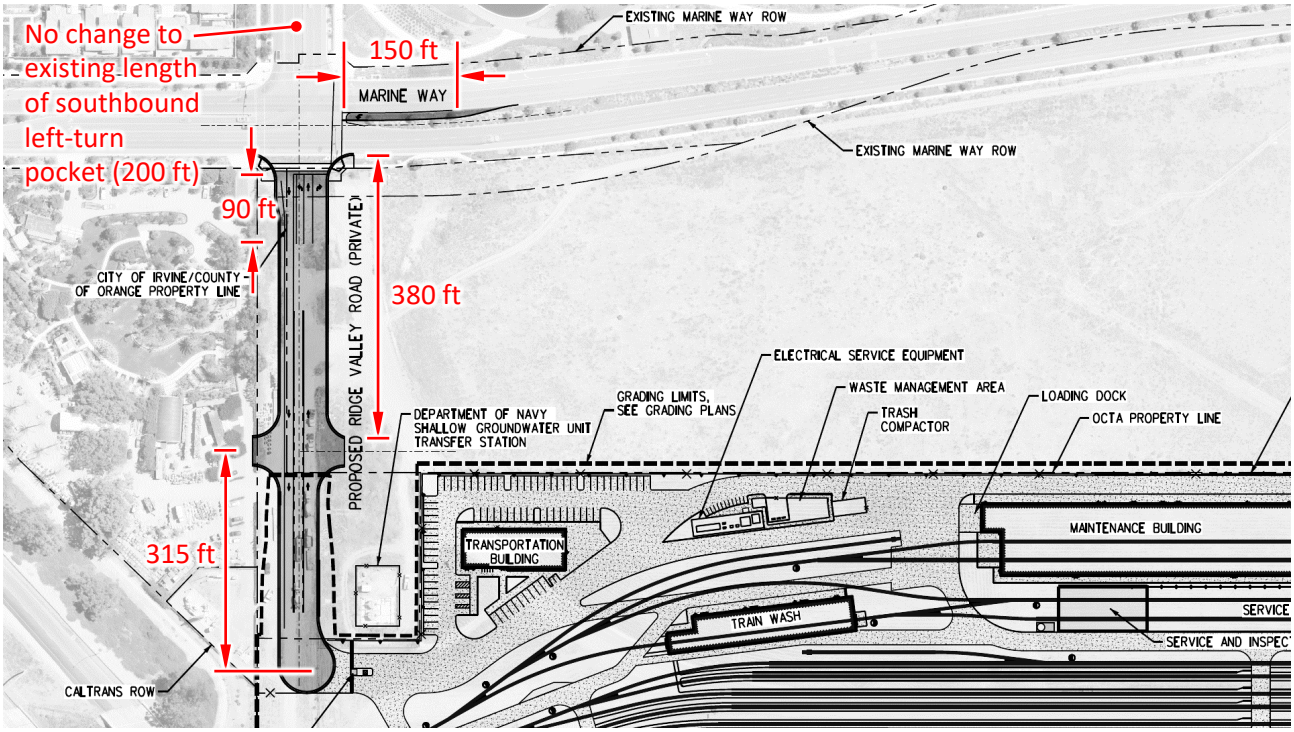
The new northbound approach at the Ridge Valley / Marine Way intersection would be striped with three lanes: a left-turn lane, a through lane, and a right-turn lane. To accommodate the new northbound approach at the intersection, the existing outer left-turn lane on the southbound (Ridge Valley) approach would be restriped as a through lane. With this change, the existing southbound and new northbound approaches would operate with protected left-turn phasing in a lead–lag sequence. Actuation through detector loops or other means would minimize impacts to background traffic along Marine Way and Ridge Valley, allowing the northbound approach to be served only when there is demand.

In addition, the Project would provide a new westbound left-turn pocket at the intersection (replacing a portion of the landscaped median along Marine Way), operating with protected phasing in a lead–lag sequence with the eastbound left-turn movement. Signal phasing for the southbound right-turn movement would also be modified to provide an overlap phase with the eastbound left-turn movement.

The LOS results summarized in Table 5.2-1, Table 6.1-1, and Table 7.1-1 already incorporate all of these lane configurations and signal phasing assumptions and show that the modified intersection would operate at LOS A during the a.m. and p.m. peak hours.

An analysis of relevant criteria from the *City of Irvine Transportation Design Procedures (TDP)* (June 2020) is provided in the following subsections. Proposed turn pocket lengths and driveway spacing are illustrated in Figure 7.1-2. Detailed plans are provided in Attachment B to this memorandum.

Figure 7.1-2 Proposed Turn Pocket Lengths and Driveway Spacing



TDP-1: Turn Lane Pocket Lengths

At the Ridge Valley / Marine Way intersection, the Project would add two new left-turn movements (northbound left and westbound left) and modify the southbound left-turn movement by converting the shared left-through lane into a through lane (leaving only one left-turn lane). A Leish nomograph analysis of turn pocket lengths was conducted for these three left-turn movements, together with the southbound left-turn movement at Sand Canyon Avenue / Marine Way, which will be reduced to a single lane in the future as part of striping modifications proposed by a proposed development on the nearby Traveland site. The results of the Leish nomograph analysis are shown in Figure 7.1-3 and Figure 7.1-4.

As shown in Figure 7.1-3, left-turn pocket lengths at Ridge Valley / Marine Way would exceed the recommended (desirable) distance for all three left-turn movements under the Short-Term Interim Year Baseline plus Project scenarios.[6] The peak-hour left-turn volume is on the order of 25–35 vehicles or less in all cases, and is generally below the meaningful range of the nomograph analysis.

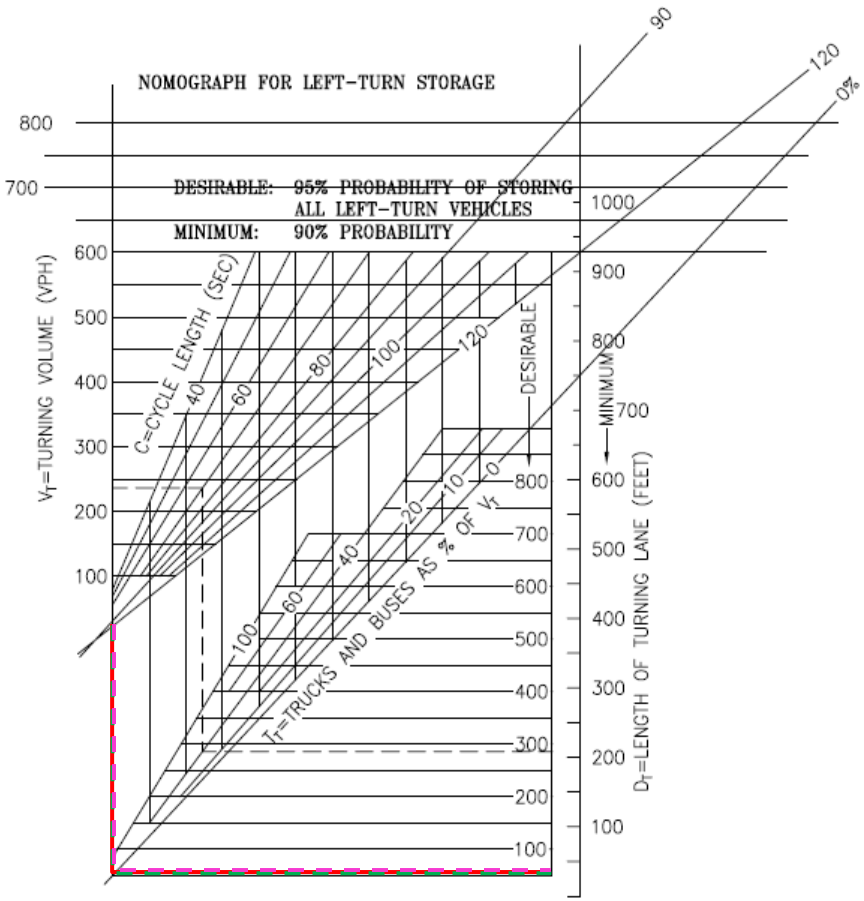
As shown in Figure 7.1-4, the existing length of the southbound left-turn pocket at Sand Canyon Avenue / Marine Way would fall below the recommended (desirable) distance in both the AM peak hour and PM peak hour under the Short-Term Interim Year Baseline Alternative 1 plus Project scenario. The Project is estimated to add approximately four vehicles to this movement in the AM peak hour and one vehicle to this

[6] Alternative 1 and Alternative 2 are the same for purposes of this Leish nomograph analysis, as traffic volumes and lane configurations at the Ridge Valley / Marine Way intersection are the same for both alternatives.

movement in the PM peak hour, which is on the order of 1–3 percent of the total peak-hour volume on this movement. This is an interim condition until Marine Way is realigned to reflect Alternative 2, which aligns with the northbound I-5 off-ramp. Two southbound left turn lanes will be provided at that time.

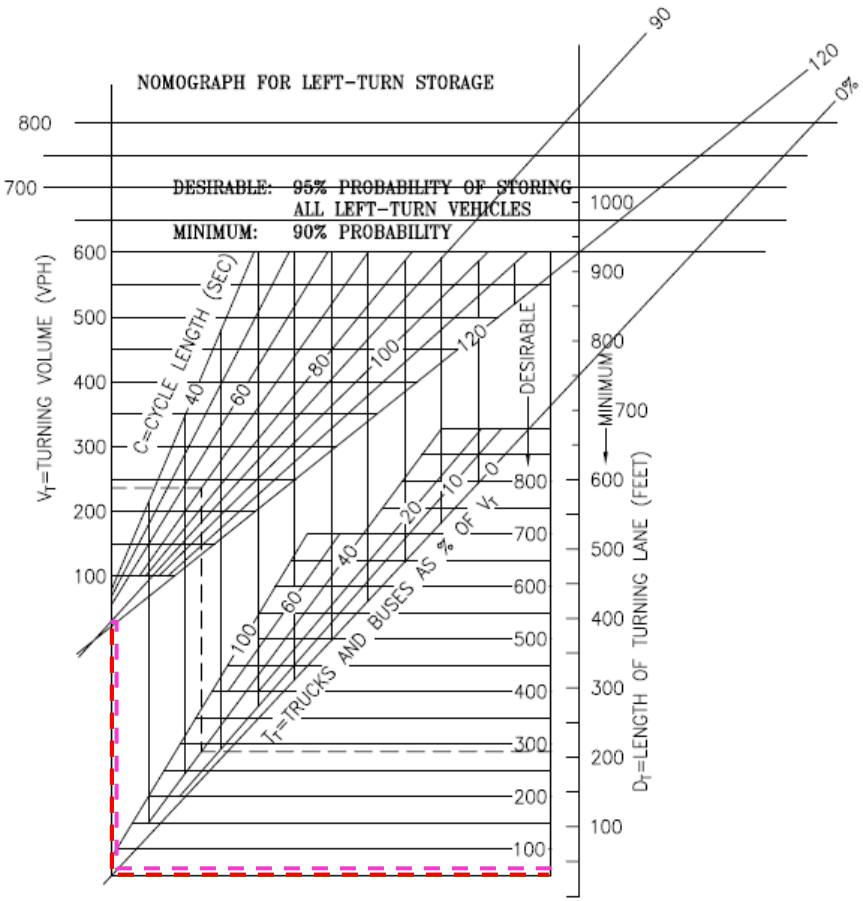
Figure 7.1-3 Leish Nomograph – Ridge Valley / Marine Way

AM peak hour



	V_T	D_T (desirable)	D_T (actual/proposed)
Northbound left	24	< 25	90
Southbound left	26	< 25	200
Westbound left	1	< 25	150

PM peak hour

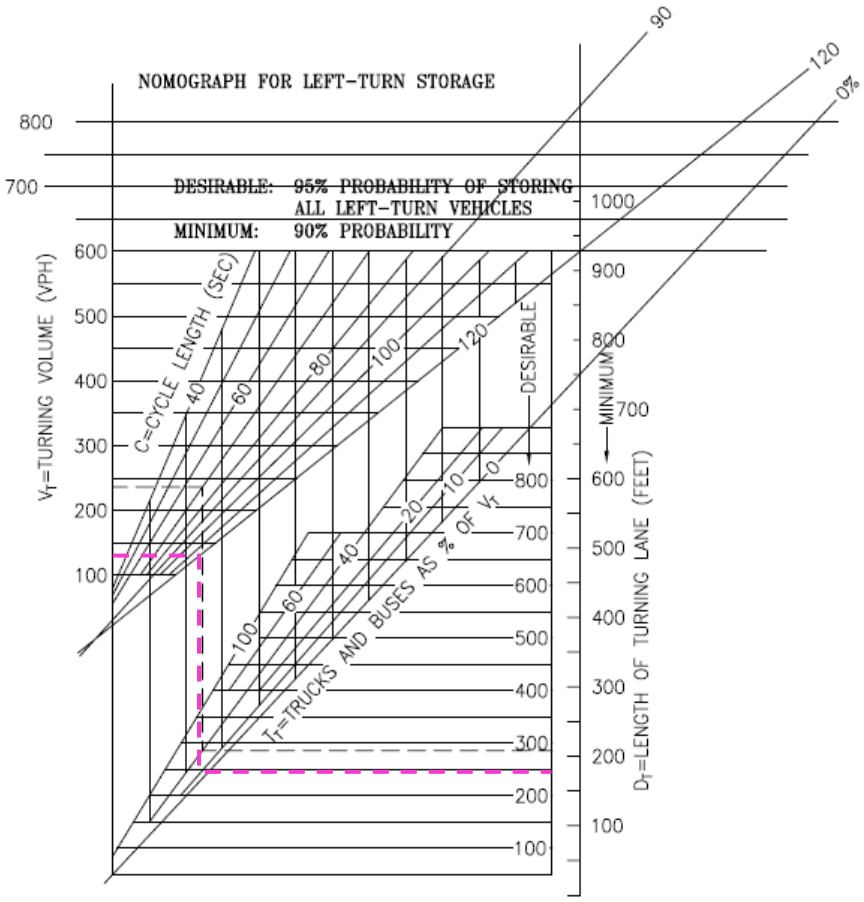


	V_T	D_T (desirable)	D_T (actual/proposed)
Northbound left	15	< 25	90
Southbound left	35	≈ 25	200
Westbound left	0	< 25	150

Note: Assume cycle length C = 120 sec and conservatively assume heavy vehicle percentage T_T = 10%

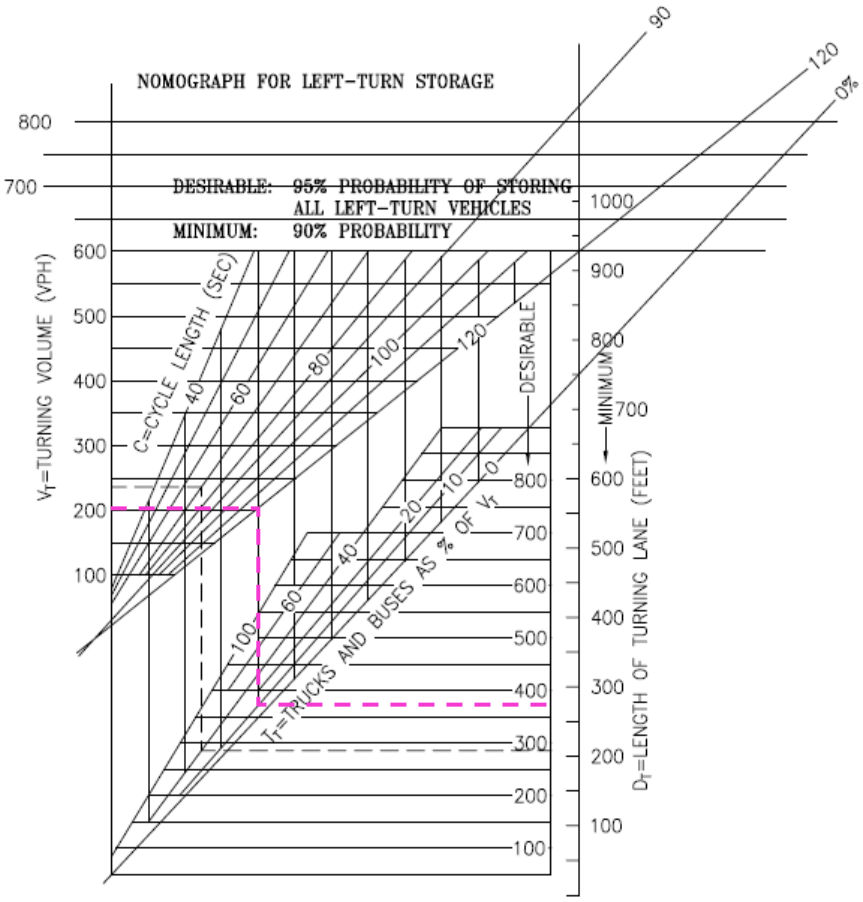
Figure 7.1-4 Leish Nomograph – Sand Canyon Avenue / Marine Way (Alternative 1)

AM peak hour



	V_T	D_T (desirable)	D_T (actual/proposed)
Southbound left	128	245	185

PM peak hour



	V_T	D_T (desirable)	D_T (actual/proposed)
Southbound left	202	365	185

Note: Assume cycle length C = 120 sec and conservatively assume heavy vehicle percentage T_T = 10%

TDP-10: Distance Between Driveways and Intersections

The recommended minimum spacing between a driveway and an intersection (or between two driveways) is 90 feet for a roadway classified as a Private Way, although this classification applies only to residential streets. Based on the width of the proposed roadway, the City of Irvine has recommended application of the Commuter roadway classification for the analysis of driveway spacing. For Commuter roadways, the minimum spacing is 150 feet.

As indicated in Figure 7.1-2, the nearest driveway / intersection (the future "A Street") is 380 feet from the Ridge Valley / Marine Way intersection (measured from Marine Way nearest curb face to A Street nearest curb face). The Project's proposed driveway would be located 315 feet from A Street (measured from centerline to centerline). In both cases, the spacing would exceed the minimum spacing prescribed in TDP-10.

Furthermore, the proposed Ridge Valley extension would be a cul-de-sac primarily intended to provide local access for the Project and adjacent properties, with no through traffic and minimal traffic volumes. The Project driveway would be located at the end of this private road (the proposed turnaround is actually located within the Project's property lines), such that any queues at the proposed controlled gate access would not obstruct access to other properties, much less background traffic at the upstream intersection with Marine Way.

Therefore, the Project would satisfy TDP-10.

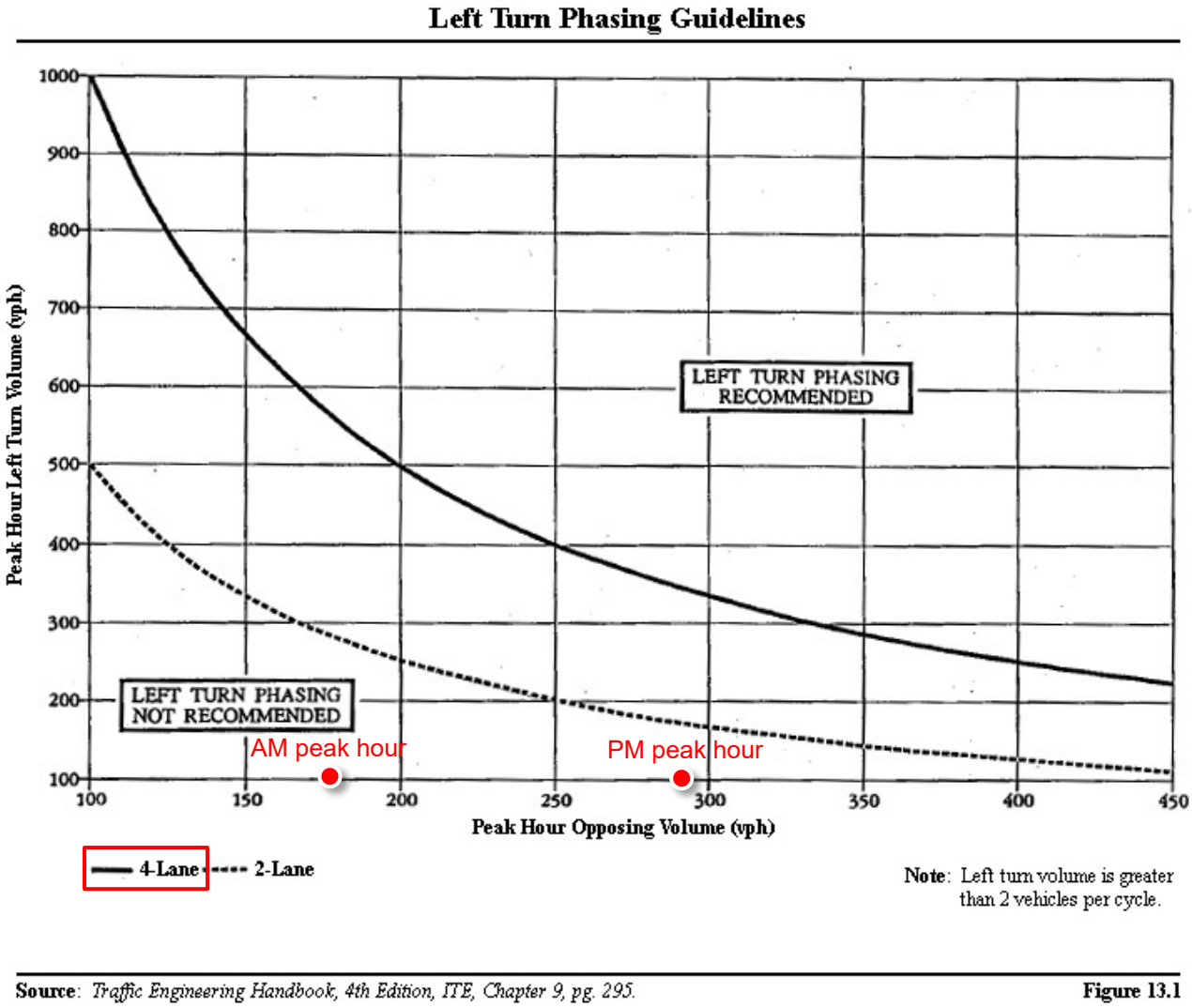
TDP-11: Corner Clearance

As the proposed Ridge Valley extension is a cul-de-sac primarily intended for local access for the Project (and, potentially in the future, adjacent properties), there would be no through traffic, and the only adjacent intersection for consideration is the Ridge Valley/ Marine Way intersection. As mentioned above, the Project would meet TDP-10 criteria for minimum distance between driveways and intersections and would, therefore, also generally satisfy TDP-11.

TDP-13: Left-Turn Signal Phasing

As illustrated in Figure 7.1-1, the Project is expected to add 1 vehicle during the AM peak hour and 0 vehicles during the PM peak hour to the westbound left-turn movement at Ridge Valley / Marine Way. Under the Short-Term Interim Year Baseline plus Project scenarios, there would be no other traffic expected on this turn movement outside of Project-generated traffic. As such, the peak-hour volume on this movement would be negligible. However, a left-turn signal phasing analysis was conducted to determine the need for protected signal phasing for this turn movement and is illustrated in Figure 7.1-5.

Figure 7.1-5 Left-Turn Signal Phasing Analysis



Source: *Traffic Engineering Handbook, 4th Edition, ITE, Chapter 9, pg. 295.* **Figure 13.1**

As indicated in Figure 7.1-5, the expected traffic volume on this movement under the Short-Term Interim Year Baseline plus Project scenarios is well below the meaningful range of the analysis, which is approximately 100 vehicles per hour for the left-turn volume (2 vehicles per cycle or more). Despite these conclusions, protected left-turn phasing can still be considered appropriate at this location due to several factors:

- Permitted left-turn movements with high-volumes of opposing traffic can present a risk for pedestrians in the crosswalk, as motorists are frequently focused on finding gaps in opposing traffic flow and may not pay adequate attention to pedestrian activity in the far-side crosswalk.
- The opposing eastbound approach features double left-turn lanes, which may complicate permitted left-turn movements from the westbound approach.
- Fuel trucks and other large vehicles that may need to visit the site on a regular basis may access the site from this westbound left-turn movement. Providing protected phasing for this movement would ensure adequate time and protection for these vehicles, which may require additional time and larger turning clearances. As indicated in the detailed plans in Attachment B, the Project proposes to use lead–lag sequencing to avoid potential conflicts between the eastbound and westbound left-turn movements.
- Future development of adjacent properties along the Ridge Valley extension as part of other projects may eventually warrant protected phasing for this movement, even if the Project alone may not warrant it.
- A protected left-turn phase at this location offers safer opportunities for potential U-turn movements. Currently, the large intersection spacing and lack of side streets along Marine Way between Ridge Valley and Skyhawk can complicate traffic circulation.

For these reasons, protected signal phasing is considered appropriate at this location and the Project would satisfy TDP-13.

TDP-15: Vehicle Stacking and Gate Stacking Analysis

As indicated in the site plan shown in Attachment B, ingress / egress at the Project driveway would be restricted by a controlled gate access. For analysis of gate stacking at office and retail developments, TDP-15 prescribes use of the Crommelin methodology. Figure 7.1-6 and Figure 7.1-7 show the results of this analysis for the Project based on the estimated trip generation summarized in Table 4.1-1.

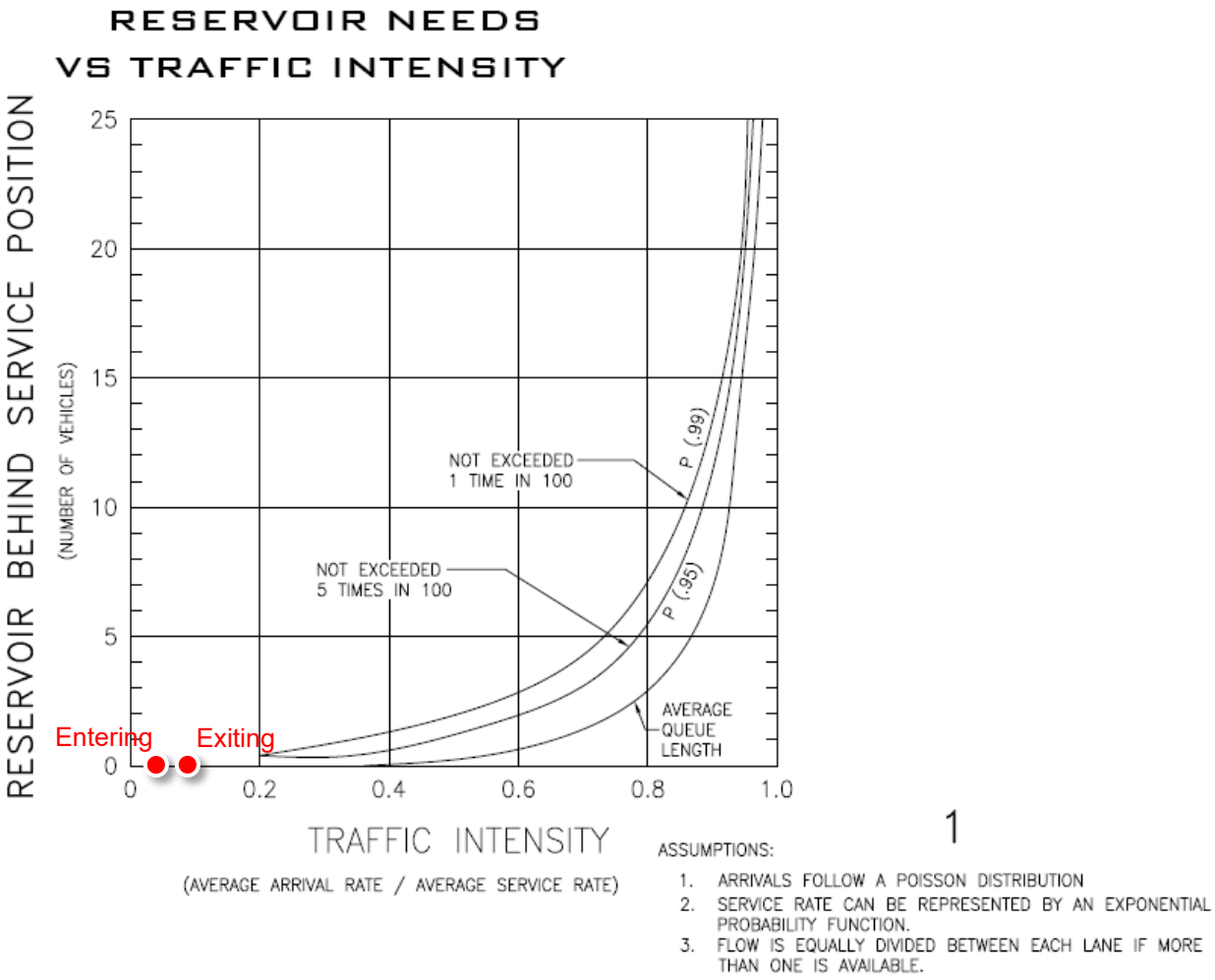
As shown in Figure 7.1-6, the estimated traffic intensity of the Project would fall well below the meaningful range of the Crommelin methodology. However, the gate arm would be located to provide at least 25 feet of ingress stacking (measured from the curb line of the turnaround), which would be sufficient to accommodate one standard passenger car. In addition, there would be no conflicting traffic when entering or exiting the Project site, as the Project driveway would be located at the end of a dead-end, private road

primarily intended to provide local access for the Project, as mentioned above. Therefore, no queuing due to conflicting traffic is expected within or external to the site.

As shown in Figure 7.1-7, the amount of parking provided and the estimated directional peak-hour volumes would not warrant more than a single lane in each direction.

Overall, the Project would satisfy TDP-15.

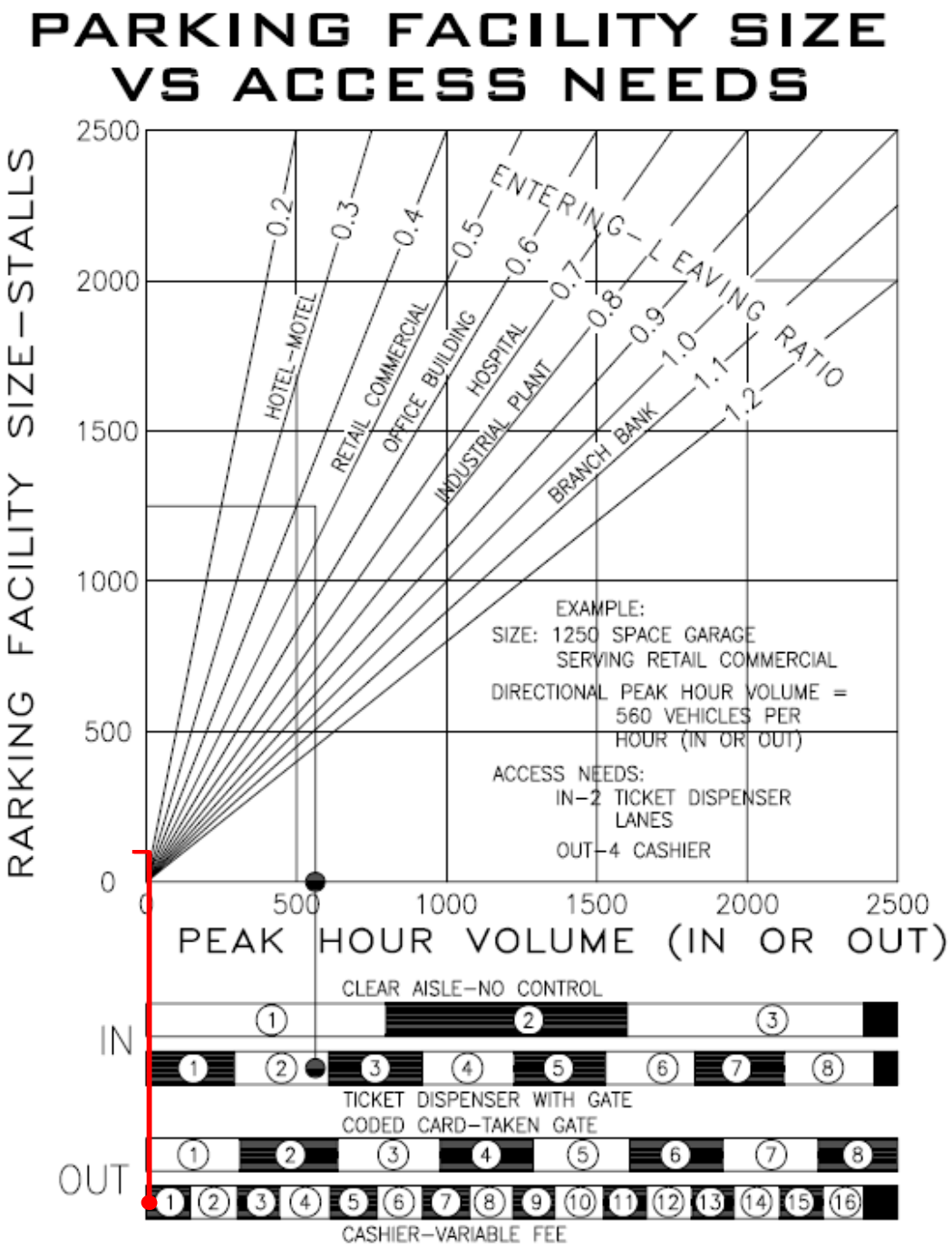
Figure 7.1-6 Gate Stacking Analysis – Reservoir Needs



Entering
Average arrival rate = 14 vehicles per hour (Table 4.1-1)
Average service rate = 340 vehicles per hour (coded-card operated gate)
Traffic intensity = 14 ÷ 340 ≈ 0.04

Exiting
Average arrival rate = 28 vehicles per hour (Table 4.1-1)
Average service rate = 320 vehicles per hour (coded-card operated gate)
Traffic intensity = 28 ÷ 340 ≈ 0.09

Figure 7.1-7 Gate Stacking Analysis – Access Needs



Parking facility size = 120 stalls (Section 2.2)
Directional peak hour volumes (Table 4.1-1):
Entering = 14 vehicles (AM peak hour)
Exiting = 28 vehicles (AM peak hour)

Entering–leaving ratio:
Entering = 14 ÷ 120 = 0.12
Exiting = 28 ÷ 120 = 0.23

7.2 CIRCULATION PHASING

The City's latest Circulation Phasing Analysis Report (March 2020) did not identify any affected locations within the area in the vicinity of the Project Site. Based on the results of the LOS analysis described earlier, the Project would not result in or substantially contribute to LOS deficiencies at any study intersections or roadway segments.

7.3 CONGESTION MANAGEMENT PROGRAM CONSISTENCY

As shown in Table 4.1-1, the Project would generate approximately 220 daily trips, which would be well below the general threshold of 2,400 daily trips for all development projects and the specific threshold of 1,600 daily trips for development projects with direct access to, or in close proximity to, the Congestion Management Program (CMP) Highway System. Therefore, a CMP Traffic Study to determine the Project's consistency with the CMP is not required, in accordance with Exhibit 6 ("CMP Traffic Impact Analysis Exempt Projects") of the *City of Irvine Traffic Study Guidelines* (City of Irvine, 2007).

7.4 PEDESTRIAN CIRCULATION

Objective B-3 of the Circulation Element of the City's General Plan is to "establish a pedestrian circulation system to support and encourage walking as a mode of transportation". The Circulation Element includes the following three policies to support Objective B-3:

- Link residences with schools, shopping centers, and other public facilities, both within a planning area and to adjacent planning areas, through an internal system of trails.
- Require development to provide safe, convenient, and direct pedestrian access to surrounding land uses and transit stops. Issues such as anticipated interaction between pedestrians and vehicles, proposed infrastructure improvements, and design standards shall be considered.
- Design and locate land uses to encourage access to them by nonautomotive means.

The Project is a specialized use without access for the general public and would not be a major activity generator or attractor. Pedestrian circulation from the general public is not anticipated for the Project and therefore sidewalks would not be provided on the Ridge Valley extension. The Project would provide two sidewalk curb ramps on the Ridge Valley and Marine Way intersection. These modifications would generally support Objective B-3 and the three associated policies by providing safe, convenient, and direct pedestrian access. Proposed modifications would also be designed in accordance with applicable standards (such as City of Irvine street design standards and Americans with Disabilities Act [ADA] design standards) and would facilitate safe pedestrian circulation at this location.

7.5 BICYCLE CIRCULATION

Objective B-4 of the Circulation Element of the City's General Plan is to "plan, provide and maintain a comprehensive bicycle trail network that together with the regional trail system, encourages increased use of bicycle trails for commuters and recreational purposes". The Circulation Element includes several

supporting policies to expand and enhance bicycle circulation, as well as a separate objective (Objective B-5) and associated policies regarding riding and hiking trails.

While the Project is a specialized use with limited access for the general public and would not be a major activity generator or attractor, bicycle access would be provided by existing Class II bikeways along Marine Way, Ridge Valley, and Sand Canyon Avenue, as well as Class I bikeways along Sand Canyon Avenue (Sand Canyon Side Path) and within the Great Park and the surrounding neighborhoods. The Project would not physically alter existing bikeways, and the proposed modifications at the Ridge Valley / Marine Way intersection as part of the Ridge Valley extension would be designed in accordance with applicable standards to facilitate safe bicycle circulation at this location.

7.6 TRANSIT FACILITIES

There are no transit services in the immediate vicinity of the Project Site. The closest major route is OCTA's Route 90 (Tustin–Dana Point) traveling along Irvine Center Drive, with the closest stops located at Sand Canyon Avenue, approximately 1.3 miles away from the Ridge Valley / Marine Way intersection.

Supplemental peak-period-only bus service is provided by two OCTA iShuttle routes (402C and 403D) out of Metrolink's Irvine station. These two routes are designed to connect Metrolink passengers with workplaces in the areas surrounding the station, and only operate in the commute direction (departing the station during the a.m. peak period and arriving at the station during the p.m. peak period). The closest stops for these routes are as follows:

- For Route 402C: Sand Canyon Avenue at the Capital Group complex (north side, between Oak Canyon and Irvine Center Drive), approximately 1.1 miles away from the Ridge Valley / Marine Way intersection
- For Route 403D: Sand Canyon Avenue at Waterworks Way, approximately 1.4 miles away from the Ridge Valley / Marine Way intersection

The Project is a specialized use with limited access for the general public and would not be a major activity generator or attractor.

7.7 VEHICLES MILES TRAVELED ANALYSIS

As indicated in Table 4.1-1, the Project's weekday daily trip generation would not exceed 250 trips. As such, a VMT impact analysis is not required for the Project, in accordance with the project screening criteria established in Exhibit 8 ("VMT Impact Analysis Guidelines (SB 743)") of the *City of Irvine Traffic Study Guidelines* (City of Irvine, 2007).

8. REQUIRED IMPROVEMENTS AND RECOMMENDATIONS

Based on the results of the intersection and roadway segment LOS analysis in Section 5.2 and Section 6.1, the Project would not result in or make a substantial contribution to any LOS deficiencies. Therefore, no LOS deficiency improvements are required.

9. CONCLUSION

As discussed in further detail in Section 7.1, the Project would create a new northbound approach at the Ridge Valley / Marine Way. The new Ridge Valley northbound approach would be striped with three lanes (a left, through, and right turn) and Marine Way would be provided with a new westbound left-turn pocket. The southbound approach would be restriped to provide a left, through and right turn lane. Signal phasing would be modified to north/south and east/west lead-lag operation with southbound right turn overlap at the Ridge Valley / Marine Way intersection for the revised roadway configuration.

The Project does not result in or make a substantial contribution to any LOS deficiencies under either the Existing Baseline scenario or the two Short-Term Interim Year Baseline scenario alternatives (with and without the Marine Way realignment). All study intersections and roadway segments would operate at acceptable LOS under all scenarios based on the City's LOS thresholds, with the exception of the segment of Marine Way between Sand Canyon Avenue and Ridge Valley, which would be deficient in terms of daily LOS under Short-Term Interim Year Alternative 1, with and without the Project. However, a peak-hour link analysis indicates that this segment would operate at acceptable conditions based on peak-hour LOS, even with the addition of the Project. Therefore, no improvements are required.

All applicable City of Irvine's TDPs were evaluated and adequately addressed, including TDP-1 (Turn Lane Pocket Lengths), TDP-10 (Distance Between Driveways and Intersections), TDP-11 (Corner Clearance), TDP-13 (Left-Turn Signal Phasing), and TDP-15 (Vehicle Stacking and Gate Stacking Analysis).

Based on the Project's trip generation, a CMP Traffic Study and VMT impact analysis are not required.

10. REFERENCES

City of Irvine, (2007).Transportation Design Procedures. Available at: https://legacy.cityofirvine.org/civica/filebank/blobdload.asp?BlobID=10062

_____, (2020). 2020 Citywide Phasing Analysis Report. Available at: https://irvinewatchdog.org/wp-content/uploads/2020/06/Attachment_1_-_2020_Citywide_Circulation_Phasing_Analysis_Report.pdf

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LSA, (October 2020).Traffic Study Hoag Hospital Irvine. Available at: https://www.cityofirvine.org/cmis/views/9d41e22f-0d2b-433c-85a5-547a4fb3627b%253B1.0

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Transportation Research Board (TRB), (2017). Highway Capacity Manual.

Appendix H Attachments
Technical Memorandum
Traffic

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority

550 S. Main St.
Orange, CA 92868

And

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

AECOM
300 S. Grand Ave.
Los Angeles, CA 90071

September 2023

Attachment A

Limited Traffic Study Scope of Work

AECOM
300 S Grand Avenue
Los Angeles, CA 90071
www.aecom.com

213 593 8100 tel
213 593 8623 fax

Memorandum

Date: November 24, 2020

To: Victor Mendez – City of Irvine

From: Jaime Guzman, AECOM
Noel Casil, AECOM

Subject: OCTA Metrolink Maintenance Facility Draft Limited Traffic Study Scope of Work Memorandum

---

AECOM is responsible for the preparation of a Traffic Study for the OCTA Metrolink Orange County Maintenance Facility Project (OCMF). Discussion and coordination of the traffic study parameters between OCTA representatives and the City of Irvine resulted in the mutual agreement that a Limited Scope Traffic Study is necessary consistent with the scope format and content as described in the City's Traffic Study Guidelines (April 2020). This scope of work memorandum is intended to document the planned approach for the Limited scope Traffic Study.

Limited Traffic Study Scope of Work

AECOM will conduction the Limited Scope Traffic Study according to the City of Irvine Traffic Study Guidelines (April 2020).

General Assumptions:

- Study Area – will be limited to adjacent intersection/s
- Analysis Scenarios
    - Existing Conditions
    - Opening Year Without Project – this should be called Short-term Interim Year Baseline
    - Opening Year With Project – this should be called Short-term Interim Year Baseline Plus

Limited Traffic Study Outline and Scope of Work Assumptions

I. Executive Summary

The Limited Scope Traffic Study will include an Executive Summary that provides a summary of all calculations and findings of the report.

II. Introduction

A. Study Area

The following five (5) study intersections will be evaluated in this Limited Scope Traffic Study:

- Sand Canyon Ave/I-5 NB Ramps
- Sand Canyon Ave/Marine Way
- Sand Canyon Ave/I-5 SB Ramps
- Ridge Valley/Marine Way
- Ridge Valley/Project

The following three (3) roadway segments will be evaluated in this Limited Scope Traffic Study:

- Marine Way between Sand Canyon and Ridge Valley
- Marine Way east of Ridge Valley
- Ridge Valley between Great Park Blvd and Marine Way

III. Existing Conditions

The study will include an assessment of existing conditions, including existing intersection counts (from data provided by the City of Irvine in pre-COVID-19 conditions) and existing transit information. As there are no existing uses on-site, there is no current contribution of traffic by the existing site.

In communications with the City of Irvine, the City of Irvine states, “The existing conditions data should be based on the most recent counts collected prior to COVID-19 conditions and a 2% growth rate per year should be added to those counts to represent 2020 conditions.

IV. Existing Conditions with Proposed Development (Not required for this Project)

Based on coordination between OCTA and the City of Irvine, there is no need for an Existing Plus Project scenario to be included in the traffic study.

V. Future Traffic Without Proposed Development (Short-term Interim Year only)

The study will include an analysis of the future condition with the proposed Project. Per City of Irvine requirements, “the Short-term Interim Year analysis to identify LOS impacts can be based on ITAM with and without project. Alternatively, the Short-term Interim Year analysis can be based on 2020 volumes with 2% growth per year to represent future conditions five years out. If this alternative is used, manual distribution of project trips is required, and city staff will need to confirm that distribution.”

A. Projected Traffic

For this study, the City of Irvine recommends the following: “There should be two Short-term Interim Year scenarios studied: Alt 1 that is based on the assumption that Marine Way is an existing two-lane roadway that connects to Sand Canyon at its existing location; and Alt 2 that is based on the near-term future assumption that Marine Way is a four-lane roadway that is realigned to connect to Sand Canyon at the Sand Canyon/I-5 NB on-off-ramps. For each of these two alternatives, all study intersections and links must be evaluated.”

B. Committed Improvements

The study will include a description of the committed improvements under the interim conditions. Interim improvements are not proposed by OCTA but the team will coordinate with the City of Irvine to identify and committed improvements that need to be considered.

VI. Proposed Project Impacts

As part of the evaluation for project impacts, the following elements will be done as part of the Limited Traffic Study:

A. Model Trip Generation - Manual Trip Generation will be conducted

B. Adjustments to Trip Generation adjustments are not anticipated, but any adjustment requests would be coordinated with the City of Irvine

C. Trip Distribution and Trip Assignment - Manual Trip Distribution will be conducted

D. Phased Projects - although the OCMF project will include a phased approach to construction, the project will analyze the full long-term compliment of trips/traffic anticipated with full build out of the site as planned.

VII. Future Traffic With Proposed Development

This task will be conducted in conjunction with Item V above.

VIII. Cumulative Analysis

OCTA and its contractors need to discuss with City of Irvine if this is applicable based on the need for CUP approval of site use

IX. Analysis/Performance Criteria

This task will be completed consistent with City’s Traffic Study Guidelines (April 2020) for intersection and roadway link LOS.

X. Special Issues (As Needed)

A. Site Access Analysis (City requirements shown below)

City of Irvine states, “An access analysis section must be included in the traffic study (i.e., within the Special Issues section) and all applicable Transportation Design Procedures (TDPs) must be evaluated, including but not limited to TDP-1 (turn lane pocket lengths), TDP-14 (driveway throat

length), and TDP-3, TDP-4, and TDP-10 (if a second project driveway is proposed to access Marine Way.)"

B. Transit Connectivity and Pedestrian Circulation this is anticipated to not be applicable since the OCMF will not be accessible for pedestrians and no transit service will be provided for the public at this facility.

C. Congestion Management Program (CMP) Consistency/Requirements - the OCMF project is exempt from the mandatory CMP Traffic Impact Analysis per Exhibit 6: CMP Traffic Impact Analysis Projects

D. Circulation Phasing Locations - not applicable for the OCMF project

E. CEQA VMT Analysis Summary - the OCMF project is anticipated to have only 80 employees at peak operation, therefore it does not meet 250 daily trip thresholds, therefore CEQA VMT analysis is not needed as confirmed by City

City of Irvine however states, "The Limited Scope Traffic Study must include this discussion regarding VMT impact analysis. The traffic study cannot be silent regarding VMT analysis." Therefore, the study will include a section that describes VMT analysis provisions and the rationale for why VMT is not applicable to the project.

F. Others, as appropriate

XI. Required Improvements/Recommendations

Based on City review of the draft Limited Scope Traffic Study, the team will address comments and identify and required improvements if applicable.

Please confirm that you approve of the approach outlined above and/or contact us with additional comments or thoughts on items that should be included in our analysis. We anticipate moving ahead with analysis upon confirmation of this approach. Should you have any questions or comments please contact me at your earliest convenience.

Sincerely,

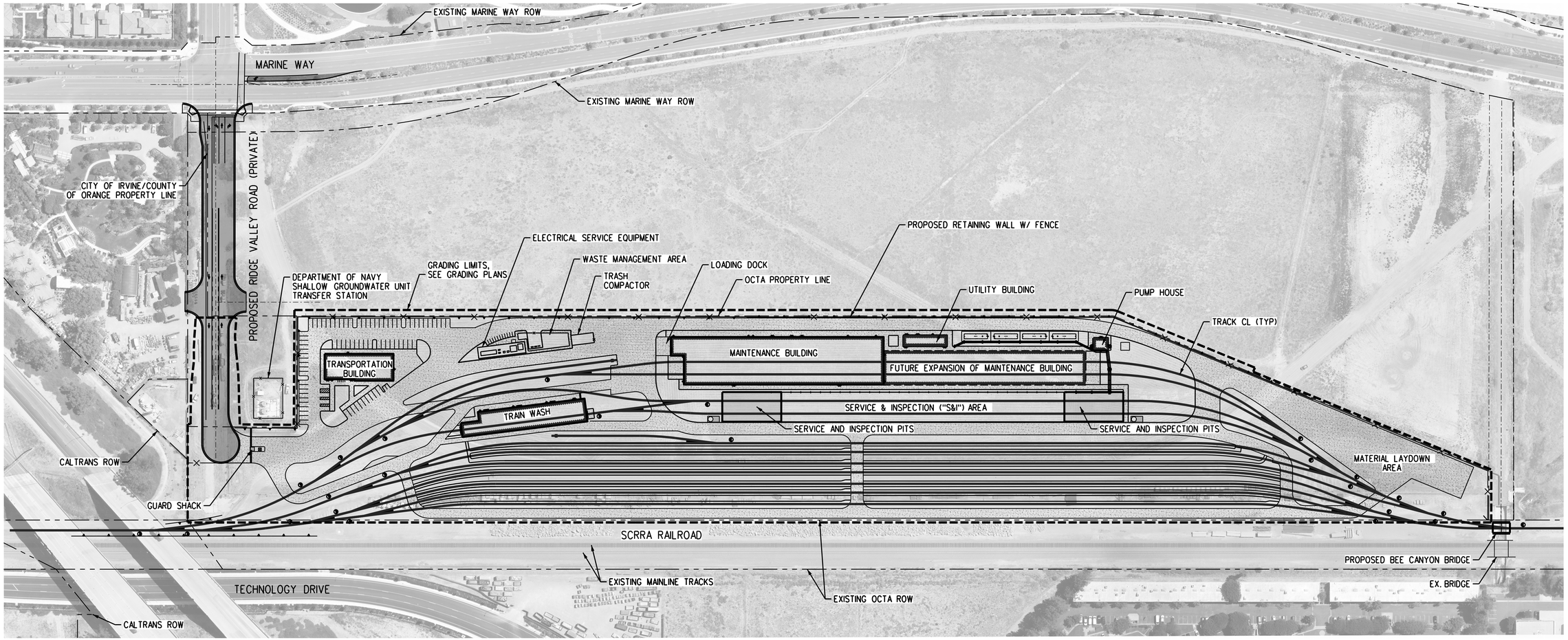


Jaime R Guzman
AECOM – Deputy Project Manager
(323) 605-1691
jaime.guzman1@aecom.com

cc: Lora Cross, OCTA
Huey Yann Ooi, OCTA
Mrika Simoni, Gannett Fleming
Jason Neff, Gannett Fleming
Rob Hertz, AECOM

Attachment B

Project Site Plan



100 0 100 200

1"=100'

NOTES:

1. SEE GRADING PLANS FOR GRADING LIMIT.
2. SEE EXISTING SITE PLAN FOR PROPERTY OWNERS.
3. SEE FENCE PLAN FOR PROPOSED FENCE.
4. SEE RETAINING WALL PLANS FOR PROPOSED RETAINING WALL.

REV.	DATE		BY	SUB.	APP.
2	01/05/22	CONDITIONAL USE PERMIT SUBMITTAL - REVISION 2			
1	10/13/21	CONDITIONAL USE PERMIT SUBMITTAL - REVISION 1			
0	6/30/21	CONDITIONAL USE PERMIT SUBMITTAL			

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DESIGNED BY	D. SMITH
DRAWN BY	D. SALAZAR
CHECKED BY	J. NEFF
APPROVED BY	M. FREEMAN
DATE	01/05/2022

NOT FOR CONSTRUCTION

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Gannett Fleming

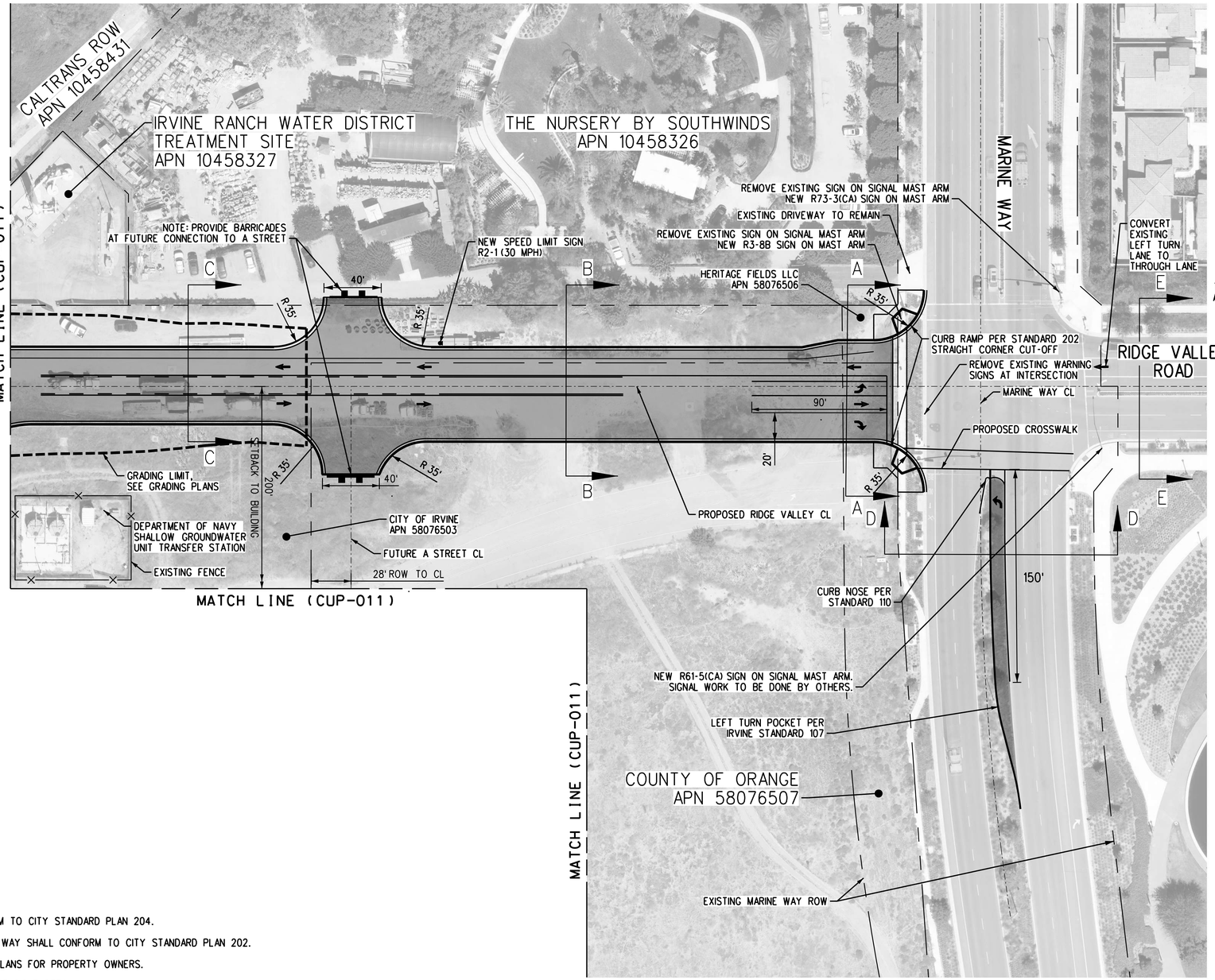
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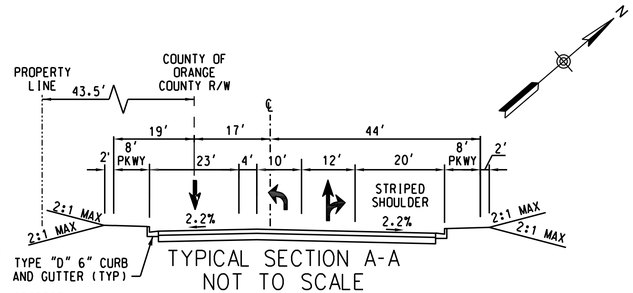
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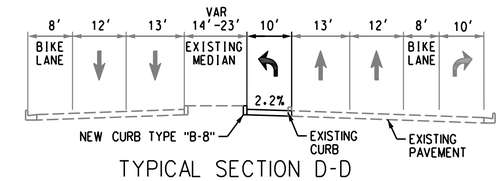
METROLINK ORANGE COUNTY MAINTENANCE FACILITY PROJECT
CIVIL
PROPOSED SITE PLAN - OVERALL VIEW

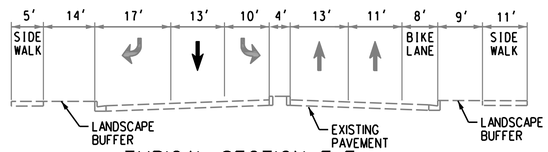
CASE NO.	00846471-PCPU
CONTRACT NO.	C9114.3
DRAWING NO.	CUP-009
REVISION	2
SHEET NO.	09 OF 55
SCALE	AS SHOWN

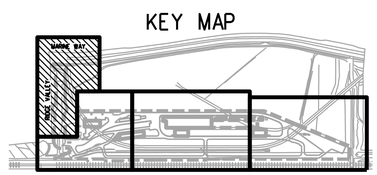
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NOTES:

1. DRIVEWAYS SHALL CONFORM TO CITY STANDARD PLAN 204.
2. CURB RETURNS AT MARINE WAY SHALL CONFORM TO CITY STANDARD PLAN 202.
3. REFER TO EXISTING SITE PLANS FOR PROPERTY OWNERS.
4. REFER CUP-016 FOR LINE OF SIGHT DETAIL.
5. EASTMENTS WITH THE CITY OF IRVINE, COUNTY OF ORANGE, AND/OR HERITAGE FIELDS WILL BE PROVIDED IN THE FINAL DESIGN PHASE.
6. IN LEU OF SIDEWALK, DROP-OFF AT END OF CUL DE SAC WILL BE USED FOR WALKING IN FOR ANY ADA COMPLIANCE REQUIRED.

40 0 40 80
1"=40'

REV.	DATE		BY	SUB.	APP.
2	01/05/22	CONDITIONAL USE PERMIT SUBMITTAL - REVISION 2			
1	10/13/21	CONDITIONAL USE PERMIT SUBMITTAL - REVISION 1			
0	6/30/21	CONDITIONAL USE PERMIT SUBMITTAL			

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DRAWN BY D. SALAZAR
CHECKED BY J. NEFF
APPROVED BY M. FREEMAN
DATE 01/05/2022

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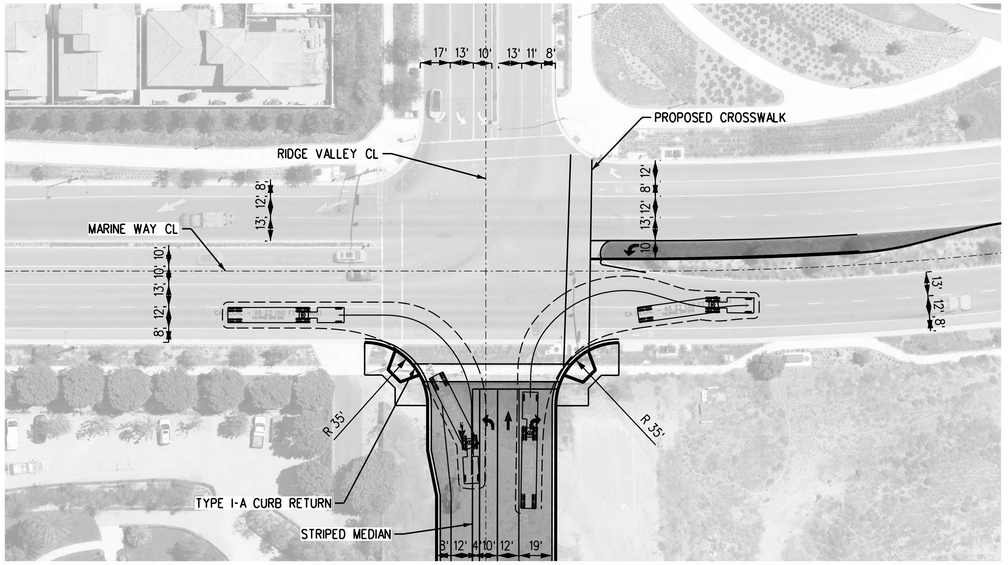
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Gannett Fleming

SUBMITTED: _____ PROJECT MANAGER
APPROVED: _____

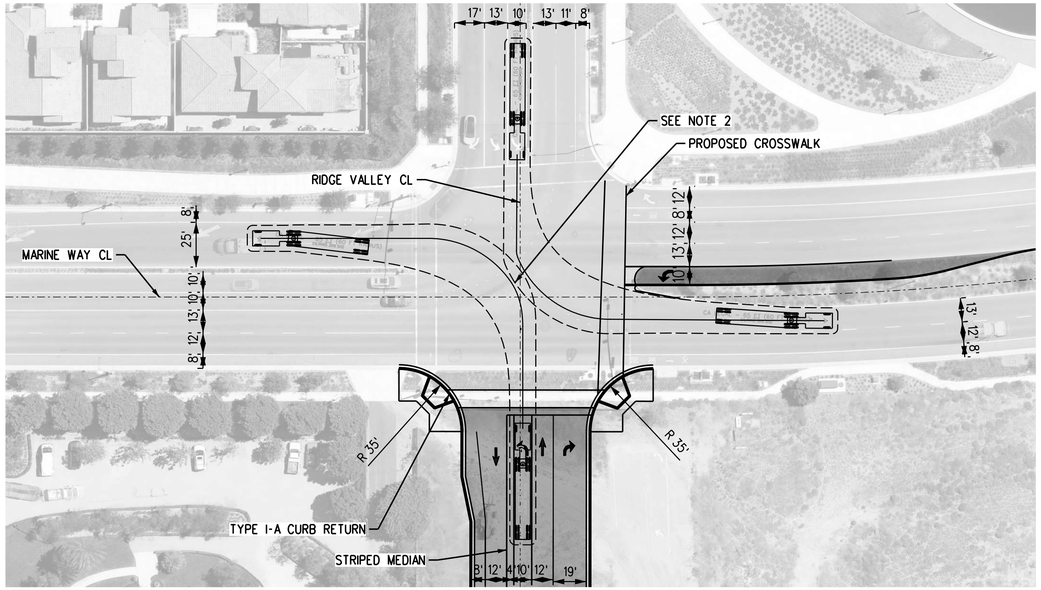
METROLINK ORANGE COUNTY MAINTENANCE FACILITY PROJECT CIVIL PROPOSED SITE PLAN SHEET 1 OF 4

CONTRACT NO. 00846471-PCPU
CONTRACT NO. C9114.3
DRAWING NO. CUP-010
REVISION 2
SHEET NO. 10 OF 55
SCALE AS SHOWN

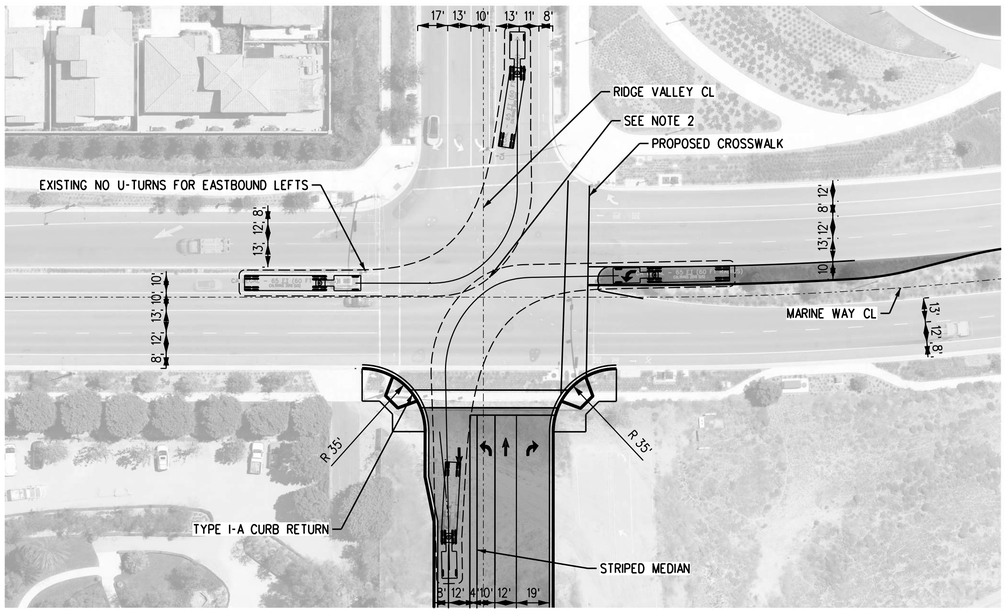
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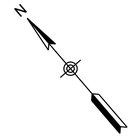
MARINE WAY AND RIDGE VALLEY INTERSECTION
EASTBOUND AND SOUTHBOUND RIGHT TURNS

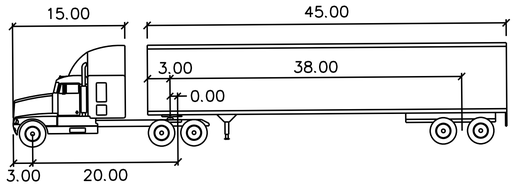


MARINE WAY AND RIDGE VALLEY INTERSECTION
EASTBOUND AND WESTBOUND LEFT TURNS



MARINE WAY AND RIDGE VALLEY INTERSECTION
NORTHBOUND AND SOUTHBOUND LEFT TURNS





CA LEGAL - 65 FT (60 FT RADIUS)

FEET

TRACTOR WIDTH	: 8.50	LOCK TO LOCK TIME	: 6.0
TRAILER WIDTH	: 8.50	STEERING ANGLE	: 20.9
TRACTOR TRACK	: 8.50	ARTICULATING ANGLE	: 70.0
TRAILER TRACK	: 8.50		

TRUCK PATH CENTERLINE

3' CLEARANCE

NOTES:

1. SEE CUP-016 FOR LINE OF SIGHT DETAIL
2. NORTHBOUND AND SOUTHBOUND LEFTS AS WELL AS EASTBOUND AND WESTBOUND LEFTS WILL BE PROGRAMMED TO OPERATE IN A LEAD-LAG SEQUENCE. A RIGHT-TURN OVERLAP FOR SOUTHBOUND WILL OPERATE CONCURRENTLY WITH EASTBOUND LEFTS.

40 0 40 80
1"=40'

REV.	DATE		BY	SUB.	APP.
2	01/05/22	CONDITIONAL USE PERMIT SUBMITTAL - REVISION 2			
1	10/13/21	CONDITIONAL USE PERMIT SUBMITTAL - REVISION 1			
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DESIGNED BY D. SMITH
DRAWN BY P. NGUYEN
CHECKED BY J. NEFF
APPROVED BY M. FREEMAN
DATE 01/05/2022

NOT FOR CONSTRUCTION

METROLINK®
Gannett Fleming

SUBMITTED: _____ PROJECT MANAGER
APPROVED: _____

METROLINK ORANGE COUNTY MAINTENANCE FACILITY PROJECT
GENERAL AUTOTURN LAYOUT PLANS
MARINE WAY AND RIDGE VALLEY

CASE NO. 00846471-PCPU
CONTRACT NO. C91143
DRAWING NO. CUP-047
REVISION 2
SHEET NO. 48 OF 55
SCALE AS SHOWN

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Attachment C

ICU Level of Service Calculations

Existing Baseline (2020)

1 (303) Sand Canyon Ave. / I-5 NB Ramps

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	2	3,400	243	0.07	c	566	0.17	c
NBT	3	5,100	467	0.09		1,657	0.32	
NBR	d	1,700	13	0.01		18	0.01	
SBL	1	1,700	16	0.01		5	0.00	
SBT	3	5,100	1,878	0.37	c	836	0.16	c
SBR	1	1,700	570	0.34		222	0.13	
EBL	1.5		322			938		
EBT	0.5	3,400	0	0.09	c	0	0.28	c
EBR	2	3,400	526	0.15		217	0.06	
WBL	1	1,700	6	0.00	c	37	0.02	c
WBT	1	1,700	0	0.00		0	0.00	
WBR	0	0	3			0		
Right turn adjustment			NBR			NBR		
			SBR			SBR		
			EBR			EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W	+		E/W	+	
Total capacity utilization				**0.58**			**0.68**	
Level of service				**A**			**B**	

2 (304) Sand Canyon Ave. / Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	0	0	0			0		
NBT	3	5,100	548	0.11		2,084	0.41	c
NBR	1	1,700	197	0.12		463	0.27	
SBL	2	3,400	99	0.03		141	0.04	c
SBT	3	5,100	2,236	0.44	c	937	0.18	
SBR	0	0	0			0		
EBL	0	0	0			0		
EBT	0	0	0			0		
EBR	0	0	0			0		
WBL	2	3,400	448	0.13	c	281	0.08	c
WBT	0	0	0			0		
WBR	1	1,700	146	0.09		130	0.08	
Right turn adjustment			NBR			NBR		
			SBR			SBR		
			EBR			EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W			E/W		
Total capacity utilization				**0.62**			**0.58**	
Level of service				**B**			**A**	

3 (305) Sand Canyon Ave. / I-5 SB Ramps

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	0	0	0			0		
NBT	4	6,800	473	0.07		1,922	0.28	c
NBR	1	1,700	121	0.07		380	0.22	
SBL	2	3,400	732	0.22		450	0.13	c
SBT	4	6,800	1,967	0.29	c	726	0.11	
SBR	0	0	0			0		
EBL	2.5		254	0.07	c	617	0.12	c
EBT	0	6,800	4			1		
EBR	1.5		893	0.26		250	0.15	
WBL	0	0	0			0		
WBT	0	0	0			0		
WBR	0	0	0			0		
Right turn adjustment			NBR			NBR		
			SBR			SBR		
			EBR	0.19	c	EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W			E/W		
Total capacity utilization				**0.60**			**0.58**	
Level of service				**A**			**A**	

4 Ridge Valley / Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL		0						
NBT		0						
NBR		0						
SBL	2	3,400	23	0.01	c	32	0.01	c
SBT	0	0	0			0		
SBR	1	1,700	526	0.31		171	0.10	
EBL	2	3,400	114	0.03	c	390	0.11	c
EBT	2	3,400	149	0.04		262	0.08	
EBR	0	0	0			0		
WBL	0	0	0			0		
WBT	2	3,400	80	0.02	c	220	0.06	c
WBR	1	1,700	16	0.01		37	0.02	
Right turn adjustment			NBR			NBR		
			SBR	0.28	c	SBR	0.01	c
			EBR			EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W			E/W		
Total capacity utilization				**0.39**			**0.24**	
Level of service				**A**			**A**	

Existing Baseline (2020) plus Project

1 (303) Sand Canyon Ave. / I-5 NB Ramps

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	2	3,400	255	0.08	c	573	0.17	c
NBT	3	5,100	469	0.09		1,658	0.33	
NBR	d	1,700	13	0.01		18	0.01	
SBL	1	1,700	16	0.01		5	0.00	
SBT	3	5,100	1,878	0.37	c	836	0.16	c
SBR	1	1,700	570	0.34		222	0.13	
EBL	1.5		322			938		
EBT	0.5	3,400	0	0.09	c	0	0.28	c
EBR	2	3,400	530	0.16		218	0.06	
WBL	1	1,700	6	0.00	c	37	0.02	c
WBT	1	1,700	0	0.00		0	0.00	
WBR	0	0	3			0		
Right turn adjustment			NBR			NBR		
			SBR			SBR		
			EBR			EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W	+		E/W	+	
Total capacity utilization				**0.59**			**0.68**	
Level of service				**A**			**B**	

2 (304) Sand Canyon Ave. / Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	0	0	0			0		
NBT	3	5,100	548	0.11		2,084	0.41	c
NBR	1	1,700	203	0.12		463	0.27	
SBL	2	3,400	103	0.03		142	0.04	c
SBT	3	5,100	2,236	0.44	c	937	0.18	
SBR	0	0	0			0		
EBL	0	0	0			0		
EBT	0	0	0			0		
EBR	0	0	0			0		
WBL	2	3,400	457	0.13	c	287	0.08	c
WBT	0	0	0			0		
WBR	1	1,700	159	0.09		137	0.08	
Right turn adjustment			NBR			NBR		
			SBR			SBR		
			EBR			EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W			E/W		
Total capacity utilization				**0.62**			**0.58**	
Level of service				**B**			**A**	

3 (305) Sand Canyon Ave. / I-5 SB Ramps

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	0	0	0			0		
NBT	4	6,800	474	0.07		1,922	0.28	c
NBR	1	1,700	121	0.07		380	0.22	
SBL	2	3,400	739	0.22		455	0.13	c
SBT	4	6,800	1,970	0.29	c	727	0.11	
SBR	0	0	0			0		
EBL	2.5		259	0.08	c	617	0.12	c
EBT	0	6,800	4			1		
EBR	1.5		893	0.26		250	0.15	
WBL	0	0	0			0		
WBT	0	0	0			0		
WBR	0	0	0			0		
Right turn adjustment			NBR			NBR		
			SBR			SBR		
			EBR	0.19	c	EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W			E/W		
Total capacity utilization				**0.61**			**0.58**	
Level of service				**B**			**A**	

4 Ridge Valley / Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	1	1,700	21	0.01		13	0.01	
NBT	1	1,700	2	0.01	c	1	0.01	c
NBR	1	1,700	1	0.00		0	0.00	
SBL	1	1,700	23	0.01	c	32	0.02	c
SBT	1	1,700	1	0.00		0	0.00	
SBR	1	1,700	526	0.31		171	0.10	
EBL	2	3,400	114	0.03	c	390	0.11	c
EBT	2	3,400	149	0.05		262	0.08	
EBR	0	0	10			1		
WBL	1	1,700	0	0.00		0	0.00	
WBT	2	3,400	80	0.02	c	220	0.06	c
WBR	1	1,700	16	0.01		37	0.02	
Right turn adjustment			NBR			NBR		
			SBR	0.26	c	SBR		
			EBR			EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W			E/W		
Total capacity utilization				**0.38**			**0.25**	
Level of service				**A**			**A**	

Short-Term Interim Year Baseline (2025) Alternative 1

1 (303) Sand Canyon Ave. / I-5 NB Ramps

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	2	3,400	291	0.09	c	710	0.21	c
NBT	3	5,100	602	0.12		1,829	0.36	
NBR	d	1,700	33	0.02		31	0.02	
SBL	1	1,700	40	0.02		10	0.01	
SBT	3	5,100	2,175	0.43	c	1,074	0.21	c
SBR	1	1,700	749	0.44		310	0.18	
EBL	1.5		461			1,126		
EBT	0.5	3,400	0	0.14	c	0	0.33	c
EBR	2	3,400	622	0.18		268	0.08	
WBL	1	1,700	12	0.01	c	94	0.06	c
WBT	1	1,700	0	0.00		0	0.00	
WBR	0	0	8			0		
Right turn adjustment			NBR			NBR		
			SBR			SBR		
			EBR			EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W	+		E/W	+	
Total capacity utilization				**0.72**			**0.86**	
Level of service				**C**			**D**	

2 (304) Sand Canyon Ave. / Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	0	0	0			0		
NBT	3	5,100	701	0.14		2,342	0.46	c
NBR	1	1,700	240	0.14		674	0.40	
SBL	1	1,700	124	0.07		201	0.12	c
SBT	4	6,800	2,607	0.38	c	1,222	0.18	
SBR	0	0	0			0		
EBL	0	0	0			0		
EBT	0	0	0			0		
EBR	0	0	0			0		
WBL	2	3,400	535	0.16	c	487	0.14	c
WBT	0	0	0			0		
WBR	1	1,700	194	0.11		202	0.12	
Right turn adjustment			NBR			NBR		
			SBR			SBR		
			EBR			EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W			E/W		
Total capacity utilization				**0.59**			**0.77**	
Level of service				**A**			**C**	

3 (305) Sand Canyon Ave. / I-5 SB Ramps

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	0	0	0			0		
NBT	4	6,800	611	0.09		2,315	0.34	c
NBR	1	1,700	131	0.08		401	0.24	
SBL	2	3,400	844	0.25		649	0.19	c
SBT	4	6,800	2,314	0.34	c	1,012	0.15	
SBR	0	0	0			0		
EBL	2.5		305	0.09	c	702	0.14	c
EBT	0	6,800	4			1		
EBR	1.5		911	0.27		236	0.14	
WBL	0	0	0			0		
WBT	0	0	0			0		
WBR	0	0	0			0		
Right turn adjustment			NBR			NBR		
			SBR			SBR		
			EBR	0.18	c	EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W			E/W		
Total capacity utilization				**0.66**			**0.72**	
Level of service				**B**			**C**	

4 Ridge Valley / Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL		0						
NBT		0						
NBR		0						
SBL	2	3,400	26	0.01	c	35	0.01	c
SBT	0	0	0			0		
SBR	1	1,700	581	0.34		189	0.11	
EBL	2	3,400	126	0.04	c	430	0.13	c
EBT	2	3,400	164	0.05		289	0.09	
EBR	0	0	0			0		
WBL	0	0	0			0		
WBT	2	3,400	88	0.03	c	243	0.07	c
WBR	1	1,700	18	0.01		41	0.02	
Right turn adjustment			NBR			NBR		
			SBR	0.31	c	SBR	0.01	c
			EBR			EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W			E/W		
Total capacity utilization				**0.44**			**0.27**	
Level of service				**A**			**A**	

Short-Term Interim Year Baseline (2025) Alternative 1 plus Project

1 (303) Sand Canyon Ave. / I-5 NB Ramps

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	2	3,400	304	0.09	c	717	0.21	c
NBT	3	5,100	604	0.12		1,830	0.36	
NBR	d	1,700	33	0.02		31	0.02	
SBL	1	1,700	40	0.02		10	0.01	
SBT	3	5,100	2,176	0.43	c	1,074	0.21	c
SBR	1	1,700	749	0.44		310	0.18	
EBL	1.5		461			1,126		
EBT	0.5	3,400	0	0.14	c	0	0.33	c
EBR	2	3,400	626	0.18		270	0.08	
WBL	1	1,700	12	0.01	c	94	0.06	c
WBT	1	1,700	0	0.00		0	0.00	
WBR	0	0	8			0		
Right turn adjustment			NBR			NBR		
			SBR			SBR		
			EBR			EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W	+		E/W	+	
Total capacity utilization				**0.72**			**0.86**	
Level of service				**C**			**D**	

2 (304) Sand Canyon Ave. / Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	0	0	0			0		
NBT	3	5,100	701	0.14		2,342	0.46	c
NBR	1	1,700	248	0.15		676	0.40	
SBL	1	1,700	128	0.08		202	0.12	c
SBT	4	6,800	2,607	0.38	c	1,222	0.18	
SBR	0	0	0			0		
EBL	0	0	0			0		
EBT	0	0	0			0		
EBR	0	0	0			0		
WBL	2	3,400	545	0.16	c	494	0.15	c
WBT	0	0	0			0		
WBR	1	1,700	207	0.12		210	0.12	
Right turn adjustment			NBR			NBR		
			SBR			SBR		
			EBR			EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W			E/W		
Total capacity utilization				**0.59**			**0.78**	
Level of service				**A**			**C**	

3 (305) Sand Canyon Ave. / I-5 SB Ramps

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	0	0	0			0		
NBT	4	6,800	612	0.09		2,315	0.34	c
NBR	1	1,700	131	0.08		401	0.24	
SBL	2	3,400	851	0.25		655	0.19	c
SBT	4	6,800	2,316	0.34	c	1,013	0.15	
SBR	0	0	0			0		
EBL	2.5		311	0.09	c	704	0.14	c
EBT	0	6,800	4			1		
EBR	1.5		911	0.27		236	0.14	
WBL	0	0	0			0		
WBT	0	0	0			0		
WBR	0	0	0			0		
Right turn adjustment			NBR			NBR		
			SBR			SBR		
			EBR	0.18	c	EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W			E/W		
Total capacity utilization				**0.66**			**0.72**	
Level of service				**B**			**C**	

4 Ridge Valley / Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c		PM peak hour Volume	PM peak hour v/c	
NBL	1	1,700	24	0.01		15	0.01	
NBT	1	1,700	3	0.02	c	1	0.01	c
NBR	1	1,700	1	0.00		1	0.00	
SBL	1	1,700	26	0.02	c	35	0.02	c
SBT	1	1,700	1	0.00		0	0.00	
SBR	1	1,700	581	0.34		189	0.11	
EBL	2	3,400	126	0.04	c	430	0.13	c
EBT	2	3,400	164	0.05		289	0.09	
EBR	0	0	12			3		
WBL	1	1,700	1	0.00		0	0.00	
WBT	2	3,400	88	0.03	c	243	0.07	c
WBR	1	1,700	18	0.01		41	0.02	
Right turn adjustment			NBR			NBR		
			SBR	0.29	c	SBR		
			EBR			EBR		
			WBR			WBR		
Clearance interval				0.05	c		0.05	c
Split phasing			N/S			N/S		
			E/W			E/W		
Total capacity utilization				**0.45**			**0.28**	
Level of service				**A**			**A**	

Short-Term Interim Year Baseline (2025) Alternative 2

1 (303) Sand Canyon Ave. / I-5 NB Ramps / Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c	PM peak hour Volume	PM peak hour v/c
NBL	2	3,400	228	0.07 c	653	0.19 c
NBT	4	6,800	472	0.07	1,684	0.25
NBR	1	1,700	274	0.16	705	0.41
SBL	2	3,400	136	0.04	171	0.05
SBT	4	6,800	2,079	0.31 c	913	0.13 c
SBR	1	1,700	749	0.44	310	0.18
EBL	2	3,400	461	0.14	1,126	0.33 c
EBT	1.5	5,100	28	0.02 c	40	0.02
EBR	1.5		595	0.18	228	0.07
WBL	2	3,400	547	0.16 c	581	0.17
WBT	2	3,400	63	0.02	56	0.02 c
WBR	1	1,700	139	0.08	145	0.09

Right turn adjustment	NBR		NBR	
	SBR	0.02 c	SBR	
	EBR	0.11 c	EBR	
	WBR		WBR	0.01 c
Clearance interval		0.05 c		0.05 c
Split phasing	N/S		N/S	
	E/W		E/W	
Total capacity utilization		**0.74**		**0.73**
Level of service		**C**		**C**

2 (304) Sand Canyon Ave. / Old Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c	PM peak hour Volume	PM peak hour v/c
NBL	0	0	0		0	
NBT	4	6,800	828	0.12	2,911	0.43 c
NBR	d	1,700	114	0.07	105	0.06
SBL	0	0	94	0.06	113	0.07 c
SBT	4	6,800	3,048	0.46 c	1,596	0.25
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3,400	53	0.02 c	89	0.03 c
WBT	0	0	0		0	
WBR	1	1,700	44	0.03	84	0.05

Right turn adjustment	NBR		NBR	
	SBR		SBR	
	EBR		EBR	
	WBR		WBR	
Clearance interval		0.05 c		0.05 c
Split phasing	N/S		N/S	
	E/W		E/W	
Total capacity utilization		**0.53**		**0.58**
Level of service		**A**		**A**

3 (305) Sand Canyon Ave. / I-5 SB Ramps

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c	PM peak hour Volume	PM peak hour v/c
NBL	0	0	0		0	
NBT	4	6,800	611	0.09	2,315	0.34 c
NBR	1	1,700	131	0.08	401	0.24
SBL	2	3,400	844	0.25	649	0.19 c
SBT	4	6,800	2,314	0.34 c	1,012	0.15
SBR	0	0	0		0	
EBL	2.5		305	0.09 c	702	0.14 c
EBT	0	6,800	4		1	
EBR	1.5		911	0.27	236	0.14
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	

Right turn adjustment	NBR		NBR	
	SBR		SBR	
	EBR	0.18 c	EBR	
	WBR		WBR	
Clearance interval		0.05 c		0.05 c
Split phasing	N/S		N/S	
	E/W		E/W	
Total capacity utilization		**0.66**		**0.72**
Level of service		**B**		**C**

4 Ridge Valley / Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c	PM peak hour Volume	PM peak hour v/c
NBL		0				
NBT		0				
NBR		0				
SBL	2	3,400	26	0.01 c	35	0.01 c
SBT	0	0	0		0	
SBR	1	1,700	581	0.34	189	0.11
EBL	2	3,400	126	0.04 c	430	0.13 c
EBT	2	3,400	164	0.05	289	0.09
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3,400	88	0.03 c	243	0.07 c
WBR	1	1,700	18	0.01	41	0.02

Right turn adjustment	NBR		NBR	
	SBR	0.31 c	SBR	0.01 c
	EBR		EBR	
	WBR		WBR	
Clearance interval		0.05 c		0.05 c
Split phasing	N/S		N/S	
	E/W		E/W	
Total capacity utilization		**0.44**		**0.27**
Level of service		**A**		**A**

Short-Term Interim Year Baseline (2025) Alternative 2 plus Project

1 (303) Sand Canyon Ave. / I-5 NB Ramps / Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c	PM peak hour Volume	PM peak hour v/c
NBL	2	3,400	228	0.07 c	653	0.19 c
NBT	4	6,800	472	0.07	1,684	0.25
NBR	1	1,700	281	0.17	707	0.42
SBL	2	3,400	136	0.04	171	0.05
SBT	4	6,800	2,079	0.31 c	913	0.13 c
SBR	1	1,700	749	0.44	310	0.18
EBL	2	3,400	461	0.14	1,126	0.33 c
EBT	1.5	5,100	32	0.02 c	41	0.02
EBR	1.5		595	0.18	228	0.07
WBL	2	3,400	557	0.16 c	587	0.17
WBT	2	3,400	76	0.02	64	0.02 c
WBR	1	1,700	140	0.08	146	0.09

Right turn adjustment	NBR		NBR	
	SBR	0.01 c	SBR	
	EBR	0.11 c	EBR	
	WBR		WBR	0.01 c
Clearance interval		0.05 c		0.05 c
Split phasing	N/S		N/S	
	E/W		E/W	
Total capacity utilization		**0.73**		**0.73**
Level of service		**C**		**C**

2 (304) Sand Canyon Ave. / Old Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c	PM peak hour Volume	PM peak hour v/c
NBL	0	0	0		0	
NBT	4	6,800	835	0.12	2,913	0.43 c
NBR	d	1,700	114	0.07	105	0.06
SBL	0	0	94	0.06	113	0.07 c
SBT	4	6,800	3,058	0.46 c	1,603	0.25
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3,400	53	0.02 c	89	0.03 c
WBT	0	0	0		0	
WBR	1	1,700	44	0.03	84	0.05

Right turn adjustment	NBR		NBR	
	SBR		SBR	
	EBR		EBR	
	WBR		WBR	
Clearance interval		0.05 c		0.05 c
Split phasing	N/S		N/S	
	E/W		E/W	
Total capacity utilization		**0.53**		**0.58**
Level of service		**A**		**A**

3 (305) Sand Canyon Ave. / I-5 SB Ramps

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c	PM peak hour Volume	PM peak hour v/c
NBL	0	0	0		0	
NBT	4	6,800	612	0.09	2,315	0.34 c
NBR	1	1,700	131	0.08	401	0.24
SBL	2	3,400	851	0.25	655	0.19 c
SBT	4	6,800	2,316	0.34 c	1,013	0.15
SBR	0	0	0		0	
EBL	2.5		311	0.09 c	704	0.14 c
EBT	0	6,800	4		1	
EBR	1.5		911	0.27	236	0.14
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	

Right turn adjustment	NBR		NBR	
	SBR		SBR	
	EBR	0.18 c	EBR	
	WBR		WBR	
Clearance interval		0.05 c		0.05 c
Split phasing	N/S		N/S	
	E/W		E/W	
Total capacity utilization		**0.66**		**0.72**
Level of service		**B**		**C**

4 Ridge Valley / Marine Way

	Lanes	Capacity	AM peak hour Volume	AM peak hour v/c	PM peak hour Volume	PM peak hour v/c
NBL	1	1,700	24	0.01	15	0.01
NBT	1	1,700	3	0.02 c	1	0.01 c
NBR	1	1,700	1	0.00	1	0.00
SBL	1	1,700	26	0.02 c	35	0.02 c
SBT	1	1,700	1	0.00	0	0.00
SBR	1	1,700	581	0.34	189	0.11
EBL	2	3,400	126	0.04 c	430	0.13 c
EBT	2	3,400	164	0.05	289	0.09
EBR	0	0	12		3	
WBL	1	1,700	1	0.00	0	0.00
WBT	2	3,400	88	0.03 c	243	0.07 c
WBR	1	1,700	18	0.01	41	0.02

Right turn adjustment	NBR		NBR	
	SBR	0.29 c	SBR	
	EBR		EBR	
	WBR		WBR	
Clearance interval		0.05 c		0.05 c
Split phasing	N/S		N/S	
	E/W		E/W	
Total capacity utilization		**0.45**		**0.28**
Level of service		**A**		**A**

Attachment D

HCM Level of Service Calculations

HCM 6th Signalized Intersection Summary
1: I-5 Northbound Ramps & Sand Canyon Ave

Baseline Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	322	0	526	6	0	3	243	467	13	16	1878	570
Future Volume (veh/h)	322	0	526	6	0	3	243	467	13	16	1878	570
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	350	0	572	7	0	3	264	508	14	17	2041	620
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	478	0	1049	22	0	19	680	3053	948	99	2333	753
Arrive On Green	0.13	0.00	0.13	0.01	0.00	0.01	0.06	0.20	0.20	0.06	0.46	0.46
Sat Flow, veh/h	3563	0	3170	1781	0	1585	3456	5106	1585	1781	5106	1648
Grp Volume(v), veh/h	350	0	572	7	0	3	264	508	14	17	2041	620
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	0	1585	1728	1702	1585	1781	1702	1648
Q Serve(g_s), s	8.5	0.0	0.0	0.4	0.0	0.2	6.6	7.4	0.6	0.8	32.6	29.5
Cycle Q Clear(g_c), s	8.5	0.0	0.0	0.4	0.0	0.2	6.6	7.4	0.6	0.8	32.6	29.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	478	0	1049	22	0	19	680	3053	948	99	2333	753
V/C Ratio(X)	0.73	0.00	0.55	0.32	0.00	0.15	0.39	0.17	0.01	0.17	0.87	0.82
Avail Cap(c_a), veh/h	574	0	1134	99	0	88	680	3053	948	99	2383	769
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.4	0.0	24.6	44.1	0.0	44.0	36.9	17.5	14.8	40.5	22.1	21.3
Incr Delay (d2), s/veh	3.9	0.0	0.5	8.1	0.0	3.6	0.4	0.1	0.0	0.8	5.0	9.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	5.0	0.2	0.0	0.1	2.7	2.6	0.2	0.4	11.9	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.3	0.0	25.0	52.2	0.0	47.6	37.2	17.6	14.8	41.3	27.1	31.2
LnGrp LOS	D	A	C	D	A	D	D	B	B	D	C	C
Approach Vol, veh/h		922			10			786			2678	
Approach Delay, s/veh		31.2			50.8			24.2			28.1	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	58.3		5.6	22.2	45.6		16.6				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	47.5		5.0	10.5	42.0		14.5				
Max Q Clear Time (g_c+I1), s	2.8	9.4		2.4	8.6	34.6		10.5				
Green Ext Time (p_c), s	0.0	3.2		0.0	0.2	6.6		1.6				

Intersection Summary			
HCM 6th Ctrl Delay		28.1	
HCM 6th LOS		C	

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: I-5 Southbound Ramps & Sand Canyon Ave

Baseline Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	254	4	893	0	0	0	0	473	121	732	1967	0
Future Volume (veh/h)	254	4	893	0	0	0	0	473	121	732	1967	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	222	0	1031				0	514	132	796	2138	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1276	0	1136				0	1592	392	844	3485	0
Arrive On Green	0.36	0.00	0.36				0.00	0.25	0.25	0.49	1.00	0.00
Sat Flow, veh/h	3563	0	3170				0	6696	1585	3456	6696	0
Grp Volume(v), veh/h	222	0	1031				0	514	132	796	2138	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1609	1585	1728	1609	0
Q Serve(g_s), s	3.8	0.0	27.8				0.0	5.9	6.2	19.7	0.0	0.0
Cycle Q Clear(g_c), s	3.8	0.0	27.8				0.0	5.9	6.2	19.7	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1276	0	1136				0	1592	392	844	3485	0
V/C Ratio(X)	0.17	0.00	0.91				0.00	0.32	0.34	0.94	0.61	0.00
Avail Cap(c_a), veh/h	1366	0	1215				0	1592	392	864	3485	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.59	0.59	0.00
Uniform Delay (d), s/veh	19.8	0.0	27.5				0.0	27.7	27.8	22.4	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	9.6				0.0	0.5	2.3	12.3	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	11.4				0.0	2.1	2.4	6.2	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.8	0.0	37.1				0.0	28.2	30.1	34.8	0.5	0.0
LnGrp LOS	B	A	D				A	C	C	C	A	A
Approach Vol, veh/h		1253						646			2934	
Approach Delay, s/veh		34.0						28.6			9.8	
Approach LOS		C						C			A	

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	26.5	26.8				53.3		36.7				
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5				
Max Green Setting (Gmax), s	22.5	19.5				46.5		34.5				
Max Q Clear Time (g_c+I1), s	21.7	8.2				2.0		29.8				
Green Ext Time (p_c), s	0.3	2.6				23.4		2.4				

Intersection Summary			
HCM 6th Ctrl Delay		18.6	
HCM 6th LOS		B	

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
1: I-5 Northbound Ramps & Sand Canyon Ave

Baseline Conditions
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	938	0	217	37	0	0	566	1657	18	5	836	222
Future Volume (veh/h)	938	0	217	37	0	0	566	1657	18	5	836	222
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	1020	0	236	40	0	0	615	1801	20	5	909	241
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1103	0	1736	63	66	0	823	2042	634	99	1110	358
Arrive On Green	0.31	0.00	0.31	0.04	0.00	0.00	0.08	0.13	0.13	0.06	0.22	0.22
Sat Flow, veh/h	3563	0	3170	1781	1870	0	3456	5106	1585	1781	5106	1648
Grp Volume(v), veh/h	1020	0	236	40	0	0	615	1801	20	5	909	241
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	0	1728	1702	1585	1781	1702	1648
Q Serve(g_s), s	24.9	0.0	0.0	2.0	0.0	0.0	15.7	31.2	1.0	0.2	15.3	12.1
Cycle Q Clear(g_c), s	24.9	0.0	0.0	2.0	0.0	0.0	15.7	31.2	1.0	0.2	15.3	12.1
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1103	0	1736	63	66	0	823	2042	634	99	1110	358
V/C Ratio(X)	0.93	0.00	0.14	0.64	0.00	0.00	0.75	0.88	0.03	0.05	0.82	0.67
Avail Cap(c_a), veh/h	1128	0	1758	99	104	0	823	2042	634	99	1214	392
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.63	0.63	0.63	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	0.0	10.0	42.9	0.0	0.0	38.8	37.0	23.9	40.3	33.5	32.3
Incr Delay (d2), s/veh	12.5	0.0	0.0	10.4	0.0	0.0	2.4	3.9	0.1	0.2	6.8	9.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.4	0.0	1.1	1.1	0.0	0.0	7.4	14.6	0.3	0.1	6.4	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.6	0.0	10.0	53.2	0.0	0.0	41.2	40.9	23.9	40.5	40.3	42.0
LnGrp LOS	D	A	A	D	A	A	D	D	C	D	D	D
Approach Vol, veh/h		1256			40			2436			1155	
Approach Delay, s/veh		36.4			53.2			40.8			40.7	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	40.5		7.7	25.9	24.1		32.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	33.5		5.0	17.1	21.4		28.5				
Max Q Clear Time (g_c+I1), s	2.2	33.2		4.0	17.7	17.3		26.9				
Green Ext Time (p_c), s	0.0	0.3		0.0	0.0	2.3		0.9				

Intersection Summary			
HCM 6th Ctrl Delay		39.8	
HCM 6th LOS		D	

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: I-5 Southbound Ramps & Sand Canyon Ave

Baseline Conditions
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	617	1	250	0	0	0	0	1922	380	450	726	0
Future Volume (veh/h)	617	1	250	0	0	0	0	1922	380	450	726	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	756	0	182				0	2089	413	489	789	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	994	0	295				0	2669	657	861	4593	0
Arrive On Green	0.19	0.00	0.19				0.00	0.41	0.41	0.25	0.71	0.00
Sat Flow, veh/h	5344	0	1585				0	6696	1585	3456	6696	0
Grp Volume(v), veh/h	756	0	182				0	2089	413	489	789	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1609	1585	1728	1609	0
Q Serve(g_s), s	12.1	0.0	9.5				0.0	25.3	18.6	11.1	3.6	0.0
Cycle Q Clear(g_c), s	12.1	0.0	9.5				0.0	25.3	18.6	11.1	3.6	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	994	0	295				0	2669	657	861	4593	0
V/C Ratio(X)	0.76	0.00	0.62				0.00	0.78	0.63	0.57	0.17	0.00
Avail Cap(c_a), veh/h	1395	0	414				0	2824	696	861	4593	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.95	0.95	0.00
Uniform Delay (d), s/veh	34.7	0.0	33.7				0.0	22.8	20.8	29.6	4.2	0.0
Incr Delay (d2), s/veh	1.6	0.0	2.1				0.0	2.4	4.5	0.8	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	3.7				0.0	8.7	6.7	4.3	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.3	0.0	35.8				0.0	25.2	25.3	30.4	4.3	0.0
LnGrp LOS	D	A	D				A	C	C	C	A	A
Approach Vol, veh/h		938						2502			1278	
Approach Delay, s/veh		36.2						25.2			14.3	
Approach LOS		D						C			B	

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	26.9	41.8				68.8		21.2				
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5				
Max Green Setting (Gmax), s	13.5	39.5				57.5		23.5				
Max Q Clear Time (g_c+I1), s	13.1	27.3				5.6		14.1				
Green Ext Time (p_c), s	0.1	10.0				5.4		2.7				

Intersection Summary			
HCM 6th Ctrl Delay		24.4	
HCM 6th LOS		C	

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
1: I-5 Northbound Ramps & Sand Canyon Ave

Baseline + Project
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	322	0	530	6	0	3	256	469	13	16	1879	570
Future Volume (veh/h)	322	0	530	6	0	3	256	469	13	16	1879	570
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	350	0	576	7	0	3	278	510	14	17	2042	620
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	466	0	1024	22	0	19	664	3070	953	99	2373	766
Arrive On Green	0.13	0.00	0.13	0.01	0.00	0.01	0.13	0.40	0.40	0.06	0.46	0.46
Sat Flow, veh/h	3563	0	3170	1781	0	1585	3456	5106	1585	1781	5106	1648
Grp Volume(v), veh/h	350	0	576	7	0	3	278	510	14	17	2042	620
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	0	1585	1728	1702	1585	1781	1702	1648
Q Serve(g_s), s	8.5	0.0	0.0	0.4	0.0	0.2	6.7	5.8	0.5	0.8	32.1	29.0
Cycle Q Clear(g_c), s	8.5	0.0	0.0	0.4	0.0	0.2	6.7	5.8	0.5	0.8	32.1	29.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	466	0	1024	22	0	19	664	3070	953	99	2373	766
V/C Ratio(X)	0.75	0.00	0.56	0.32	0.00	0.15	0.42	0.17	0.01	0.17	0.86	0.81
Avail Cap(c_a), veh/h	534	0	1085	99	0	88	664	3070	953	99	2440	788
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.7	0.0	25.2	44.1	0.0	44.0	34.6	12.4	10.9	40.5	21.5	20.7
Incr Delay (d2), s/veh	5.1	0.0	0.6	8.1	0.0	3.6	0.4	0.1	0.0	0.8	4.4	9.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	5.1	0.2	0.0	0.1	2.7	1.8	0.1	0.4	11.6	11.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.8	0.0	25.8	52.2	0.0	47.6	35.0	12.5	10.9	41.3	25.9	29.7
LnGrp LOS	D	A	C	D	A	D	C	B	B	D	C	C
Approach Vol, veh/h		926			10			802			2679	
Approach Delay, s/veh		32.2			50.8			20.3			26.8	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	58.6		5.6	21.8	46.3		16.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	48.5		5.0	10.5	43.0		13.5				
Max Q Clear Time (g_c+I1), s	2.8	7.8		2.4	8.7	34.1		10.5				
Green Ext Time (p_c), s	0.0	3.2		0.0	0.2	7.7		1.3				

Intersection Summary			
HCM 6th Ctrl Delay		26.8	
HCM 6th LOS		C	

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: I-5 Southbound Ramps & Sand Canyon Ave

Baseline + Project
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	4	893	0	0	0	0	474	121	740	1970	0
Future Volume (veh/h)	260	4	893	0	0	0	0	474	121	740	1970	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	228	0	1033				0	515	132	804	2141	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1278	0	1137				0	1576	388	851	3482	0
Arrive On Green	0.36	0.00	0.36				0.00	0.24	0.24	0.49	1.00	0.00
Sat Flow, veh/h	3563	0	3170				0	6696	1585	3456	6696	0
Grp Volume(v), veh/h	228	0	1033				0	515	132	804	2141	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1609	1585	1728	1609	0
Q Serve(g_s), s	3.9	0.0	27.9				0.0	5.9	6.2	19.9	0.0	0.0
Cycle Q Clear(g_c), s	3.9	0.0	27.9				0.0	5.9	6.2	19.9	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1278	0	1137				0	1576	388	851	3482	0
V/C Ratio(X)	0.18	0.00	0.91				0.00	0.33	0.34	0.95	0.61	0.00
Avail Cap(c_a), veh/h	1366	0	1215				0	1576	388	868	3482	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.63	0.63	0.00
Uniform Delay (d), s/veh	19.8	0.0	27.4				0.0	27.9	28.0	22.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	9.7				0.0	0.6	2.4	13.2	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	11.4				0.0	2.1	2.4	6.3	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.8	0.0	37.1				0.0	28.4	30.3	35.5	0.5	0.0
LnGrp LOS	B	A	D				A	C	C	D	A	A
Approach Vol, veh/h		1261						647			2945	
Approach Delay, s/veh		34.0						28.8			10.1	
Approach LOS		C						C			B	

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	26.7	26.5				53.2		36.8				
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5				
Max Green Setting (Gmax), s	22.6	19.4				46.5		34.5				
Max Q Clear Time (g_c+I1), s	21.9	8.2				2.0		29.9				
Green Ext Time (p_c), s	0.3	2.6				23.4		2.4				

Intersection Summary			
HCM 6th Ctrl Delay		18.8	
HCM 6th LOS		B	

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
1: I-5 Northbound Ramps & Sand Canyon Ave

Baseline + Project
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	938	0	218	37	0	0	574	1658	18	5	837	222
Future Volume (veh/h)	938	0	218	37	0	0	574	1658	18	5	837	222
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	1020	0	237	40	0	0	624	1802	20	5	910	241
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1103	0	1738	63	66	0	825	2042	634	99	1106	357
Arrive On Green	0.31	0.00	0.31	0.04	0.00	0.00	0.08	0.13	0.13	0.06	0.22	0.22
Sat Flow, veh/h	3563	0	3170	1781	1870	0	3456	5106	1585	1781	5106	1648
Grp Volume(v), veh/h	1020	0	237	40	0	0	624	1802	20	5	910	241
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	0	1728	1702	1585	1781	1702	1648
Q Serve(g_s), s	24.9	0.0	0.0	2.0	0.0	0.0	15.9	31.2	1.0	0.2	15.3	12.1
Cycle Q Clear(g_c), s	24.9	0.0	0.0	2.0	0.0	0.0	15.9	31.2	1.0	0.2	15.3	12.1
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1103	0	1738	63	66	0	825	2042	634	99	1106	357
V/C Ratio(X)	0.93	0.00	0.14	0.64	0.00	0.00	0.76	0.88	0.03	0.05	0.82	0.68
Avail Cap(c_a), veh/h	1128	0	1761	99	104	0	825	2042	634	99	1203	388
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.63	0.63	0.63	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	0.0	9.9	42.9	0.0	0.0	38.9	37.0	23.9	40.3	33.6	32.4
Incr Delay (d2), s/veh	12.5	0.0	0.0	10.4	0.0	0.0	2.6	3.9	0.1	0.2	7.0	9.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.4	0.0	1.1	1.1	0.0	0.0	7.5	14.6	0.3	0.1	6.5	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.6	0.0	10.0	53.2	0.0	0.0	41.5	40.9	23.9	40.5	40.6	42.2
LnGrp LOS	D	A	A	D	A	A	D	D	C	D	D	D
Approach Vol, veh/h		1257			40			2446			1156	
Approach Delay, s/veh		36.4			53.2			40.9			40.9	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	40.5		7.7	26.0	24.0		32.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	33.5		5.0	17.3	21.2		28.5				
Max Q Clear Time (g_c+I1), s	2.2	33.2		4.0	17.9	17.3		26.9				
Green Ext Time (p_c), s	0.0	0.3		0.0	0.0	2.2		0.9				

Intersection Summary			
HCM 6th Ctrl Delay		39.8	
HCM 6th LOS		D	

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: I-5 Southbound Ramps & Sand Canyon Ave

Baseline + Project
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	618	1	250	0	0	0	0	1922	380	456	727	0
Future Volume (veh/h)	618	1	250	0	0	0	0	1922	380	456	727	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	757	0	182				0	2089	413	496	790	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	995	0	295				0	2669	657	860	4592	0
Arrive On Green	0.19	0.00	0.19				0.00	0.41	0.41	0.25	0.71	0.00
Sat Flow, veh/h	5344	0	1585				0	6696	1585	3456	6696	0
Grp Volume(v), veh/h	757	0	182				0	2089	413	496	790	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1609	1585	1728	1609	0
Q Serve(g_s), s	12.1	0.0	9.5				0.0	25.3	18.6	11.3	3.6	0.0
Cycle Q Clear(g_c), s	12.1	0.0	9.5				0.0	25.3	18.6	11.3	3.6	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	995	0	295				0	2669	657	860	4592	0
V/C Ratio(X)	0.76	0.00	0.62				0.00	0.78	0.63	0.58	0.17	0.00
Avail Cap(c_a), veh/h	1395	0	414				0	2824	696	860	4592	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.95	0.95	0.00
Uniform Delay (d), s/veh	34.7	0.0	33.7				0.0	22.8	20.8	29.6	4.2	0.0
Incr Delay (d2), s/veh	1.6	0.0	2.1				0.0	2.4	4.5	0.9	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	3.7				0.0	8.7	6.7	4.4	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.3	0.0	35.8				0.0	25.2	25.3	30.5	4.3	0.0
LnGrp LOS	D	A	D				A	C	C	C	A	A
Approach Vol, veh/h		939						2502			1286	
Approach Delay, s/veh		36.2						25.2			14.4	
Approach LOS		D						C			B	

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	26.9	41.8				68.7		21.3				
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5				
Max Green Setting (Gmax), s	13.5	39.5				57.5		23.5				
Max Q Clear Time (g_c+I1), s	13.3	27.3				5.6		14.1				
Green Ext Time (p_c), s	0.0	10.0				5.4		2.7				

Intersection Summary			
HCM 6th Ctrl Delay		24.5	
HCM 6th LOS		C	

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary — Alternative 1 - Short Term Interim Conditions
1: I-5 Northbound Ramps & Sand Canyon Ave — AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	461	0	622	12	0	8	291	602	33	40	2175	749
Future Volume (veh/h)	461	0	622	12	0	8	291	602	33	40	2175	749
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	501	0	676	13	0	9	316	654	36	43	2364	814
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	572	0	940	42	0	37	470	2862	888	99	2451	791
Arrive On Green	0.16	0.00	0.16	0.02	0.00	0.02	0.09	0.38	0.38	0.06	0.48	0.48
Sat Flow, veh/h	3563	0	3170	1781	0	1585	3456	5106	1585	1781	5106	1648
Grp Volume(v), veh/h	501	0	676	13	0	9	316	654	36	43	2364	814
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	0	1585	1728	1702	1585	1781	1702	1648
Q Serve(g_s), s	12.4	0.0	4.9	0.6	0.0	0.5	8.0	7.9	1.3	2.1	40.3	43.2
Cycle Q Clear(g_c), s	12.4	0.0	4.9	0.6	0.0	0.5	8.0	7.9	1.3	2.1	40.3	43.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	572	0	940	42	0	37	470	2862	888	99	2451	791
V/C Ratio(X)	0.88	0.00	0.72	0.31	0.00	0.24	0.67	0.23	0.04	0.43	0.96	1.03
Avail Cap(c_a), veh/h	574	0	942	99	0	88	470	2862	888	127	2451	791
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.9	0.0	28.3	43.2	0.0	43.2	39.0	14.8	12.8	41.1	22.7	23.4
Incr Delay (d2), s/veh	14.2	0.0	2.7	4.1	0.0	3.3	3.6	0.2	0.1	3.0	11.6	39.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	0.0	6.8	0.3	0.0	0.2	3.5	2.7	0.4	0.9	15.8	22.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.1	0.0	31.0	47.4	0.0	46.4	42.5	15.0	12.8	44.1	34.2	63.0
LnGrp LOS	D	A	C	D	A	D	D	B	B	D	C	F
Approach Vol, veh/h		1177			22			1006			3221	
Approach Delay, s/veh		39.6			47.0			23.6			41.6	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	54.9		6.6	16.7	47.7		18.9				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	6.4	46.1		5.0	9.3	43.2		14.5				
Max Q Clear Time (g_c+I1), s	4.1	9.9		2.6	10.0	45.2		14.4				
Green Ext Time (p_c), s	0.0	4.3		0.0	0.0	0.0		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		37.8	
HCM 6th LOS		D	

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary — Alternative 1 - Short Term Interim Conditions
3: I-5 Southbound Ramps & Sand Canyon Ave — AM Peak Hour



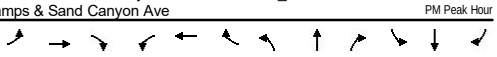
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	4	911	0	0	0	0	611	131	844	2314	0
Future Volume (veh/h)	305	4	911	0	0	0	0	611	131	844	2314	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	267	0	1062				0	664	142	917	2515	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1270	0	1130				0	1424	351	941	3498	0
Arrive On Green	0.36	0.00	0.36				0.00	0.22	0.22	0.54	1.00	0.00
Sat Flow, veh/h	3563	0	3170				0	6696	1585	3456	6696	0
Grp Volume(v), veh/h	267	0	1062				0	664	142	917	2515	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1609	1585	1728	1609	0
Q Serve(g_s), s	4.7	0.0	29.2				0.0	8.1	6.9	23.2	0.0	0.0
Cycle Q Clear(g_c), s	4.7	0.0	29.2				0.0	8.1	6.9	23.2	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1270	0	1130				0	1424	351	941	3498	0
V/C Ratio(X)	0.21	0.00	0.94				0.00	0.47	0.40	0.97	0.72	0.00
Avail Cap(c_a), veh/h	1290	0	1148				0	1424	351	941	3498	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.46	0.46	0.00
Uniform Delay (d), s/veh	20.2	0.0	28.0				0.0	30.4	30.0	20.2	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	14.4				0.0	1.1	3.4	14.4	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	12.6				0.0	3.0	2.7	6.8	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	0.0	42.4				0.0	31.5	33.4	34.6	0.6	0.0
LnGrp LOS	C	A	D				A	C	C	C	A	A
Approach Vol, veh/h		1329						806			3432	
Approach Delay, s/veh		38.0						31.9			9.7	
Approach LOS		D						C			A	

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	29.0	24.4				53.4		36.6				
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5				
Max Green Setting (Gmax), s	24.5	19.4				48.4		32.6				
Max Q Clear Time (g_c+I1), s	25.2	10.1				2.0		31.2				
Green Ext Time (p_c), s	0.0	3.0				30.8		0.9				

Intersection Summary			
HCM 6th Ctrl Delay		19.6	
HCM 6th LOS		B	

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary — Alternative 1_Short Term Interim Conditions
1: I-5 Northbound Ramps & Sand Canyon Ave — PM Peak Hour



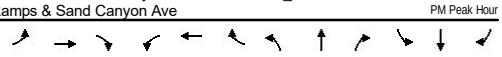
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1126	0	268	94	0	0	710	1829	31	10	1074	310
Future Volume (veh/h)	1126	0	268	94	0	0	710	1829	31	10	1074	310
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	1224	0	291	102	0	0	772	1988	34	11	1167	337
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1093	0	1624	99	104	0	710	1952	606	99	1186	383
Arrive On Green	0.31	0.00	0.31	0.06	0.00	0.00	0.07	0.13	0.13	0.06	0.23	0.23
Sat Flow, veh/h	3563	0	3170	1781	1870	0	3456	5106	1585	1781	5106	1648
Grp Volume(v), veh/h	1224	0	291	102	0	0	772	1988	34	11	1167	337
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	0	1728	1702	1585	1781	1702	1648
Q Serve(g_s), s	27.6	0.0	0.0	5.0	0.0	0.0	18.5	34.4	1.7	0.5	20.5	17.8
Cycle Q Clear(g_c), s	27.6	0.0	0.0	5.0	0.0	0.0	18.5	34.4	1.7	0.5	20.5	17.8
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1093	0	1624	99	104	0	710	1952	606	99	1186	383
V/C Ratio(X)	1.12	0.00	0.18	1.03	0.00	0.00	1.09	1.02	0.06	0.11	0.98	0.88
Avail Cap(c_a), veh/h	1093	0	1624	99	104	0	710	1952	606	99	1186	383
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.46	0.46	0.46	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.2	0.0	11.8	42.5	0.0	0.0	41.9	39.3	25.0	40.4	34.4	33.3
Incr Delay (d2), s/veh	66.6	0.0	0.1	99.0	0.0	0.0	50.4	18.8	0.1	0.5	22.6	23.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.7	0.0	1.5	4.9	0.0	0.0	13.3	18.7	0.6	0.2	10.1	9.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	97.8	0.0	11.8	141.5	0.0	0.0	92.3	58.1	25.1	40.9	57.0	57.3
LnGrp LOS	F	A	B	F	A	A	F	F	C	D	E	E
Approach Vol, veh/h		1515			102			2794			1515	
Approach Delay, s/veh		81.3			141.5			67.1			56.9	
Approach LOS		F			F			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	38.9		9.5	23.0	25.4		32.1				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	34.4		5.0	18.5	20.9		27.6				
Max Q Clear Time (g_c+I1), s	2.5	36.4		7.0	20.5	22.5		29.6				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	0.0		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		69.4	
HCM 6th LOS		E	

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary — Alternative 1_Short Term Interim Conditions
3: I-5 Southbound Ramps & Sand Canyon Ave — PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	702	1	236	0	0	0	0	2315	401	649	1012	0
Future Volume (veh/h)	702	1	236	0	0	0	0	2315	401	649	1012	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	843	0	172				0	2516	436	705	1100	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	960	0	285				0	2805	691	810	4635	0
Arrive On Green	0.18	0.00	0.18				0.00	0.44	0.44	0.23	0.72	0.00
Sat Flow, veh/h	5344	0	1585				0	6696	1585	3456	6696	0
Grp Volume(v), veh/h	843	0	172				0	2516	436	705	1100	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1609	1585	1728	1609	0
Q Serve(g_s), s	13.8	0.0	9.0				0.0	32.6	19.3	17.7	5.2	0.0
Cycle Q Clear(g_c), s	13.8	0.0	9.0				0.0	32.6	19.3	17.7	5.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	960	0	285				0	2805	691	810	4635	0
V/C Ratio(X)	0.88	0.00	0.60				0.00	0.90	0.63	0.87	0.24	0.00
Avail Cap(c_a), veh/h	980	0	291				0	2824	696	810	4635	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.84	0.84	0.00
Uniform Delay (d), s/veh	36.0	0.0	34.0				0.0	23.5	19.8	33.1	4.2	0.0
Incr Delay (d2), s/veh	9.1	0.0	3.4				0.0	5.0	4.3	8.7	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	3.6				0.0	11.4	6.9	7.7	1.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.0	0.0	37.4				0.0	28.6	24.1	41.8	4.3	0.0
LnGrp LOS	D	A	D				A	C	C	D	A	A
Approach Vol, veh/h		1015						2952			1805	
Approach Delay, s/veh		43.7						27.9			19.0	
Approach LOS		D						C			B	

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	25.6	43.7				69.3		20.7				
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5				
Max Green Setting (Gmax), s	20.5	39.5				64.5		16.5				
Max Q Clear Time (g_c+I1), s	19.7	34.6				7.2		15.8				
Green Ext Time (p_c), s	0.3	4.6				8.4		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		27.9	
HCM 6th LOS		C	

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary Alternative 1 - Short Term Interim Year + Project
1: I-5 Northbound Ramps & Sand Canyon Ave AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	461	0	626	12	0	8	304	604	33	40	2176	749
Future Volume (veh/h)	461	0	626	12	0	8	304	604	33	40	2176	749
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	501	0	680	13	0	9	330	657	36	43	2365	814
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	570	0	947	42	0	37	480	2865	889	99	2440	788
Arrive On Green	0.16	0.00	0.16	0.02	0.00	0.02	0.09	0.38	0.38	0.06	0.48	0.48
Sat Flow, veh/h	3563	0	3170	1781	0	1585	3456	5106	1585	1781	5106	1648
Grp Volume(v), veh/h	501	0	680	13	0	9	330	657	36	43	2365	814
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	0	1585	1728	1702	1585	1781	1702	1648
Q Serve(g_s), s	12.4	0.0	4.7	0.6	0.0	0.5	8.3	7.9	1.3	2.1	40.6	43.0
Cycle Q Clear(g_c), s	12.4	0.0	4.7	0.6	0.0	0.5	8.3	7.9	1.3	2.1	40.6	43.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	570	0	947	42	0	37	480	2865	889	99	2440	788
V/C Ratio(X)	0.88	0.00	0.72	0.31	0.00	0.24	0.69	0.23	0.04	0.43	0.97	1.03
Avail Cap(c_a), veh/h	570	0	947	99	0	88	480	2865	889	127	2440	788
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.0	0.0	28.2	43.2	0.0	43.2	38.9	14.8	12.7	41.1	22.9	23.5
Incr Delay (d2), s/veh	14.7	0.0	2.6	4.1	0.0	3.3	3.9	0.2	0.1	3.0	12.3	41.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	0.0	6.8	0.3	0.0	0.2	3.6	2.7	0.4	0.9	16.1	22.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	0.0	30.8	47.4	0.0	46.4	42.9	15.0	12.8	44.1	35.2	64.5
LnGrp LOS	D	A	C	D	A	D	D	B	B	D	D	F
Approach Vol, veh/h		1181			22			1023			3222	
Approach Delay, s/veh		39.7			47.0			23.9			42.7	
Approach LOS		D			D			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	55.0		6.6	17.0	47.5		18.9				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	6.4	46.2		5.0	9.6	43.0		14.4				
Max Q Clear Time (g_c+I1), s	4.1	9.9		2.6	10.3	45.0		14.4				
Green Ext Time (p_c), s	0.0	4.3		0.0	0.0	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			38.5									
HCM 6th LOS			D									

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary Alternative 1 - Short Term Interim Year + Project
3: I-5 Southbound Ramps & Sand Canyon Ave AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	311	4	911	0	0	0	0	612	131	851	2316	0
Future Volume (veh/h)	311	4	911	0	0	0	0	612	131	851	2316	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	272	0	1063				0	665	142	925	2517	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1272	0	1132				0	1420	350	941	3493	0
Arrive On Green	0.36	0.00	0.36				0.00	0.22	0.22	0.54	1.00	0.00
Sat Flow, veh/h	3563	0	3170				0	6696	1585	3456	6696	0
Grp Volume(v), veh/h	272	0	1063				0	665	142	925	2517	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1609	1585	1728	1609	0
Q Serve(g_s), s	4.8	0.0	29.2				0.0	8.1	6.9	23.6	0.0	0.0
Cycle Q Clear(g_c), s	4.8	0.0	29.2				0.0	8.1	6.9	23.6	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1272	0	1132				0	1420	350	941	3493	0
V/C Ratio(X)	0.21	0.00	0.94				0.00	0.47	0.41	0.98	0.72	0.00
Avail Cap(c_a), veh/h	1294	0	1152				0	1420	350	941	3493	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.46	0.46	0.00
Uniform Delay (d), s/veh	20.1	0.0	28.0				0.0	30.5	30.0	20.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	14.2				0.0	1.1	3.5	16.1	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	12.6				0.0	3.0	2.7	7.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	0.0	42.2				0.0	31.6	33.5	36.4	0.6	0.0
LnGrp LOS	C	A	D				A	C	C	D	A	A
Approach Vol, veh/h		1335						807			3442	
Approach Delay, s/veh		37.7						31.9			10.2	
Approach LOS		D						C			B	
Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	29.0	24.4				53.4		36.6				
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5				
Max Green Setting (Gmax), s	24.5	19.3				48.3		32.7				
Max Q Clear Time (g_c+I1), s	25.6	10.1				2.0		31.2				
Green Ext Time (p_c), s	0.0	3.0				30.8		0.9				
Intersection Summary												
HCM 6th Ctrl Delay			19.9									
HCM 6th LOS			B									

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary Alternative 1 - Short Term Interim + Project
1: I-5 Northbound Ramps & Sand Canyon Ave PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1126	0	270	94	0	0	717	1830	31	10	1074	310
Future Volume (veh/h)	1126	0	270	94	0	0	717	1830	31	10	1074	310
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	1224	0	293	102	0	0	779	1989	34	11	1167	337
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1089	0	1585	109	114	0	672	1929	599	99	1220	394
Arrive On Green	0.31	0.00	0.31	0.06	0.00	0.00	0.06	0.12	0.12	0.06	0.24	0.24
Sat Flow, veh/h	3563	0	3170	1781	1870	0	3456	5106	1585	1781	5106	1648
Grp Volume(v), veh/h	1224	0	293	102	0	0	779	1989	34	11	1167	337
Grp Sat Flow(s),veh/h/ln	1781	0	1585	1781	1870	0	1728	1702	1585	1781	1702	1648
Q Serve(g_s), s	27.5	0.0	0.0	5.1	0.0	0.0	17.5	34.0	1.7	0.5	20.3	17.6
Cycle Q Clear(g_c), s	27.5	0.0	0.0	5.1	0.0	0.0	17.5	34.0	1.7	0.5	20.3	17.6
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1089	0	1585	109	114	0	672	1929	599	99	1220	394
V/C Ratio(X)	1.12	0.00	0.18	0.94	0.00	0.00	1.16	1.03	0.06	0.11	0.96	0.86
Avail Cap(c_a), veh/h	1089	0	1585	109	114	0	672	1929	599	99	1220	394
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	0.50	0.50	0.50	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.3	0.0	12.4	42.1	0.0	0.0	42.1	39.4	25.3	40.4	33.8	32.8
Incr Delay (d2), s/veh	68.2	0.0	0.1	66.4	0.0	0.0	80.4	23.3	0.1	0.5	17.3	20.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.8	0.0	1.6	4.3	0.0	0.0	15.4	19.2	0.6	0.2	9.5	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	99.5	0.0	12.5	108.4	0.0	0.0	122.5	62.7	25.3	40.9	51.1	53.4
LnGrp LOS	F	A	B	F	A	A	F	F	C	D	D	D
Approach Vol, veh/h		1517			102			2802			1515	
Approach Delay, s/veh		82.7			108.4			78.9			51.5	
Approach LOS		F			F			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	38.5		10.0	22.0	26.0		32.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	34.0		5.5	17.5	21.5		27.5				
Max Q Clear Time (g_c+I1), s	2.5	36.0		7.1	19.5	22.3		29.5				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			73.4									
HCM 6th LOS			E									

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary Alternative 1 - Short Term Interim + Project
3: I-5 Southbound Ramps & Sand Canyon Ave PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	704	1	236	0	0	0	0	2315	401	655	1013	0
Future Volume (veh/h)	704	1	236	0	0	0	0	2315	401	655	1013	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	845	0	172				0	2516	436	712	1101	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	961	0	285				0	2805	691	810	4634	0
Arrive On Green	0.18	0.00	0.18				0.00	0.44	0.44	0.23	0.72	0.00
Sat Flow, veh/h	5344	0	1585				0	6696	1585	3456	6696	0
Grp Volume(v), veh/h	845	0	172				0	2516	436	712	1101	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1609	1585	1728	1609	0
Q Serve(g_s), s	13.9	0.0	9.0				0.0	32.6	19.3	17.9	5.2	0.0
Cycle Q Clear(g_c), s	13.9	0.0	9.0				0.0	32.6	19.3	17.9	5.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	961	0	285				0	2805	691	810	4634	0
V/C Ratio(X)	0.88	0.00	0.60				0.00	0.90	0.63	0.88	0.24	0.00
Avail Cap(c_a), veh/h	980	0	291				0	2824	696	810	4634	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.83	0.83	0.00
Uniform Delay (d), s/veh	36.0	0.0	34.0				0.0	23.5	19.8	33.2	4.3	0.0
Incr Delay (d2), s/veh	9.2	0.0	3.4				0.0	5.0	4.3	9.3	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	3.6				0.0	11.4	6.9	7.8	1.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.1	0.0	37.4				0.0	28.6	24.1	42.6	4.4	0.0
LnGrp LOS	D	A	D				A	C	C	D	A	A
Approach Vol, veh/h		1017						2952			1813	
Approach Delay, s/veh		43.8						27.9			19.4	
Approach LOS		D						C			B	
Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	25.6	43.7				69.3		20.7				
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5				
Max Green Setting (Gmax), s	20.5	39.5				64.5		16.5				
Max Q Clear Time (g_c+I1), s	19.9	34.6				7.2		15.9				
Green Ext Time (p_c), s	0.2	4.6				8.4		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			28.0									
HCM 6th LOS			C									

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary — Alternative 2 - Short Term Interim Conditions
1: I-5 Northbound Ramps & Sand Canyon Ave — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	461	28	595	547	63	139	228	472	274	136	2079	749
Future Volume (veh/h)	461	28	595	547	63	139	228	472	274	136	2079	749
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	501	30	647	595	68	151	248	513	298	148	2260	814
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	566	242	409	628	540	241	281	2244	697	178	2338	755
Arrive On Green	0.16	0.13	0.13	0.18	0.15	0.15	0.08	0.44	0.44	0.10	0.46	0.46
Sat Flow, veh/h	3563	1870	3170	3456	3554	1585	3456	5106	1585	1781	5106	1648
Grp Volume(v), veh/h	501	30	647	595	68	151	248	513	298	148	2260	814
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1777	1585	1728	1702	1585	1781	1702	1648
Q Serve(g_s), s	16.5	1.7	15.5	20.4	2.0	10.7	8.5	7.5	8.4	9.8	51.7	31.2
Cycle Q Clear(g_c), s	16.5	1.7	15.5	20.4	2.0	10.7	8.5	7.5	8.4	9.8	51.7	31.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	566	242	409	628	540	241	281	2244	697	178	2338	755
V/C Ratio(X)	0.89	0.12	1.58	0.95	0.13	0.63	0.88	0.23	0.43	0.83	0.97	1.08
Avail Cap(c_a), veh/h	626	242	409	628	540	241	281	2244	697	270	2340	756
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.4	46.2	52.3	48.5	44.0	47.7	54.6	21.0	6.8	53.0	31.6	10.5
Incr Delay (d2), s/veh	13.4	0.2	272.5	23.8	0.1	5.1	26.5	0.2	1.9	12.6	12.2	55.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	0.8	21.7	10.9	0.9	4.6	4.6	2.8	3.1	4.8	21.7	22.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.7	46.5	324.8	72.3	44.1	52.8	81.0	21.2	8.7	65.7	43.9	66.4
LnGrp LOS	E	D	F	E	D	D	F	C	A	E	D	F
Approach Vol, veh/h		1178			814			1059			3222	
Approach Delay, s/veh		206.2			66.3			31.7			50.6	
Approach LOS		F			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.5	57.2	26.3	20.0	14.2	59.5	23.6	22.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.2	46.5	21.8	15.5	9.7	55.0	21.1	16.2
Max Q Clear Time (g_c+I1), s	11.8	10.4	22.4	17.5	10.5	53.7	18.5	12.7
Green Ext Time (p_c), s	0.2	4.3	0.0	0.0	0.0	1.3	0.5	0.3

Intersection Summary		
HCM 6th Ctrl Delay		78.7
HCM 6th LOS		E

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary — Alternative 2 - Short Term Interim Conditions
3: I-5 Southbound Ramps & Sand Canyon Ave — AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	4	911	0	0	0	0	611	131	844	2314	0
Future Volume (veh/h)	305	4	911	0	0	0	0	611	131	844	2314	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	267	0	1062				0	664	142	917	2515	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1270	0	1130				0	1424	351	941	3498	0
Arrive On Green	0.36	0.00	0.36				0.00	0.22	0.22	0.27	0.54	0.00
Sat Flow, veh/h	3563	0	3170				0	6696	1585	3456	6696	0
Grp Volume(v), veh/h	267	0	1062				0	664	142	917	2515	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1609	1585	1728	1609	0
Q Serve(g_s), s	4.7	0.0	29.2				0.0	8.1	6.9	23.7	26.4	0.0
Cycle Q Clear(g_c), s	4.7	0.0	29.2				0.0	8.1	6.9	23.7	26.4	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1270	0	1130				0	1424	351	941	3498	0
V/C Ratio(X)	0.21	0.00	0.94				0.00	0.47	0.40	0.97	0.72	0.00
Avail Cap(c_a), veh/h	1290	0	1148				0	1424	351	941	3498	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	20.2	0.0	28.0				0.0	30.4	30.0	32.4	15.4	0.0
Incr Delay (d2), s/veh	0.1	0.0	14.4				0.0	1.1	3.4	23.3	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	12.6				0.0	3.0	2.7	11.9	8.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	0.0	42.4				0.0	31.5	33.4	55.7	16.7	0.0
LnGrp LOS	C	A	D				A	C	C	E	B	A
Approach Vol, veh/h		1329						806			3432	
Approach Delay, s/veh		38.0						31.9			27.1	
Approach LOS		D						C			C	

Timer - Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	29.0	24.4				53.4		36.6
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	24.5	19.4				48.4		32.6
Max Q Clear Time (g_c+I1), s	25.7	10.1				28.4		31.2
Green Ext Time (p_c), s	0.0	3.0				16.3		0.9

Intersection Summary		
HCM 6th Ctrl Delay		30.4
HCM 6th LOS		C

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary — Alternative 2 - Short Term Interim Conditions
1: I-5 Northbound Ramps & Sand Canyon Ave — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1126	40	228	581	56	145	653	1684	705	171	913	310
Future Volume (veh/h)	1126	40	228	581	56	145	653	1684	705	171	913	310
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	1224	43	248	632	61	158	710	1830	766	186	992	337
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1182	137	232	1054	165	73	745	1806	561	186	1239	400
Arrive On Green	0.33	0.07	0.07	0.31	0.05	0.05	0.22	0.35	0.35	0.10	0.24	0.24
Sat Flow, veh/h	3563	1870	3170	3456	3554	1585	3456	5106	1585	1781	5106	1648
Grp Volume(v), veh/h	1224	43	248	632	61	158	710	1830	766	186	992	337
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1777	1585	1728	1702	1585	1781	1702	1648
Q Serve(g_s), s	36.5	2.4	5.5	17.1	1.8	4.1	22.3	38.9	38.9	11.5	20.1	21.4
Cycle Q Clear(g_c), s	36.5	2.4	5.5	17.1	1.8	4.1	22.3	38.9	38.9	11.5	20.1	21.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1182	137	232	1054	165	73	745	1806	561	186	1239	400
V/C Ratio(X)	1.04	0.31	1.07	0.60	0.37	2.15	0.95	1.01	1.37	1.00	0.80	0.84
Avail Cap(c_a), veh/h	1182	221	375	1054	165	73	745	1806	561	186	1239	400
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.8	48.4	23.5	32.5	50.9	34.0	42.6	35.5	35.5	49.2	39.1	39.6
Incr Delay (d2), s/veh	35.8	1.3	60.3	0.9	1.4	559.8	22.3	24.6	176.2	65.6	5.5	19.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.6	1.2	5.1	7.3	0.9	13.4	11.2	18.8	42.2	8.2	8.5	10.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.5	49.7	83.8	33.5	52.3	593.8	64.9	60.1	211.7	114.8	44.6	58.6
LnGrp LOS	F	D	F	C	D	F	E	F	F	F	D	E
Approach Vol, veh/h		1515			851			3306			1515	
Approach Delay, s/veh		73.7			138.8			96.3			56.4	
Approach LOS		E			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	43.4	38.1	12.5	28.2	31.2	41.0	9.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	11.5	38.9	28.6	13.0	23.7	26.7	36.5	5.1
Max Q Clear Time (g_c+I1), s	13.5	40.9	19.1	7.5	24.3	23.4	38.5	6.1
Green Ext Time (p_c), s	0.0	0.0	1.8	0.6	0.0	2.1	0.0	0.0

Intersection Summary		
HCM 6th Ctrl Delay		88.1
HCM 6th LOS		F

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary — Alternative 2 - Short Term Interim Conditions
3: I-5 Southbound Ramps & Sand Canyon Ave — PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	702	1	236	0	0	0	0	2315	401	649	1012	0
Future Volume (veh/h)	702	1	236	0	0	0	0	2315	401	649	1012	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	843	0	172				0	2516	436	705	1100	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	988	0	293				0	2811	692	883	4718	0
Arrive On Green	0.18	0.00	0.18				0.00	0.44	0.44	0.26	0.73	0.00
Sat Flow, veh/h	5344	0	1585				0	6696	1585	3456	6696	0
Grp Volume(v), veh/h	843	0	172				0	2516	436	705	1100	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1609	1585	1728	1609	0
Q Serve(g_s), s	16.8	0.0	10.9				0.0	39.8	23.5	21.0	6.1	0.0
Cycle Q Clear(g_c), s	16.8	0.0	10.9				0.0	39.8	23.5	21.0	6.1	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	988	0	293				0	2811	692	883	4718	0
V/C Ratio(X)	0.85	0.00	0.59				0.00	0.90	0.63	0.80	0.23	0.00
Avail Cap(c_a), veh/h	1093	0	324				0	2837	699	883	4718	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.4	0.0	41.0				0.0	28.6	24.1	38.3	4.7	0.0
Incr Delay (d2), s/veh	6.2	0.0	2.3				0.0	4.9	4.3	5.2	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	0.0	4.4				0.0	14.6	8.8	8.9	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.6	0.0	43.3				0.0	33.6	28.4	43.5	4.8	0.0
LnGrp LOS	D	A	D				A	C	C	D	A	A
Approach Vol, veh/h		1015						2952			1805	
Approach Delay, s/veh		48.5						32.8			20.0	
Approach LOS		D						C			B	

Timer - Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	32.6	52.6				85.2		24.8
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	25.5	48.5				78.5		22.5
Max Q Clear Time (g_c+I1), s	23.0	41.8				8.1		18.8
Green Ext Time (p_c), s	0.7	6.3				8.4		1.6

Intersection Summary		
HCM 6th Ctrl Delay		31.6
HCM 6th LOS		C

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
1: I-5 Northbound Ramps & Sand Canyon Ave
02/02/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	461	32	595	557	76	140	228	472	281	136	2079	749
Future Volume (veh/h)	461	32	595	557	76	140	228	472	281	136	2079	749
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	501	35	647	605	83	152	248	513	305	148	2260	814
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	575	260	441	659	599	267	233	2146	666	178	2310	746
Arrive On Green	0.16	0.14	0.14	0.19	0.17	0.17	0.07	0.42	0.42	0.10	0.45	0.45
Sat Flow, veh/h	3563	1870	3170	3456	3554	1585	3456	5106	1585	1781	5106	1648
Grp Volume(v), veh/h	501	35	647	605	83	152	248	513	305	148	2260	814
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1777	1585	1728	1702	1585	1781	1702	1648
Q Serve(g_s), s	16.5	2.0	16.7	20.6	2.4	10.6	8.1	7.8	9.0	9.8	52.2	30.9
Cycle Q Clear(g_c), s	16.5	2.0	16.7	20.6	2.4	10.6	8.1	7.8	9.0	9.8	52.2	30.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	575	260	441	659	599	267	233	2146	666	178	2310	746
V/C Ratio(X)	0.87	0.13	1.47	0.92	0.14	0.57	1.06	0.24	0.46	0.83	0.98	1.09
Avail Cap(c_a), veh/h	689	260	441	680	599	267	233	2146	666	270	2311	746
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.1	45.3	51.7	47.6	42.5	45.9	55.9	22.4	7.3	53.0	32.3	10.6
Incr Delay (d2), s/veh	10.3	0.2	222.1	17.2	0.1	2.8	76.5	0.3	2.3	12.6	14.3	60.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	0.9	20.3	10.5	1.1	4.4	5.9	3.0	3.4	4.8	22.3	23.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.4	45.5	273.7	64.8	42.6	48.7	132.4	22.7	9.6	65.7	46.5	71.3
LnGrp LOS	E	D	F	E	D	D	F	C	A	E	D	F
Approach Vol, veh/h		1183			840			1066			3222	
Approach Delay, s/veh		176.2			59.7			44.5			53.7	
Approach LOS		F			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.5	54.9	27.4	21.2	12.6	58.8	23.9	24.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.2	43.5	23.6	16.7	7.4	54.3	23.2	17.1
Max Q Clear Time (g_c+I1), s	11.8	11.0	22.6	18.7	10.1	54.2	18.5	12.6
Green Ext Time (p_c), s	0.2	4.3	0.3	0.0	0.0	0.1	0.9	0.4

Intersection Summary	
HCM 6th Ctrl Delay	75.9
HCM 6th LOS	E

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
3: I-5 Southbound Ramps & Sand Canyon Ave
02/02/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	311	4	911	0	0	0	0	612	131	851	2316	0
Future Volume (veh/h)	311	4	911	0	0	0	0	612	131	851	2316	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	272	0	1063				0	665	142	925	2517	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	1322	0	1176				0	1474	363	993	3564	0
Arrive On Green	0.37	0.00	0.37				0.00	0.23	0.23	0.29	0.55	0.00
Sat Flow, veh/h	3563	0	3170				0	6696	1585	3456	6696	0
Grp Volume(v), veh/h	272	0	1063				0	665	142	925	2517	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1609	1585	1728	1609	0
Q Serve(g_s), s	6.2	0.0	38.1				0.0	10.7	9.1	31.3	34.4	0.0
Cycle Q Clear(g_c), s	6.2	0.0	38.1				0.0	10.7	9.1	31.3	34.4	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1322	0	1176				0	1474	363	993	3564	0
V/C Ratio(X)	0.21	0.00	0.90				0.00	0.45	0.39	0.93	0.71	0.00
Avail Cap(c_a), veh/h	1499	0	1334				0	1474	363	1051	3564	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.7	0.0	35.7				0.0	39.8	39.2	41.6	19.6	0.0
Incr Delay (d2), s/veh	0.1	0.0	8.2				0.0	1.0	3.1	13.8	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	15.6				0.0	4.1	3.7	14.4	11.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.8	0.0	43.9				0.0	40.8	42.3	55.4	20.8	0.0
LnGrp LOS	C	A	D				A	D	D	E	C	A
Approach Vol, veh/h		1335						807			3442	
Approach Delay, s/veh		40.2						41.0			30.1	
Approach LOS		D						D			C	

Timer - Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	39.0	32.0				71.0		49.0
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	36.5	19.5				60.5		50.5
Max Q Clear Time (g_c+I1), s	33.3	12.7				36.4		40.1
Green Ext Time (p_c), s	1.2	2.5				19.0		4.4

Intersection Summary	
HCM 6th Ctrl Delay	34.1
HCM 6th LOS	C

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
Alternative 2 - Short Term Interim Conditions + Project
1: I-5 Northbound Ramps & Sand Canyon Ave
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1126	41	228	587	64	146	653	1684	707	171	913	310
Future Volume (veh/h)	1126	41	228	587	64	146	653	1684	707	171	913	310
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	1224	45	248	638	70	159	710	1830	768	186	992	337
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1182	137	232	1054	165	73	745	1806	561	186	1239	400
Arrive On Green	0.33	0.07	0.07	0.30	0.05	0.05	0.22	0.35	0.35	0.10	0.24	0.24
Sat Flow, veh/h	3563	1870	3170	3456	3554	1585	3456	5106	1585	1781	5106	1648
Grp Volume(v), veh/h	1224	45	248	638	70	159	710	1830	768	186	992	337
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1728	1777	1585	1728	1702	1585	1781	1702	1648
Q Serve(g_s), s	36.5	2.5	5.5	17.3	2.1	4.1	22.3	38.9	38.9	11.5	20.1	21.4
Cycle Q Clear(g_c), s	36.5	2.5	5.5	17.3	2.1	4.1	22.3	38.9	38.9	11.5	20.1	21.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1182	137	232	1054	165	73	745	1806	561	186	1239	400
V/C Ratio(X)	1.04	0.33	1.07	0.61	0.42	2.16	0.95	1.01	1.37	1.00	0.80	0.84
Avail Cap(c_a), veh/h	1182	221	375	1054	165	73	745	1806	561	186	1239	400
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.8	48.4	23.5	32.6	51.0	34.0	42.6	35.5	35.5	49.2	39.1	39.6
Incr Delay (d2), s/veh	35.8	1.4	59.6	1.0	1.7	565.8	22.3	24.6	177.7	65.6	5.5	19.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.6	1.2	5.1	7.4	1.0	13.6	11.2	18.8	42.5	8.2	8.5	10.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.5	49.8	83.1	33.6	52.8	599.7	64.9	60.1	213.2	114.8	44.6	58.6
LnGrp LOS	F	D	F	C	D	F	E	F	F	F	D	E
Approach Vol, veh/h		1517			867			3308			1515	
Approach Delay, s/veh		73.6			139.0			96.7			56.4	
Approach LOS		E			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	43.4	38.0	12.6	28.2	31.2	41.0	9.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	11.5	38.9	28.6	13.0	23.7	26.7	36.5	5.1
Max Q Clear Time (g_c+I1), s	13.5	40.9	19.3	7.5	24.3	23.4	38.5	6.1
Green Ext Time (p_c), s	0.0	0.0	1.8	0.6	0.0	2.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	88.4
HCM 6th LOS	F

Notes
User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary
Alternative 2 - Short Term Interim Conditions + Project
3: I-5 Southbound Ramps & Sand Canyon Ave
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	704	1	236	0	0	0	0	2315	401	655	1013	0
Future Volume (veh/h)	704	1	236	0	0	0	0	2315	401	655	1013	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	845	0	172				0	2516	436	712	1101	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	990	0	294				0	2811	692	882	4716	0
Arrive On Green	0.19	0.00	0.19				0.00	0.44	0.44	0.26	0.73	0.00
Sat Flow, veh/h	5344	0	1585				0	6696	1585	3456	6696	0
Grp Volume(v), veh/h	845	0	172				0	2516	436	712	1101	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1609	1585	1728	1609	0
Q Serve(g_s), s	16.8	0.0	10.9				0.0	39.8	23.5	21.3	6.1	0.0
Cycle Q Clear(g_c), s	16.8	0.0	10.9				0.0	39.8	23.5	21.3	6.1	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	990	0	294				0	2811	692	882	4716	0
V/C Ratio(X)	0.85	0.00	0.59				0.00	0.90	0.63	0.81	0.23	0.00
Avail Cap(c_a), veh/h	1093	0	324				0	2837	699	882	4716	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.4	0.0	41.0				0.0	28.6	24.1	38.4	4.7	0.0
Incr Delay (d2), s/veh	6.2	0.0	2.3				0.0	4.9	4.3	5.6	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	0.0	4.4				0.0	14.6	8.8	9.1	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.6	0.0	43.2				0.0	33.6	28.4	44.0	4.8	0.0
LnGrp LOS	D	A	D				A	C	C	D	A	A
Approach Vol, veh/h		1017						2952			1813	
Approach Delay, s/veh		48.5						32.8			20.2	
Approach LOS		D						C			C	

Timer - Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	32.6	52.6				85.1		24.9
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	25.5	48.5				78.5		22.5
Max Q Clear Time (g_c+I1), s	23.3	41.8				8.1		18.8
Green Ext Time (p_c), s	0.7	6.3				8.4		1.5

Intersection Summary	
HCM 6th Ctrl Delay	31.6
HCM 6th LOS	C

Notes
User approved volume balancing among the lanes for turning movement.

Appendix I
Public Outreach

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority

550 S. Main St.
Orange, CA 92868
and

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

Prepared by:

AECOM
300 S. Grand Ave.
Los Angeles, CA 90071

September 2023

REVISION	DESCRIPTION	DATE
0	Draft Appendix I Public Outreach	4/1/2022
1	Final Appendix I Public Outreach	9/22/2023

Table of Contents

1. PUBLIC OUTREACH SUMMARY 1
2. PUBLIC OUTREACH MATERIALS 1

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1. PUBLIC OUTREACH SUMMARY

OCTA provided the nearby residents of the Travata community with several opportunities to meet to discuss the Project. Below is a summary of those meetings.

- OCMF Virtual Public Meeting , Oct. 5, 2021 – 5:30 p.m.
    - Travata was notified via flyer
    - Recording of meeting is available here: https://youtu.be/IuPm9uYc2ns. Also posted on www.octa.net/ocmf
- Thursday, Nov. 4, 10:30 a.m.
    - Member of OCTA Outreach went to Travata to provide residents with ways to access project information if they missed the virtual meeting.
    - Residents were notified via email through Travata property manager.
- Wednesday, Jan. 12, 5 p.m.
    - OCTA Outreach and Project Manager met with Travata to go over project, answer questions and clarify environmental process.
    - Residents were notified via email through Travata property manager.
- Wednesday, March 14, 5 p.m.
    - OCTA Outreach, Project Manager, Environmental Consultant, and City of Irvine staff met with Travata to go over project, answer questions on the Draft IS/MND that was circulated on Monday, February 28, 2022. A hardcopy of the Draft IS/MND was delivered to the community on February
    - Residents were notified via email through Travata property manager.

2. PUBLIC OUTREACH MATERIALS

The following are outreach materials for this Project, including the Notice of Intent to Adopt a Mitigated Negative Declaration (NOI) and newspaper (printed and website) publications.

February 28, 2022

To: Public Agencies, Organizations, and Interested Parties

From: Orange County Transportation Authority

Subject: **Notice of Public Review and Intent to Adopt a Mitigated Negative Declaration**

Pursuant to the *State of California Public Resources Code* and the *Guidelines for Implementation of the California Environmental Quality Act*, as most recently amended, this notice is issued to advise that the Orange County Transportation Authority (OCTA) has prepared a Draft Initial Study/Mitigated Negative Declaration (IS/MND) to evaluate the environmental effects of the Metrolink Orange County Maintenance Facility Project (Project). The Project will provide locomotive and railcar servicing and storage facilities for Metrolink's Orange County Line trains in order to improve Metrolink's operational efficiency and overall system performance.

This Initial Study was completed in accordance with OCTA's Guidelines for Implementing the California Environmental Quality Act (CEQA). The document relies on site-specific analysis prepared to address in detail the environmental impacts associated with the Project. On the basis of the Initial Study, OCTA staff has concluded that the Project will not have a significant effect on the environment with the implementation of best management practices and mitigation measures. Consequently, a Mitigated Negative Declaration is proposed.

The Project site is not listed on any lists enumerated under Section 65962.5 of the California Government Code.

Project Location: The proposed location for the Project lies in the City of Irvine (City). The main Project Footprint is located on a 21.3-acre OCTA-owned parcel in the City, adjacent to Marine Way and OCTA Metrolink Railroad, between mileposts (MP) 183.50 and 184.00. This location is within a closed military base (Marine Corps Air Station [MCAS] El Toro) formerly owned by the United States Department of the Navy (DON). After MCAS El Toro was closed, the site was quitclaimed by the Navy to Heritage Fields El Toro, LLC in 2011, and then by way of grant deed conveyed by Heritage Fields to the City that same year. OCTA then purchased the fee ownership of the Project Site from the City. Regional vehicle access to the Project Site is from I-5 at Sand Canyon Avenue. Local vehicle access is via Marine Way to Ridge Valley. Construction for the Project will also occur within the existing Metrolink railroad corridor between MP 183.30 and MP 184.50.

Project Description: The Project includes the construction of a new rail yard, a new rail bridge over the Bee Canyon Channel adjacent to an existing single-span rail bridge, lead tracks and yard tracks, storage, operations and maintenance buildings, train wash, ancillary structures, landscape improvements, street and traffic signal improvements, and safety and security features. Funding is currently not available to construct the entire facility at one time. Instead, a phase construction approach is proposed to build the initial portion of the facility including the most immediately needed elements. The addition of the remaining components will be advanced as the need arises and when funding becomes available.

Public Review Period: A 30-day public review period will begin on February 28, 2022. Comments can be submitted via email (ocmf@octa.net) or mailed to Lora Cross, Project Manager, Orange County Transportation Authority, 550 S. Main Street Orange, CA 92868. Comments must be submitted by no later than 5:00 p.m. on March 29, 2022. The Draft IS/MND and reference documents are also available for review with a link to comment on the Project webpage (www.octa.net/ocmf) and for review physically at the OCTA headquarters at 550 S. Main Street in the City of Orange.

For additional information regarding this Project, please contact:

Lora Cross
Project Manager
Orange County Transportation Authority
E-mail: ocmf@octa.net

HOLLYWOOD

Protesters seek end to COVID-19 mandates as they wane

By Linh Tat
ltat@scng.com



More than 100 protesters including parents and their kids march along Hollywood on Boulevard Sunday. The "March to Free L.A." rally to demand the county end all coronavirus mandates, including ones related to masking in schools, and for a return to normalcy. Today, state officials are expected to lift an indoor mask mandate within schools.

PHOTO BY GENE BLEVINS

On the eve of an anticipated announcement by Gov. Gavin Newsom's administration about when its indoor school masking mandate might be lifted, more than 100 people gathered in Hollywood on Sunday to demand the end of coronavirus mandates — with an emphasis on doing away with school masking requirements — in order to restore a sense of normalcy for students.

During the "March to Free L.A.," an event organized by The L.A. Uprising and California Students United and attended by parents from Los Angeles Unified and other Southern California districts, participants called on local, state and federal officials to stop treating the presence of the coronavirus as a state of emergency.

Two years into the pandemic, with transmission and hospitalization rates coming down again after the winter surge and with vaccines available in the United States to those who want them, there is a growing sentiment that the virus is here to stay, and that society must learn to live with it.

"Why are we having a state of emergency when we're hosting the Super Bowl and the Oscars? ... We want L.A. to go back to normal," said Danna Rosenthal, a member of The L.A. Uprising and California Students United, and a parent in L.A. Unified.

She and other parents have voiced concerns that prolonged coronavirus restrictions in schools are harming students, citing learning loss and mental health crises that many children have experienced throughout the pandemic.

"If the adults don't start realizing what we've done to kids, it's going to be a major tragedy going forward," Rosenthal said. "We need to start putting children first instead of asking the children to protect us."

Those who participated in the march say they've lost faith in public health officials and believe that coronavirus restrictions aren't grounded in science but, rather, politics.

They have been calling for L.A. County Public Health Director Barbara Ferrer to be fired or to step down.

Sunday's march down Hollywood Boulevard from La Brea Avenue to Vine Street came on the eve of a highly anticipated announcement that state officials are expected to make today regarding when California might lift its indoor school masking policy.

The march also took place two days after the U.S. Centers for Disease Control and Prevention eased up on its guidance to allow more counties to lift indoor masking mandates. However, under the new guidelines, L.A. County, like 37% of other counties in the U.S., is still considered a high-risk area for coronavirus transmissions. In such counties, the CDC continues to recommend that people, including students, wear masks indoors.

L.A. Unified School District officials have repeatedly touted the district's coronavirus safety protocols — whose standards are considered among the highest in the nation — for keeping students and staff safe. They have often cited those protocols as a core reason why no campus has had to shut down since schools reopened.

The head of the local teachers union also recently suggested that it's too early to discuss lifting indoor masking mandates in schools.

"These protocols, including the current testing regiment and indoor masking, have protected tens of thousands of educators and more than half a million students, along with their families," United Teachers Los Angeles President Cecily Myart-Cruz had said Wednesday. "It is premature to discuss removing these health and safety measures while there are still many unvaccinated youths in our early education programs and schools."

OCTA

Metrolink Orange County Maintenance Facility Project
Notice of Public Review and Intent to Adopt a Mitigated Negative Declaration

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For additional information regarding this Project, please contact:

Lora Cross
Project Manager
Orange County Transportation Authority
E-mail: ocmf@octa.net

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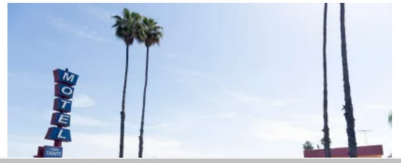
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Procession, memorial service planned for Huntington Beach officer killed in helicopter crash

Community members were invited to pay their respects to 14-year HBPD officer Nicholas Vella during a procession around city streets Tuesday morning.







LATEST HEADLINES

Suspect arrested in Garden Grove sober living home stabbing 16 hours ago

Contagious equine virus removes horses from Swallows Day parade, other events 1 day ago

Temperatures to warm up after chilly weekend in Southern California 44 mins ago

Coronavirus: Orange County reported 1,066 new cases and 31 new deaths over the weekend 3 hours ago

Fullerton district street



Appendix J
Response to Comments

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority

550 S. Main St.
Orange, CA 92868
and

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

Prepared by:

AECOM
300 S. Grand Ave.
Los Angeles, CA 90071

September 2023

REVISION	DESCRIPTION	DATE
0	Draft IS-MND Response to Comments	4/1/2022
1	Final IS-MND Response to Comments	9/22/2023

Table of Contents

1. INTRODUCTION 1

2. RESPONSES TO COMMENTS 1

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1. INTRODUCTION

The Draft Initial Study/Mitigated Negative Declaration (Draft IS/MND) for the Metrolink Orange County Maintenance Facility Project (Project) was circulated for public review on February 28, 2022 through March 29, 2022. A total of 85 comment letters were received. Written responses are presented for all comments received during the public review period. Each comment letter comment has been assigned a comment number that reflects the order in which the comments was entered into our comment log.

2. RESPONSES TO COMMENTS

The following matrix provides all comments letter text received during the public review period and the responses associated with all individual comments contained in the comment letter.

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Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
1	03/02/22	Chris & Joyce Loo	loo1995@aol.com Irvine, CA	Dear Sir: We would like to take this opportunity to inform you of our objection to the proposed construction of the Metrolink maintenance facility by the Orange County Transportation Authority (OCTA) at the former El Toro Marine Base. Our opposition to the facility is predicated upon the creation of potentials for health hazards, noise issues, increased traffic activity possibly resulting in congestion, devaluation of surrounding real estate property, and air pollution. Prior to the purchase of our residence in April 2019 at the Travata Community across from the Great Park, we had explored many other residential locations. We found Travata to offer many amenities which facilitated our decision to purchase. It should be noted that at no time during our purchasing process was there a disclosure regarding the proposed OCTA maintenance facility. The disclosure of such information would have deterred us from making the purchase. We did not become aware of the proposed facility until November 2021. As a suggestion, we would like to see the city planners collaborate with OCTA to find another location which would be suitable and conducive for a rail maintenance facility. Sincerely, Chris/Joyce Loo	Opposition of the Project has been noted and will be considered by OCTA. Section 3.3 of the IS/MND states impacts related to air quality would be less than significant with mitigation measures incorporated, and the criteria air pollutant emissions associated with the proposed Project would not expose sensitive receptors to substantial criteria pollutant concentrations. Section 3.13 of the IS/MND states impacts related to noise would be less than significant with mitigation measures, and the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies would be less than significant. Additionally, total Project sound levels would not meet or exceed the FTA thresholds for both on-site operational noise sources associated with the Rail Shops and Yard, as well as automobile and truck traffic in and out of the site. Section 3.17 of the IS/MND states impacts related to vehicle miles traveled (VMT) would be less than significant. The estimated daily trip volumes would not exceed local or regional thresholds and meets the requirements of the Congestion Management Program (CMP) Highway System. Section 3.14 of the IS/MND states impacts related to population and housing would not occur because the proposed Project is located on vacant land where no housing currently exists, and the land use is designated as the Great Park. The displacement of households or businesses would not occur. The analysis of potential economic impacts, including those specific to real estate property values is not required per CEQA Guidelines. Regarding disclosure of the Project, per Planning Commission resolution 16-3551 which was adopted November 17, 2016, disclosure statements for the Travata community were to include notification of OCTA facilities in the area including the future Metrolink Maintenance Facility. Regarding possible relocation of the Project to another site, in June of 2010 OCTA entered into an agreement for reserving the 21 acre site for purchase from the City of Irvine for the purpose of a rail maintenance facility. It is not feasible to move the site further south on the rail road due to the location of Irvine Metrolink station and there is no other open land along the Orange County rail line that would make it feasible ot move the location of the station.
2	03/02/22	Howard Lichtman	ldcinc1980@gmail.com (310) 710-8001 105 Palencia, Irvine CA	Proposed OCTA facility location. The Travata Community is directly in the background. March 2, 2022 Lora Cross, Project Manager Orange County Transportation Authority 550 S. Main Street Orange, CA 92868. Our recently constructed Travata community (55 years and over) has been given a major blow by finding out about the plans to build an OCTA train maintenance facility directly across the street from our community. This project was never disclosed to us in the required disclosure documents, prior to purchasing our properties, and we would have never bought our homes in the Travata development if we had known what was being planned. A 24 hour a day train maintenance facility within 500 feet of our community is totally unacceptable. Noise, light, air / ground pollution and its visual presence have the potential to drastically alter the quality of our lives and values of our properties. Our community is made up of senior citizens and this is the wrong project for the proposed location. This is a very serious matter and we do not want to end up with another "North Irvine - All American Asphalt Plant" nightmare in our backyard. Please find another location away from our community. A portion of the south / adjacent RV Storage Depot or further south Great Park land to the south of the RV Storage Depot (both properties adjacent to the railroad tracks) are just a few of alternate locations that should be considered. PLEASE FIND ANOTHER LOCATION!!!!! Sincerely, Howard Lichtman Homeowner 105 Palencia, Irvine, CA. 92618	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 regarding impacts related to noise and air quality. Section 3.1 of the IS/MND states sensitive receptors (the Great Park and residences) would be too far from the Project Site to experience spillover lighting due to security lighting. Additionally, the nighttime lighting fixtures would be installed to direct the majority of the light to within and directly adjacent to the OCMF, and away from sensitive areas, to the maximum extent feasible. Therefore, impacts would be less than significant. This section also states views from the residences located northwest of the Project Site would be blocked by existing mature trees on their properties, as well as the concrete wall that surrounds the residential complex. The view would also be blocked by fencing that would surround the Project Site during construction and a six-foot concrete wall with landscaping during operations. The Project would not substantially alter the visual character for residential viewers primarily due to the distance of the Project buildings from the residential viewers, and because the residences are surrounded by an existing tall concrete wall and large trees within their property. Additionally, no aesthetically significant view or landmark would be altered or blocked. Therefore, impacts would be less than significant. OCTA is not familiar with the All American Asphalt Plan and therefore cannot comment on it. The OCMF is not a manufacturing site. Refer to Comment Response 1 regarding relocation of the Project.
3	03/03/22	David Wang and Jeanne Lu	wlaohio@aol.com 148 Burgess, Irvine CA	to: Lora Cross, Project Manager, Orange County Transportation Authority Dear Ms. Cross: Our recently constructed Travata community (55 years and over) has been given a major blow by finding out about the plans to build an OCTA train maintenance facility directly across the street from our community. This project was never disclosed to us in the required disclosure documents, prior to purchasing our properties, and we would have never bought our homes in the Travata development if we had known what was being planned. A 24 hour a day train maintenance facility within 500 feet of our community is totally unacceptable. Noise, light, air / ground pollution and its visual presence have the potential to drastically alter the quality of our lives and values of our properties. Our community is made up of senior citizens and this is the wrong project for the proposed location. We need to have a meeting with city council and city planner representatives as soon as possible to discuss this matter and to voice our concerns. A meeting at our Travata Community Center with city representatives is requested as soon as possible. This is a very serious matter and we do not want to end up with another "North Irvine - All American Asphalt Plant" nightmare in our backyard. Best regards David Wang and Jeanne Lu Residents at 148 Burgess Irvine, CA92618	Refer to Comment Response 1 for impacts related to noise and air quality. Refer to Comment Response 2 for impacts related to lighting and visual quality. Regarding a request for a meeting, on March 14th, 2022 OCTA held a meeting with the Travata Community in which City Planners were present to answer questions. A separate meeting was held on March 15th between City Planners and Travata residences. Refer to Comment Response 2 regarding All-American Asphalt. Opposition of the Project has been noted and will be considered by OCTA.
4	03/06/22	Thomas and Nancy Cooper	tcooper1213@icloud.com 144 Palencia, Irvine CA	Dear Orange County Transit Authority members, We are senior citizens living in the Travata neighborhood which is adjacent to the proposed Irvine Metrolink Rail Yard site. We relocated to Irvine and to our specific location next to the Great Park for the healthy Irvine environment and for the ability to enjoy healthy walks in the Great Park with clean air, and peaceful surroundings. We are quite disturbed to have recently learned about OCTA plans to build a noisy, pollution generating, view blocking, rail yard right next door. We believe the proposed use would violate zoning ordinances and clearly result in excessive noise at night and degradation of air quality, not to mention already high traffic on Marine Way. These would certainly have substantial adverse effects on nearby residents. We ask that you stop this Metrolink Rail Yard in its tracks and move it much further away from a residential area. It is currently only about 500-600 feet from our homes. We are totally against the proposed Metrolink Rail Yard, and we object to the Mitigated Negative Declaration. Sincerely, Thomas L Cooper and Nancy A Cooper 144 Palencia Irvine, CA 92618	Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 2 regarding impacts to visual quality. As discussed in Section 3.11 of the IS/MND, the proposed Project is located on land zoned as 6.1 "Institutional", which applies to land for public and quasi-public facilities such as churches, schools, or utilities. The Project can be categorized as one of the conditional uses under 6.1 Institutional zoning—government facility. Additionally, the use of some heavy equipment and chemical processes for the purpose of maintaining rail vehicles on site does not qualify the OCMF as heavy industrial use. There are no heavy industrial manufacturing or production features involved in activities at the OCMF during construction and operations. As such, the Project would be consistent with existing land use and zoning requirements. Refer to Comment Response 1 regarding relocation of the Project. Opposition of the Project has been noted and will be considered by OCTA.
5	03/08/22	Patricia Langevin	plange6604@cox.net 134 Burgess, Irvine CA	To Whom It May Concern, My name is Patricia Langevin, 134 Burgess, Irvine 92618. I am writing this letter to oppose the proposed Metrolink Rail Maintenance Facility to be built at Marine Way and Ridge Valley. I have been an Irvine resident for 44 years and purchased my new home in Travata near the Great Park in November of 2018. I have read the Mitigated Negative Declaration Document and the Contour Map of the 30 year Cancer Risk report on the Proposed Metrolink Facility and I have several objections to this project. I am very concerned about the added noise, light, traffic, and air pollution that the building and operation of this facility would bring to my community. I would have never purchased my new home had I know this was to be developed just 500 feet from my neighborhood. I would appreciate your support in choosing another site for this project. Thank you. Sincerely, Patricia Langevin	As detailed in Table 3.3-15, Summary of Excess Cancer Risks, of the MND, and shown in Figure 10.2-2 (Contour Map of 30-Year Residential Cancer Risk) of Appendix B of the MND, the maximum excess cancer risk for an individual resident in the age restricted community would be 1.68 in a million, less than the threshold of 10 in a million. The maximum excess cancer risk for an individual in a non-age restricted community is 9.25 in a million, also less than the SCAQMD threshold of 10 in a million. Therefore, the Project would not expose the surrounding residents to significant air quality impacts. Refer to Comment Response 1 regarding impacts to noise, air quality, and traffic. Refer to Comment Response 2 regarding impacts to lighting.
6	03/08/22	James F. Geiger	james.geiger@rcn.com 258 Carlow, Irvine CA	Ms Cross, I received subject letter and reviewed reference documents associated with the proposed rail yard project. I was stunned and appalled to learn that OCTA would propose such a heavy, noisy, pollution-generating industrial site literally across the street from an over-55 residential community (Travata) and the Great Park recreation complex serving thousands of families in pursuit of healthy outdoor activities. The documents discussing environmental and aesthetic impacts glossed over the reality that such a large complex operating 24/7 and receiving/dispatching rail cars day and night would have a devastating impact to the quality of life for so many proximal Irvine residents. I was particularly struck by mention that a "six foot fence surrounding the rail yard" would shield any negative views of activity conducted within the confines of the site, notwithstanding the fact that constant noise during nighttime and early morning hour operations will regard that boundary as irrelevant. As recent home purchasers in the Travata community, my wife and I had no idea this potential project was coming. We chose Irvine as our home since the city prides itself on being one of the 10 best places to live in America. Living adjacent to a rail yard with 24/7 maintenance operations is a terrifying prospect to this homeowner, and I'll be adding my voice in whatever venue is available to protest and hopefully defeat this reprehensible proposal. Respectfully, James F. Geiger, Colonel, USAF (ret) 258 Carlow Irvine, CA 92618	Refer to Comment Response 1 regarding impacts related to noise and air quality. Refer to Comment Response 2 regarding impacts related to visual quality. Refer to Comment Response 1 regarding concern over disclosure of project.
7	03/09/22	Edward Benveniste	qnumber5@att.net 239 Carlow, Irvine CA	I'm a resident here at the Travata Community in Irvine. I recently learned that the OCTA is contemplating a maintenance facility directly across from our neighborhood. At the time of my purchase, I was never informed in the form of any disclosures of the possibility of this happening. I would have seriously reconsidered my purchase had I known. I am very concerned about noise disturbance, lighting disturbance, pollution, aesthetics and the negative effect this facility will have on the value of my property. What alarms me most, is that the facility will be functioning during unacceptable hours in such close proximity to the residents here at Travata. I am very much against this project being built so close to my home and feel an alternative location should be considered. Sincerely, Edward Benveniste 239 Carlow Irvine, CA 92618	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 regarding impacts related to noise and air quality. Refer to Comment Response 2 for impacts related to lighting and aesthetics. Economic impacts are not considered significant under CEQA Guidelines.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
8	03/09/22	Kelvin Ko	kokelvin@gmail.com 111 Carlow, Irvine CA	To: Lora Cross Project Manager OCTA Orange, CA Dear Lora, Please consider finding an alternate site to build the captioned project. I am currently residing at Travata, Irvine, an over 55 senior community. Your planned project will adversely impact the quality of life of our community. The noise, light and pollution would be unbearable. The people of our community are at the last stage of our lives. Please don't let that happen to us. Thanks Sincerely, Kelvin Ko kokelvin@gmail.com 111 Carlow Irvine, CA 92618	Refer to Comment Response 1 regarding relocation or alternative site of the Project. Refer to Comment Response 1 for impacts related to noise and air quality, and Comment Response 2 for impacts related to lighting.
9	03/10/22	Debra Geiger	geiger.debra@rcn.com	Ms Cross, My husband and I, both USAF Veterans, purchased a home in the Travata Community in October 2021. We carefully reviewed and researched the disclosure documents and there was NOTHING provided about the plans to build an OCTA train maintenance facility directly across the street from our intended home. Had there been such a disclosure, we NEVER would have purchased this home. And because we financed using a VA loan, these plans also place the VA Administration at risk should this facility be built and housing prices subsequently decline. Noise and air pollution are a significant concern to me as I suffer from Tinnitus from my time in the military and have a significant breathing issue related to Diesel fuel (so much so that we had to sell a boat we loved because it ran on diesel fuel). The diesel fumes caused by trains is likely one of the primary reasons for locating train stations in commercial and industrial areas and not near residences. The proposed train yard site is far closer to residential areas than any Metrolink station. The Mitigated Negative Declaration (MND) notes that rail yard activities produce high levels of diesel particulates. Trains are a major contributor of toxic air contaminants along with construction equipment. The report states that 'diesel particulate matter continues to account for about two-thirds of the cancer risk from air toxins'. This is the WRONG PROJECT for senior citizens like me living nearby the proposed location. Our move to Irvine was to bring us closer to our 2 grandchildren (a 2-year old and a newborn) who live within 10 miles of our home. The 2-year old already spends significant time at our home--and in Great Park which is across the street. It is wrong to expose our grandchildren, and the hundreds of other children who participate in events at Great Park, to these toxins. The MND recognizes the train yard as an institutional land use--the same categorization as for churches and schools. However, the use of 'heavy duty equipment such as cranes and forklifts,' along with the use of industrial chemicals and processes should class the yard as a heavy industry--which is a non-permitted use at the proposed site. We urge you to reassess the categorization of this facility and find an appropriately zoned area for it! To use sports metaphors, this proposed Metrolink Rail Yard in its current proposed location is a FOUL--and we are dropping a penalty flag!!! Locate a new site for this Metrolink Rail Yard and help Irvine maintain its reputation as a community that is concerned for the wellness/safety of its residents. Respectfully, Colonel Debra A. Geiger, USAF (Retired)	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 for impacts related to noise and air quality, and Comment Response 5 related to hazardous toxins and cancer risks. In addition, as described in Section 3.3.3 of the MND, operational activities would include emissions from locomotive operations; heavy-duty equipment used on-site (such as cranes and forklifts); fuel tank emissions; natural gas consumption; and on-road vehicle travel for worker, delivery, and haul trips to and from the site. As shown in Table 3.3-10, Localized Operational Maximum Daily Emissions, which summarizes the Project's total operational on-site emissions including locomotive operations, the Project's on-site operational emissions would not exceed the SCAQMD localized thresholds of significance. Thus, the impacts to the nearby sensitive receptors and surrounding land uses would be less than significant. For the purposes of the regional emissions analysis, based on information provided by OCTA, the Project would not result in an increase in commuter rail service or additional locomotive train travel in the region. On the contrary, due to the optimal location of the Project Site, the Project is also anticipated to result in reduced locomotive travel in the region and result in a reduction in the emissions associated with locomotive travel in the region. It is also anticipated that total regional emissions associated with train idling would decrease at the existing maintenance facilities due to more efficient operations and logistics with the shift of a portion of operations to the Project site. Thus, as shown in Table 3.3-9, the Project's net increase in regional emissions would also not exceed the regional thresholds of significance. Refer to Comment Response 4 for impacts related to land use and zoning. Refer to Comment Response 1 regarding relocation of the Project.
10	03/11/22	Joseph and Sandy Toma	joetoma@me.com 135 Palencia, Irvine CA	To Whom it may concern, Our recently constructed Travata community (55 years and over) has been given a major blow by finding out about the plans to build an OCTA train maintenance facility directly across the street from our community. This project was never disclosed to us in the required disclosure documents, prior to purchasing our properties. Based on this recently discovered information, we would have never bought our home in the Travata development if we had known what was being planned. A 24 hour a day train maintenance facility within 500 feet of our community is totally unacceptable. Noise, light, air / ground pollution and its visual presence have the potential to drastically alter the quality of our lives and values of our properties. Our community is made up of senior citizens and this is the wrong project for the proposed location. Regards, Sandy and Joe Toma 135 Palencia Irvine, Ca 92618	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 for impacts related to noise and air quality. Refer to Comment Response 2 for impacts related to lighting and visual quality.
11-1	03/14/22	Robert and Pamela Swanson	bpswanson@hotmail.com 209 Carlow, Irvine CA	To: OCTA Re: Opposition to Metrolink Rail Maintenance Facility (OCTA) In 2018, we purchased our home In the senior community of Travata, across from the Irvine Great Park. At that time, we gave careful consideration to the surrounding areas: the 133 and 5 Freeways, the railroad tracks and the Great Park. We believed that those were acceptable as is and would not infringe on our right to a quiet enjoyment of our property. We are opposed to the OCTA's plans to build a 24/7 Metrolink maintenance facility across the street from our community. This project was never disclosed to us in the required disclosure documents prior to purchasing our properties, and we would have never bought our home in the Travata development if we had known what was being planned. A 24 hour a day train maintenance facility within 500 feet of our community is totally unacceptable. Noise, light, air / ground pollution and its visual presence have the potential to drastically alter the quality of our lives and values of our properties. This is the wrong project for the proposed location for the following reasons: 1. ZONING: The train yard is classed as an 'institutional' land use, the same categorization as for a school or church. By its' own admission, the use of 'heavy duty equipment such as cranes and forklifts' along with the use of industrial chemicals and processes should class the yard as heavy industry, a non-permitted use at the proposed site. 2. NOISE: (a) No actual measurements of noise levels at existing Metrolink train yards were provided, only estimates were used. (b) Measurements of sound levels at the site were taken at a time when there are no trains stopping or leaving the site. Trains were only passing by and yet caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment use in the train yard into consideration. (c) City of Irvine Municipal Code Noise Ordinance does not have an upper limit for construction noise as those activities are considered temporary. However, the rail yard is expected to be under construction for 4.5 years, ie not temporary. The predicted noise levels during construction are expected to be at or in excess of the highest exterior noise levels allowed for residential areas in the City of Irvine. 3. AESTHETICS: The MND states that there will be no impact on the views of hills to southwest when the train yard plans call for a 5 story structure in the middle of the yard not to mention 4 permanent cranes (how tall?). Travata's view of the hills to the southwest (Quail Hill and Shady/Bommer Canyon) will certainly be negatively impacted. The report is deliberately misleading as neither of the photos provided show the hill formations which are generally very visible. 4. LIGHTING: (a) (Nighttime lighting would certainly impact residents' views over the site contrary to the report. We have to assume that the 4 cranes of unknown height will be well lit 24/7; (b) MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true as the rail yard is to the right of the Great Park and field lighting is quite a distance from our homes.	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 4 for impacts related to land use and zoning. Refer to Comment Response 1 for impacts related to noise and air quality. Refer to Comment Response 2 for impacts related to lighting and visual quality.
11-2	03/14/22	Robert and Pamela Swanson	bpswanson@hotmail.com 209 Carlow, Irvine CA	5. AIR QUALITY: The MND notes that rail yard activities produce high levels of diesel particulates. Trains are a major contributor of toxic air contaminants along with construction equipment and ships. The report states that 'diesel particulate matter continues to account for about two-thirds of the cancer risk from air toxins. The operational impacts from the rail yard will be primarily from diesel particulate matter. The diesel fumes caused by trains is likely one of the primary reasons for locating train stations in commercial and industrial areas and not near residences. The proposed train yard site is far closer to residential areas than any Metrolink station. 6. TRAFFIC: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. 7. MANDATORY FINDINGS OF SIGNIFICANCE: The project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impact on air quality, noise, light, aesthetic and traffic effects as discussed herein. These impacts cannot be mitigated to make the rail yard project feasible at its' current location. Its' original Sand Canyon location was >.5 miles from Travata and the rest of Cypress Village residents and as such was feasible. The new location at 500 – 650 feet from Travata is not feasible and the negative impacts are unable to be mitigated successfully. This proposed facility is not an acceptable use of land so near to a residential neighborhood especially when there are alternative sites closer to the Metrolink station on Ada and Barranca where there are only park and commercial neighbors. Robert and Pamela Swanson 209 Carlow, Irvine, CA 92618	Refer to Comment Response 9 regarding impacts related to air quality and diesel particulate matter. Refer to Comment Response 1 traffic. In addition, Section 3.20 of the Draft IS/MND states the Project does not include any characteristics such as permanent road closure or long-term blocking of road access that would physically impair or otherwise conflict with the City's Emergency Preparedness Program. Furthermore, the Project shall comply with fire prevention regulations codified by local, regional, and state authorities. Therefore, no construction or operational impacts related to substantially impairing an adopted emergency response plan or emergency evacuation plan would occur. Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly. Refer to Comment Response 1 regarding relocation of the Project.
12	03/14/22	Stuart Kaufman	skaufman@luckymail.com	1. Trash compactors & waste management located close to Travata. Why not locate farther away? 2. Will wall/fence in front of project be landscape to help with the view? 3. New wall should be sound wall! Landscaped in front. 4. How are you mitigating traffic? 5. Has a property value study been done showing r.e. value decline. 6. Buildings need to be sound proofed.	The trash compactor and waste management facilities are located at the western end of the maintenance building in an area that is outside of the operating area of the yard, is in close proximity to the loading docks and maintenance building itself, and is refuse vehicle accessible from the main entrance of the OCMF for pick up and removal of trash and waste from the site. Refer to Comment Response 2 regarding impacts related to aesthetics and visual quality. Refer to Comment Response 1 regarding impacts related to traffic. The analysis of potential economic impacts, including those specific to real estate property, is not required per CEQA Guidelines. Refer to Section 3.13 as well as Appendix F Noise Technical Memorandum regarding anticipated noise levels.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
13	03/14/22	Ann Harris	126 Burgess. Irvine CA	1. Zoning: A. The current zoning is Institutional: there is no doubt that the proposed use of a maintenance facility that uses heavy equipment and hazard waste materials belong in an industrial use zone. B. In order to rectify the conflict in zoning and use: will the agency seek a ZONE CHANGE or petition for a CONDITIONAL USE PERMIT? 2. TRAFFIC: A. Exactly how many vehicle trips per day will this site create when fully operational? B. Your Environmental Study does not distinguish the difference of heavy truck traffic and passenger vehicles. This is a major concern with so many heavy truck already using Marine Way. C. Will the ingress/regress be located off Marine Way and will this be the only employee and public ingress/regress access? 3. ENVIRONMENTAL ISSUES: A. (SOUND) What is the maximum sound decimal when fully operational? B. Will there be a sound/site barrier build on Marine Way? What type of barrie will it be? C. Will the washing bays be enclosed in covered structures? D. What is the water source for the washing bays? Will they be using culinary water or a secondary water source? E. How many gallons of water will this operation use per week? F. How are they going to dispose of the hazard waste water? 4. LOSS OF PUBLIC REVENUES: A. SINCE BOTH THE PROPERTY AND FACILITY IS OWNED AND OPERATED BY THE COUNTY; A TAX EXEMPT ENITY; WILL THERE BE ANY OFF SETS TO MAKE UP FOR LOST REVENUES TO THE PUBLIC? B. IF SO WHAT WILL THE OFF SETS BE AND HOW MUCH WILL THEY GENERATE BACK INTO THE PUBLIC COFFERS? I request that this be submitted into the public record as comments for this project. THANK YOU ANN HARRIS 126 BURGESS IRVINE, CA 92618	Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to traffic. Approximately 220 vehicles trips would be made per day when fully operational. Table 3.17-3 (Project Trip Generation) of the IS/MND identifies approximately 40 "Other" vehicle trips accessing the Project Site daily (20 in and 20 out), of the total 220 vehicles. "Other" includes deliveries, visitors, and other ancillary traffic. As stated in Section 2.3.2 of the Draft IS/MND, access to the OCMF would require a roadway extension along Ridge Valley from the intersection of Ridge Valley and Marine Way. The only site access comes from the new Ridge Valley Extension. At the entrance a security booth, gate arms, and fencing are provided to limit unauthorized access to the site. As stated in Table 3-13.8 (Operational Noise Levels and Impacts Summary) and in Section 3.13 of the Draft IS/MND, the total Project noise level would be 52 decimals, and includes contributions from both on-site operational noise sources associated with the Rail Shops and Yard, as well as automobile and truck traffic in and out of the site. Therefore, impacts would be less than significant. Refer to Comment Response 2 regarding impacts related to aesthetics and visual quality. The washing bays will be enclosed in the Train Wash Building. As stated in Section 3.19 of the IS/MND, water irrigation would be required for landscape within the Project Site and for train washing activities. In addition, the proposed OCMF would require onsite irrigation that would be tied to an existing recycled water main line located on Ridge Valley. Therefore, impacts would be less than significant. Section 2.3 of the IS/MND states, the Project would install a 115 foot by 115 foot by 5 feet deep underground cistern that would hold approximately 552,254 gallons for retention and capture/reuse. Additionally, Section 3.19 states domestic water requirements are estimated under 250 gallons per minute (gpm) and would require a two to four-inch connection line to an existing 12-inch water main line on Marine Way, which would adequately support the project needs. Therefore, impacts would be less than significant. Section 3.19 of the Draft IS/MND states the Project would require the construction of new underground wastewater pipes, that would tie into existing utilities located on Marine Way. During Project operations, solid waste would be collected by underground pipes that would connect to existing utilities on Marine Way that would transfer wastewater from the Project Site. Therefore, impacts would be less than significant. Tax revenues are not part of the CEQA evaluation.
14	03/14/22	Patty Olvea	averybusymom2@gmail.com 169 Carlow, Irvine CA	It is difficult for me to understand how your report says that there will be just limited environmental impact on the surrounding area. I live in the Travata neighborhood at the at the corner of Ridge Valley and Marine Way. This is a senior community and this project will impact our neighborhood and my life in a few ways. My main concern is sound and traffic. There are concerts, athletic fields, the Great Valley Park, and the water park currently under construction. There is already major traffic jams both on Marine Way and Ridge Valley after athletics are over, especially at the baseball stadium and soccer fields and Great Park and concerts. 2nd Major Concern - Noise especially when I am sleeping. Please do not do this project so close to homes	Refer to Comment Response 1 regarding impacts to noise and traffic.
15	03/14/22	Adly Fam	afam1946@yahoo.com 129 Palencia, Irvine CA	-Can liquids (washing, spilled fuel - - etc) leach in in the ground and get to the basin inside travata in the Palencia area? -Would the existence of this facility reduce the price of our homes. -Polution from fuels, cleaning liquids and process, sanding, welding, increased traffic - - How is this polution be measured and controlled. Did the Irvine Co. now the intended use of this land as a maintenance facility? When was your intended use communicated to the Irvine Co. or the City of Irvine?	Refer to Comment Response 14 regarding impacts to wastewater. Economic analysis is not required per CEQA Guidelines. Refer to Comment Response 9 regarding impacts related diesel particulate matter. Section 3.9 of the IS/MND states construction and operation of the Project Site would require the routine handling and storage of petroleum products and hazardous materials. Wastes, including used oils and hazardous wastes generated from the Project Site, would be properly managed, transported and disposed per regulatory standards specified under the CCR Title 22 Division 4.5. Additionally, operations of the Project include the routine handling and use of petroleum products and hazardous materials that could leak or spill if equipment such as tanks is damaged from a seismic event, fire, or other unforeseen incident. The Project would construct a Material Storage Building that would store hazardous materials and batteries. To minimize potential impacts, the design of the Project provides containment and/or diversionary structures or equipment to prevent illicit discharge of an oil or hazardous materials spill. Therefore, operational impacts that would create a significant hazard to the public or environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment would be less than significant. Refer to Comment Response 1 regarding impacts related to traffic. Refer to Comment Response 1 regarding concern over disclosure of project.
16-1	03/15/22	Kelvin Loh	loh.kelvin@gmail.com 104 Palencia, Irvine CA	To: OCTA (OCMF@OCTA.net), Mayor Farrah Khan (farrahkhan@cityofirvine.org), Vice Mayor Anthony Kuo (anthonykuo@cityofirvine.org, Councilmember Larry Agran (larryagran@cityofirvine.org), Councilmember Tammy Kim (tammykim@cityofirvine.org), Councilmember Mike Carroll (mikecarroll@cityofirvine.org) MY COMMENTS TO THE MITIGATED NEGATIVE DECLARATION ('MND') ISSUED TO OCTA FOR THE METROLINK RAIL YARD 1. ZONING: a. The train yard is classed as an 'institutional' land use, the same categorization as for a school or church. By its' own admission, the use of 'heavy duty equipment such as cranes and forklifts' along with the use of industrial chemicals and processes should class the yard as heavy industry, a non-permitted use at the proposed site. 2. NOISE: a. No actual measurements of noise levels at existing Metrolink train yards were provided, only estimates were used. b. Measurements of sound levels at the site were taken at a time when there are no trains stopping or leaving the site. Trains were only passing by and yet caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment use in the train yard into consideration. c. City of Irvine Municipal Code Noise Ordinance does not have an upper limit for construction noise as those activities are considered temporary. However, the rail yard is expected to be under construction for 4.5 years, ie not temporary. The predicted noise levels during construction are expected to be at or in excess of the highest exterior noise levels allowed for residential areas in the City of Irvine. 3. AESTHETICS: a. The MND states that there will be no impact on the views of hills to southwest when the train yard plans call for a 5 story structure in the middle of the yard not to mention 4 permanent cranes (how tall?). Travata's view of the hills to the southwest (Quail Hill and Shady/Bommer Canyon) will certainly be negatively impacted. The report is deliberately misleading as neither of the photos provided show the hill formations which are generally very visible. 4. LIGHTING: a. Nighttime lighting would certainly impact residents' views over the site contrary to the report. (pg 33, 3.1.3.4.) We have to assume that the 4 cranes of unknown height will be well lit 24/7. b. MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true as the rail yard is to the right of the Great Park and field lighting is quite a distance from our homes. 5. AIR QUALITY: Noise and air quality impacts are likely the most important. Everyone should read pages 40 and 55-56 that I have attached, as those discuss the health risks from trains and train yards and are very impactful. Also attached is a contour map of the 30-year residential cancer risk. a. The MND notes that rail yard activities produce high levels of diesel particulates. Trains are a major contributor of toxic air contaminants along with construction equipment and ships. The report states that 'diesel particulate matter continues to account for about two-thirds of the cancer risk from air toxins'. b. The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.) The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the rail yard was located along Sand Canyon.	Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to noise and air quality. Refer to Comment Response 2 regarding impacts related to lighting and visual quality. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter.
16-2	03/15/22	Kelvin Loh	loh.kelvin@gmail.com 104 Palencia, Irvine CA	c. MND notes that the EPA is attempting to reduce locomotive diesel emissions by as much as 90% but has no idea as to where Metrolink's fleet lies at present. d. The methodology used throughout the MND report may not be applicable to the proposed site's size and thus the results provided may need further clarification from an air dispersion analysis. e. The diesel fumes caused by trains is likely one of the primary reasons for locating train stations in commercial and industrial areas and not near residences. The proposed train yard site is far closer to residential areas than any Metrolink station. 6. TRAFFIC: a. Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise fire tragedy. 7. MANDATORY FINDINGS OF SIGNIFICANCE: a. The project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impact on air quality, noise, light, aesthetic and traffic effects as discussed herein. These impacts cannot be mitigated to make the rail yard project feasible at its' current location. Its' original Sand Canyon location was .5 miles from Travata and the rest of Cypress Village residents and as such was feasible. The new location at 500 – 650 feet from Travata is not feasible and the negative impacts are unable to be mitigated successfully. Submitted by Kelvin Loh 104 Palencia, Irvine, CA 92618 Travata 55+ Community	Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 20 regarding impacts related to the air dispersion analysis. Refer to Comment Response 1 regarding impacts to traffic and Comment Response 11-2 regarding impacts related to fire evacuation. Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.
17	03/15/22	Tim and Nancy Heitkamp	NHeitkamp@msn.com Irvine,CA	Dear Mayor and City employees My husband and I recently purchased a home in the Travata community across from the Great Park. We enjoy living across from the Great Park and utilize the walking paths daily. We recently learned that OCTA plans to build a 24/7 Metrolink maintenance facility with water treatment, (AKA Sewage Treatment) across the street which is of great concern. We came from the area near the 60 freeway in Ontario which has a water (sewage) treatment facility as well as one in Chino on Chino Hills Parkway. The odor that emits from both these facilities is extremely vial. To learn that a water (sewage) treatment facility is going up as well as an OCTA train maintenance facility is quite alarming. This is not an acceptable location being so close to residential property and a park that is utilized year-round by so many families. This park is the highlight of Irvine and Orange County and to greatly downgrade its usefulness and reputation should concern you. Who wants their kids playing sports and smelling human waste?? I beg the City Planners to work with the Community Development Dept. and OCTA to relocate this facility to a more acceptable location. There is property near the RV storage yard, the food bank and abandoned buildings. My understanding is this area of choice was made to keep it away from the concert venue and water park. These entertainment facilities are used seasonally. We in the Travata community use our facility year-round and enjoy being outside in the evenings where the noise, smell, light etc. will negatively impact our quality of life and greatly impact our property value. Sincerely, Tim and Nancy Heitkamp	The Project does not include wastewater treatment, including a sewage treatment plant. Refer to Comment Response 14 regarding impacts to wastewater. Refer to Comment Response 1 regarding relocation of the Project. Refer to Comment Response 1 regarding impacts to noise and Comment Response 2 for impacts related to lighting.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
18-1	03/15/22	Dan and Charlotte Nelson	dannnsk@yahoo.com	Dear Mayor and council members: Our recently constructed Travata community (55 years and over) has been given a major blow by finding out about the plans to build an OCTA train maintenance facility directly across the street from our community. This project was never disclosed to us in the required disclosure documents, prior to purchasing our properties, and we would have never bought our homes in the Travata development if we had known what was being planned. A 24 hour a day train maintenance facility within 500 feet of our community is totally unacceptable. Noise, light, air / ground pollution and its visual presence have the potential to drastically alter the quality of our lives and values of our properties. Our community is made up of senior citizens and this is the wrong project for the proposed location. COMMENTS TO THE MITIGATED NEGATIVE DECLARATION ('MND') ISSUED TO OCTA FOR THE METROLINK RAIL YARD Below are key findings from the 651 page Mitigated Negative Declaration provided by OCTA and the requires comments from residents within the 30-day period ending March 28th: 1. ZONING: The train yard is classed as an 'institutional' land use, the same categorization as for a school or church. By its' own admission, the use of 'heavy duty equipment such as cranes and forklifts' along with the anticipated high levels of diesel emissions and use of industrial chemicals and processes should class the yard as heavy industry, a non-permitted use at the proposed site. 2. AIR QUALITY: Noise and air quality impacts are likely the most concerning. Page 40 from the MND is attached as it clearly discusses the health risks from trains and train yards. a. The MND notes that rail yard activities produce high levels of diesel particulates. Trains are a major contributor of toxic air contaminants along with construction equipment and ships. The report states that 'diesel particulate matter continues to account for about two-thirds of the cancer risk from air toxins'. b. The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the 3. NOISE: a. No actual measurements of noise levels at existing Metrolink train yards were provided, only estimates were used. b. Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowingtrains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment use in the train yard into consideration. c. City of Irvine Municipal Code Noise Ordinance does not have an upper limit for construction noise as those activities are considered temporary. However, the rail yard is expected to be under construction for 4.5 years, ie not temporary. The predicted noise levels during construction are expected to be at or in excess of the highest exterior noise levels allowed for residential areas in the City of Irvine. 4. AESTHETICS: The MND states that there will be no impact on the views of hills to the southwest. Yet the train yard willhave a 5 story structure in the middle of the yard and 4 permanent cranes. Travata's view of the hills to the southwest (Quail Hill and Shady/Bommer Canyon) will certainly be negatively impacted. The report is deliberately misleading as neither of the photos provided show the hill formations which are generally very visible.	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 4 for impacts related to land use and zoning. Refer to Comment Response 1 for impacts related to air quality and noise. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 2 for impacts related to aesthetics and visual quality.
18-2	03/15/22	Dan and Charlotte Nelson	dannnsk@yahoo.com	5. LIGHTING: a. Nighttime lighting would certainly impact residents' views over the site contrary to the report.We have to assume that the train yard and the 4 cranes of unknown height will be well lit 24/7. b. MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true as the rail yard is to the right of the Great Park and field lighting is quite a distance from our homes. 6. TRAFFIC: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise fire tragedy. 7. MANDATORY FINDINGS OF SIGNIFICANCE: The project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impact on air quality, noise, light, aesthetic and traffic as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its' current location. Please do not permit this project. Dan and Charlotte Nelson	Refer to Comment Response 2 regarding impacts related to lighting. Refer to Comment Response 1 regarding impacts to traffic and Comment Response 11-2 regarding impacts related to fire evacuation. Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.
19-1	03/16/22	Sarah Maloof	sarahjmaloof@gmail.com 127 Burgess, Irvine CA	OCTA Project Planners: My name is Sarah Maloof, and I am a homeowner in Travata, the 55+ Senior Community across the street from the proposed site for the new OCTA Metrolink Maintenance Facility in Irvine. I have reviewed the document called The Draft Initial Study/Mitigated Negative Declaration (IS/MND) posted on the OCTA site for the Orange County Maintenance Facility Project (OCMF). I am strongly opposed to the OCMF being located on the site detailed in the IS/MND, and I would would like to provide the following comments: 1. ZONING: The rail yard is classed as an 'institutional' land use, the same categorization as for a school or church. The use of heavy equipment such as cranes and forklifts along with the anticipated high levels of diesel emissions, and use of industrial chemicals and processes should class the yard as heavy industry, a non-permitted use at the proposed site. 2. AIR QUALITY: The IS/MND clearly discusses the negative health risks from air pollutants and odors on sensitive receptors living within close proximity to facilities emitting diesel particulates. I am retired and spend much of my time in my home and around the Travata community. I consider myself a sensitive receptor having battled a mast cell disorder requiring me to carry an EpiPen. I can have allergic reactions to environmental conditions requiring medical assistance. The thought of living so close to a rail maintenance facility performing the functions described in the IS/MND is simply unacceptable. a. The IS/MND notes that rail yard activities produce high levels of diesel particulates. Trains are a major contributor of toxic air contaminants along with construction equipment and ships. The report states that 'diesel particulate matter continues to account for about two-thirds of the cancer risk from air toxins'. b. The operational impacts from the rail yard will be primarily from diesel particulate matter. The IS/MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.). The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the railyard was located along Sand Canyon. c. IS/MND notes that the EPA is attempting to reduce locomotive diesel emissions by as much as 90% but has no idea as to where Metrolink's fleet registers. d. The methodology used throughout the IS/MND report may not be applicable to the proposed site's size and thus the results provided require further clarification from an air dispersion analysis. e. The diesel fumes and noise created by trains is likely one of the primary reasons for locating train stations in commercial and industrial areas and not near residences. The proposed train yard site is far closer to residential areas than any Metrolink station. 3. NOISE: a. No actual measurements of noise levels at existing Metrolink train yards were provided, only estimates were used. b. Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes as well as the sounds from the outside equipment use in the train yard. In addition, the facility will be in operation 24/7 with the majority of activities occurring on the 2nd and 3rd shifts. The impact of any increased noise levels will be greater on the Travata community because of these operating hours. c. City of Irvine Municipal Code Noise Ordinance does not have an upper limit for construction noise as those activities are considered.	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 4 regarding impacts to land use and zoning. Refer to Comment Response 1 for impacts related to air quality and noise. Refer to Comment Response 27 regarding impacts related to diesel fuel and particulate matter. As described in Appendix B, pollutant concentrations were estimated using the American Meteorological Society/U.S. EPA Regulatory Model (AERMOD) dispersion model, consistent with SCAQMD modeling guidance. Advanced coordination or approval of modeling protocols with SCAQMD is not required for projects for which the SCAQMD is not the lead agency. In addition as detailed in SCAQMD's Risk Assessment Procedures for Rules 1401, 1401.1, & 212, SCAQMD modeling staff recommends consultation and a modeling protocol before performing a risk assessment which deviates from SCAQMD's methodology (emphasis added). Although the Project's air dispersion and risk assessment modeling were conducted for the purposes of CEQA environmental documentation and not for the SCAQMD Rules 1401, 1401.1, or 212, the risk assessment modeling was performed consistent with SCAQMD methodology and approval of the modeling protocol from SCAQMD is not required.
19-2	03/16/22	Sarah Maloof	sarahjmaloof@gmail.com 127 Burgess, Irvine CA	4. AESTHETICS: The IS/MND states that there will be no impact on the views of hills to the southwest. Yet the train yard will have a 5 story structure in the middle of the yard and 4 permanent cranes. Travata's view of the hills to the southwest (Quail Hill and Shady/Bommer Canyon) will certainly be negatively impacted. The report is deliberately misleading as neither of the photos provided show the hill formations which are generally very visible. 5. LIGHTING: a. Nighttime lighting would certainly impact residents' views over the site contrary to the report. We have to assume that the train yard and the 4 cranes of unknown height will be well lit 24/7. b. IS/MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true as the rail yard is to the right of the Great Park and field lighting is quite a distance from our homes. 6. TRAFFIC: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise fire tragedy. 7. MANDATORY FINDINGS OF SIGNIFICANCE: The project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impact on air quality, noise, light, aesthetic and traffic as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its current location. One other item I would like to bring to your attention. It was not disclosed to me during the selling/purchasing process that the intended use for the land being proposed as the site for this OCMF project was in fact a Rail Maintenance Yard. If that had been disclosed I would not have purchased my home for the reasons I stated above. It is not clear to me where legal responsibility for this omission lies, but if the OCMF project moves forward on the proposed site I will look to determine who can be held responsible. Sincerely, Sarah Maloof 127 Burgess Irvine, CA 92618	Refer to Comment Response 2 regarding impacts related to lighting, aesthetics and visual quality. Refer to Comment Response 1 regarding impacts related to traffic and Comment Response 11-2 regarding impacts related to fire evacuation. Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly. Refer to Comment Response 1 regarding concern over disclosure of project.
20-1	03/16/22	Melissa and Marilyn Sokolow	1spdwrtr@gmail.com 148 Palencia, Irvine CA	Dear OCTA, My elderly mother and I are residents of the Travata community in Irvine, California. After my father passed away in 2018, we felt that we needed to move from our house in Fountain Valley that we had lived in with him for more than 30 years. We found Travata in Irvine, which we viewed as a peaceful oasis where we were not reminded daily of our loss. My mother and I pooled our life savings to be able to purchase our little oasis, a brand-new house which cost over $1,000,000. We've been happy here since and have found a little peace in our lives. We first became aware of the proposed OCTA Project in the recent past when it was mentioned that literature was distributed to Travata residents concerning this rail yard facility. Before we bought our house, no Lennar sales staff ever mentioned anything about a Metrolink facility being proposed for the future. If this had been disclosed, we wouldn't have purchased our home; it would have been an immediate deal-breaker, at ANY price. We have been in complete pandemic lockdown since March 2020 due to my mother's age and fragility, but we are aware that there have been meetings and discussion about this proposal. Even before we read through the Mitigated Negative Declaration, we were opposed to this facility being built due to a plethora of health-related concerns/pollution concerns connected to this facility and its construction, including air pollution, ground pollution, noise pollution, drastic lighting changes, and all the health risks and damaging consequences stemming from these factors, as well as the anticipation of our property value decreasing. After reading through the Mitigated Negative Declaration, we feel even more strongly that this would destroy our beautiful neighborhood and our quality of life. We are, frankly, appalled after reading this document and, honestly, in disbelief that something like this would even be contemplated so close to a residential community with a beautiful world-famous park right across the street in IRVINE, CA, one of the top-rated cities in America. Several findings from the MND were either inaccurate or extremely concerning: 1) How can the OCTA facility be classified as an institutional land use, the same as a school or church? Clearly, this would be an industrial facility utilizing heavy-duty equipment, dangerous chemicals, and hazardous materials, such as diesel fuel, which incur risk of leaks, spills, and explosions. No educational facility or place of worship is composed of these things. 2) The MND notes that rail yard activities produce high levels of diesel particulates. Trains are a major contributor of toxic air contaminants along with construction equipment. It states that "diesel particulate matter continues to account for about 2/3 of the cancer risk from air toxins." The operational impacts from the OCTA facility would be primarily from diesel particulate matter. The MND says that as of 2005, the Air Resources Board, a federal agency, has recommended a 1,000 foot buffer between residences and rail yards. Travata's closest homes would be within 500 feet of this facility's property line. Quite alarming, to say the least! The diesel fumes and noise created by trains are likely primary reasons for locating train stations in commercial or industrial areas and not near residences. The proposed site for the Metrolink maintenance facility is far closer to residential neighborhoods than any Metrolink station. In addition, the MND itself notes that "some people of the population are especially sensitive to air pollutant emissions and should be given special consideration when evaluating air quality impacts from projects." Residences are considered to be one of these sensitive receptors because individuals can remain within them for 24 hours at a time. "Residential areas are considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to pollutants present. Recreational land uses are considered moderately sensitive to air pollution. Exercise places a high demand on respiratory functions, which can be impaired by air pollution..." Additionally, noticeable air pollution can detract from enjoying recreation. Our immediate area is composed of exactly these two types of sensitive receptor: a senior community and the Great Park.	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 regarding impacts related to noise and air quality. Refer to Comment Response 2 regarding impacts related to lighting, aesthetics and visual quality. Refer to Comment Response 4 regarding impacts to land use and zoning. Refer to Comment Response 16 related to hazardous materials. CEQA Guidelines do not require the analysis of potential economic impacts, including the effects of property values. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
20-2	03/16/22	Melissa and Marilyn Sokolow	1spdwrtr@gmail.com 148 Palencia, Irvine CA	3) As far as potential noise pollution, measurements of sound levels around the site were only taken at a time when trains were simply passing through our area, and yet they caused substantial spikes in noise near Travata. Obviously, once the facility is built and operational, the train noise coming from many trains, sometimes simultaneously, would increase the severity, frequency, and duration of the noise. This is not even taking into consideration the sounds of facility equipment in use, which would only add to the noise pollution. On top of all of this, the planned 4 1/2 years of construction would yield noise levels predicted to be at or in excess of the highest exterior noise levels allowed for residential areas in Irvine. 4) Marine Way, the single-lane road that Travata borders on and the OCTA site would have its employees access from, is already overly crowded with traffic from local residents, Great Park visitors, recycling plant visitors, and soon water park visitors. Presently an inadequate passage for a high volume of vehicles, creating more traffic would turn the situation into a complete nightmare. 5) Contrary to what the MND states, nighttime lighting would certainly impact residents' views over the site. Common sense tells us that the train yard and multiple cranes would be well lit 24/7. In addition, it is incorrect for the MND to state that field lighting at the Great Park obscures our nighttime views anyway. The rail facility would be located to the right of the park, and the field lighting is quite a distance from our homes in Travata. 6) It is stated that there would be no impact on the view of the hills to the southwest even though the facility would have a multi-level structure right in its center along with multiple permanent cranes. Obviously, the view would be impacted in a very negative way. The photos in this section of the MND are very misleading, as they omit the hill formations that are generally visible at any time. In summation, this OCTA project would have major negative environmental impacts on air quality, noise level, traffic, lighting, and aesthetics, which would adversely affect the local residents, including seniors and children, both directly and indirectly. There is NO way to mitigate all of these negative impacts to ensure the safety of and protect the quality of life of our local residents. Clearly, the rail yard project is not feasible at the proposed location. Sincerely, Melissa and Marilyn Sokolow 148 Palencia in Irvine, CA	Refer to Comment Response 1 regarding impacts related to noise and traffic. Refer to Comment Response 2 regarding impacts related to lighting, aesthetics and visual quality.
21	03/17/22	Candice Ho	hocandice3@gmail.com 909-618-6399	Dear Sir and Madam To whom it may concern OCTA (ocmf@octa.net), Donald Wagner, 3rd District Supervisor, OCTA Board of Directors, City Of Irvine, Mayor Farrah Khan, Vice Mayor Anthony Kuo, Councilmember Tammy Kim, Councilmember Mike Carroll, Councilmember Larry Agran, City Manager, Oliver C. Chi, Bill Rodrigues, Principle Planner, Victor Mendes, Asst. Planner I hope the Mayor, Councilmembers, City Manager, City Planners, OC Project Manager and Staffs take our voices into consideration and make the City of Irvine beautiful. The City of Irvine is known to be a beautiful city and safe city to live in. Many people dream about living here because of the well planned and thoughtful development. We applaud to the City Planners and the City Manager for their hard well done work these past years. The City of Irvine has innovation hubs - aerospace, gaming industry, transportation, medical technology, alternative energy - combat climate change while delivering more energy than Earth could use. The Great Park is the one of the largest recreational park in the United States of America with numerous amounts of people that come to use the many amenities offered (i.e personal activities, weekend family hangouts, sports practice/ games) All of these are great for people to live and to work in the City of Irvine. In 2020, I moved to Travata in Irvine because of all the wonderful and amazing things I had heard from friends, family, colleagues, news outlets, and even people from other countries like Korea and Asia. It is seen as the successful wealthy city that all of our friends and family want to move to. With this new Transportation Maintenance Facilities Building being built, I feel heart broken to know my city Irvine has passed this project so close to a senior community home and the Great Park. With the land that Irvine has, I believe moving this building somewhere more remote would be better not only for the city but also for the individuals living near the proposed maintenance building. The City of Irvine Planning Department and the City Manager approved the project for Transportation Maintenance Facilities Building will be built across from the Great Park and the senior housing community Travata. The facility will be located between Ridge Valley and Marine Way around 500 ft from the Great Park and the senior community. This maintenance facility building will cause the City of Irvine: 1) Damage the reputation of the City of Irvine being safe, professional, lovely place to live 2) Ruin the beautiful scenery 3) Ruin the fresh air for outdoor activities and daily living by emitting harmful chemicals into the air 4) Disturb the quietness of our community and area we live in 5) Increase unnecessary traffic in our area 6) Increase the likelihood of health issues caused by the harmful chemicals (especially since there is a senior community near by) and children constantly at the park 7) Decrease the property value and value of homes in surrounding areas like Cypress village 8) Increase the possibility of crime with unknown individuals coming from other counties. Please reconsider this project in consideration for all residents of the City of Irvine, but especially those living near the proposed maintenance facility and younger individuals using the park for after school sports / leisure activities. Thank you for your time and reconsideration. Sincerely, Candice Ho email: hocandice3@gmail.com Cell: 909-618-6399	Refer to Comment Response 1 regarding relocation of the Project. Refer to Comment Response 1 for impacts related to noise, air quality, and traffic. Refer to Comment Response 4 for impacts related to hazardous materials. Section 3.15 of the Draft IS/MND states the Irvine Police Department – Spectrum Substation would be the principal service provider to meet the additional police service needs at the Project Site. Furthermore, the Irvine Police Department headquarters, as well as the nearby Irvine Valley College Police Department and Cal State Fullerton Police Department, would be available for situations when the aforementioned resources have been exhausted. It is anticipated that the capacity of police service is sufficient for the Project Site through coordination of three police departments. Refer to Comment Response 2 regarding impacts related to aesthetics and visual quality. CEQA Guidelines do not require the analysis of potential economic impacts, including the effects of property values.
22	03/17/22	Michelle Zamora	michellezamora4@gmail.com	I'm writing this email on behalf of my parents, Jerry and Isabel Zamora, to express my concern with the proposed OCTA Maintenance Facility Project to be located off Ridge Valley. This facility would be located near the Travata 55+ community where they reside. Based on the information available, it appears an Environmental Impact Review was not completed to determine the potential impact this facility would have on the surrounding communities, which consists of residences and the Great Park. You must be aware of the population density in the area due to the many communities that have been built and the popularity of the Great Park. The people who purchased homes in the Travata 55+ community, like my parents, planned for this to be their final home as they enjoy their retirement years. Based on my observations of the Travata residents, a majority of this community would be deemed the most vulnerable health wise due to their ages, which includes my parents who are both 78 years old. I'm concerned my parents' health and quality of life may be impacted if this facility is built based on the information I've read on the OCTA website. One concerning factor is the possible air pollution resulting from the facility being used for fueling and cleaning the cars. This possible pollution would negatively impact my father's health as he has issues with his respiratory system. I have enjoyed visiting with my parents at their home and have witnessed other families enjoying their time with their loved ones who reside at Travata too. It would be a shame if this facility created an environment that could negatively impact the health of so many people and all that needed to be done to prevent the situation was an Environmental Impact Review. And it would also cause great distress if the facility created an environment that would force residents to move at this stage of their lives. The OCTA website states "The Orange County Maintenance Facility (OCMF), to be constructed off of Ridge Valley in Irvine, California, will include train storage tracks, locomotive and car service platforms, and a service building with overhead cranes. Service platforms will include facilities for inspection, fueling and sanding, and interior and exterior car cleaning. Additional facility components will include office space for crews and facility staff, parts storage and management, water treatment, parking access roads, and security." The website description alone creates concerns that need to be addressed. Noise Pollution - Trains coming and going, being moved for storage, overhead cranes, car service process, hours of operation Air Quality – Fueling, sanding, cleaning of cars, water treatment Water Pollution – Water treatment process Traffic Safety – The street the proposed site is located off of is already busy due to the current surrounding communities and the public going to the Great Park and the Five Point Amphitheatre events. The potential impact to the residents surrounding this project needs to be taken into consideration. OCTA must do their due diligence by conducting a thorough Environmental Impact Review to determine if the proposed site is appropriate for this type of facility. And, it is the responsibility of the Irvine City Council to request and review all pertinent data before making any decisions on this project to ensure they are making decisions in the best interest of their constituents. I appreciate your time and consideration on this matter. Michelle Zamora	Refer to Comment Response 1 regarding impacts to noise, air quality and traffic. Refer to Comment Response 14 for impacts related to water quality and wastewater.
23	03/17/22	Henrietta Ly and Roger Chiu	henrily28@gmail.com 425-239-2906	OCTA (ocmf@octa.net) Donald Wagner, 3rd District Supervisor, OCTA Board of Directors, City Of Irvine, Mayor Farrah Khan, Vice Mayor Anthony Kuo, Councilmember Tammy Kim, Councilmember Mike Carroll, Councilmember Larry Agran Bill Rodrigues, Principle Planner, Victor Mendes, Asst. Planner To all above-named parties, We moved to Irvine from Washington state almost three years ago because we've heard a lot of good things about Irvine, how it's safe, and how the city planners had long term vision while developing this city. We love the Great Parks and all the green around us. When we heard that OCTA is planning to build a rail maintenance facility next to the Great Park sports fields where our future generations are using constantly, it's such a disappointment that our City officials are even considering the proposal. We're sure you've heard a lot of opposing voices and seen a lot of opposing emails. There are a lot of valid reasons such as toxic waste, noises, traffic congestion on Marine Way which is a one lane road etc... During the 2020 fire evacuation, the traffic was so bad on Ridge Valley turning to Marine Way. Being a senior, we were so happy to be able to reside in the Travata 55+ community, next to the Great Park with a view of the open space around us. It's such a warm and caring community. We don't want the building of the rail yard to destroy it. You may not know that it's a challenge for seniors to fall asleep at night. Can you imagine falling asleep and being woken up by the rail yard maintenance work? We know a resident who didn't want to buy the house close to the freeway because the noise bothered them. We've attached an article to show you the dangerous consequences of sleep deprivation on seniors which includes problems staying focused, lowered immunity, increased risk of emotional illness, decreased cognitive functioning and various physical effects. https://www.homecareassistancescottsdale.com/dangers-of-sleep-deprivation-for-seniors/ BTW, We've already heard an increase of train whistles lately. The first year we moved here, we didn't even know that the train passed by us. Please do not even consider the proposal from OCTA. KEEP IRVINE BEAUTIFUL Thank you, Henrietta Ly Roger Chiu henrily28@gmail.com rogerchiu28@gmail.com (425)239-2906	Refer to Comment Response 1 regarding impacts related to noise and traffic. Refer to Comment Response 2 regarding impacts related to aesthetics and visual quality. Refer to Section 3.13 as well as Appendix F Noise Technical Memorandum regarding anticipated noise levels. Opposition of the Project has been noted and will be considered by OCTA.
24	03/17/22	Izzy Zamora	izzezam@gmail.com 169 Palencia, Irvine CA	My husband and I are 78 yrs old, and have a great concern on OCTA Metrolink Maintenance Yard. This Train Yard is too close to our Senior Community, Great Park and other Family Communities. The City of Irvine and their elected officials are suppose to protect the citizens in Irvine. We are asking that you really look at how this Project will affect the air quality,health and quality of life for Seniors and Families near this Train Yard. Please look at what I have listed below and how these issues will have an impact on our lives. I'm sure you are well aware of these issues. 1. Zoning is classified as institutional land use, not industrial. 2. Human waste will be emptied from trains. 3. Storing and use of fuel,chemicals and solvents which will be used for trains. 4. Grinding of certain train parts which will cause metal dust to be released into the air. 5. Yard will be operating 24/7, which means more noise from trains and trucks coming in and out of yard. 6. Yard lights on 24/7. 7. More trucks and traffic which will create more potholes on the streets. 8. There are no safe levels of bad air emissions and odors. 9. This area has several windy periods, which will blow more toxic fumes and odors into our communities. I'm sure, you would not like your parents or families living so close to this maintenance yard. This type of project should not be close to any residential area. Thank you, and we really hope you are listening to our concerns. Jerry & Isabel Zamora 169 Palencia Irvine, Ca Sent from my iPad	Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 14 regarding impacts related to water quality and wastewater. Refer to Comment Response 1 regarding impacts related to air quality, noise and traffic. Refer to Comment Response 2 regarding impacts related to lighting.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
25-1	03/18/22	Bonnie Liu	bonniepangliu@gmail.com	Hello, I am writing to strongly ask that the OCTA rail yard not be relocated so that it is not near Travata Community residents and Great Park users. The negative impacts to our health and well-being cannot be sufficiently mitigated. The following points emphasize the hazards of having the rail yard so close to our community: ZONING: The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park visitors. AIR QUALITY: The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.) The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the rail yard was located along Sand Canyon. At the proposed site, the MND estimates an increased cancer risk for the community of Travata. At a minimum, this finding alone should indicate that a more rigorous study of the negative impacts on nearby residents and park users be undertaken. NOISE: Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment used in the train yard into consideration. TRAFFIC: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy. HAZARDOUS MATERIALS: The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. This is a dangerous facility to be located anywhere near to such a busy area and one that already suffers from congested roadways. LIGHTING: Nighttime lighting would certainly impact residents' views over the site contrary to the report. As 80% of the train yard's operations will be during the overnight hours, all of the cranes and surrounding area will need to be well lit and quite visible from a large segment of Travata's residences along Marine Wayand Ridge Valley. Any resident trying to sleep in the upstairs rooms will definitely look out onto the train yard and will be impacted by the lighting. The MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true. The sports fields at the Great Park are only lit until 10pm.	Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to air quality, noise and traffic, and Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 2 regarding impacts related to lighting.
25-2	03/18/22	Bonnie Liu	bonniepangliu@gmail.com	CONCLUSION: The rail yard project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impacts on air quality, noise, hazardous materials and traffic as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its' current location. At a minimum, we urge the City of Irvine to require that OCTA prepare a more rigorous Environmental Impact Study. We believe that this study will prove that this rail yard does not belong in the Great Park neighborhood and needs to be relocated away from residents and park visitors. Thank you for listening to our concerns. Sincerely, Bonnie Liu	Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.
26-1	03/18/22	Bob Onufer	onuferbob@gmail.com	Dear OCTA, Please find attached comments on the Draft Initial Study/Mitigated Negative Declaration (MND) for the proposed Metrolink Orange County Maintenance Facility Project. The comments demonstrate that the MND is deficient and not the appropriate document for a project with the potential for significant environmental effects such as this one. As the Lead Agency for this project, the Orange County Transportation Authority should withdraw the MND and prepare an Environmental Impact Report (EIR) for the subject project. In addition to being a resident of the Travata Community, a community that will be significantly and irreparably harmed should this project go forward, I am an environmental engineer with more than forty years of experience with a primary focus on air quality. I am currently an independent consultant involved in the permitting, emissions reporting, and document preparation for clients in the western United States with an emphasis on the South Coast Air Quality Management District (SCAQMD) jurisdiction. I have been certified as an expert witness and have testified to the interpretation and application of SCAQMD regulations in Orange County Superior Court. I have also testified more than two dozen times before air district hearing boards throughout California, most recently before the SCAQMD Hearing Board in February 2022. Prior to becoming an independent consultant, I was responsible for the air quality compliance of all facilities owned and operated by Kinder Morgan throughout the western United States including western Texas, Arizona, Nevada, California, Oregon, and Washington. I have prepared or been responsible for numerous CEQA projects including those requiring MNDs as well as EIRs. I have performed all the calculations listed in the air quality portion of the MND at one time or another including dispersion modeling with AERMOD, HARP modeling for risk, LST analyses, tank modeling, and utilizing CalEEMod for construction and ancillary emission estimates. The attached comments are based on my years of experience preparing and reviewing CEQA documents along with my experience working with the SCAQMD for more than 20 years. In my expert opinion the MND is flawed and should be replaced with an EIR. Should you wish to discuss the comments, I can be reached at (949) 606-3088 or by email. Best regards, Bob Onufer	Comment includes introductory remarks and states the MND is deficient, and requests an Environmental Impact Report (EIR) be prepared. This has been noted and will be considered by OCTA.
26-2	03/18/22	Bob Onufer	onuferbob@gmail.com	SUMMARY: The Project Proponent (Proponent) has prepared a draft Initial Study/Mitigated Negative Declaration (MND) for the Metrolink Orange County Maintenance Facility Project. The MND is not the appropriate form the CEQA document should take for a variety of reasons outlined herein. The more appropriate form is an Environmental Impact Report (EIR) as the Proponent has not adequately demonstrated that the project is less than significant even accounting for the proposed mitigation measure outlined in the MND. The Proponent has prepared the MND using assumptions which lead to the conclusion that the project impacts are less than significant. However, as presented in these comments, there are equally scientifically valid assumptions that will readily demonstrate the project has significant environmental effects. In some cases, data presented in the MND shows impacts just below significant (e.g., the MEIR significance threshold is 10 and the MEIR presented is 9.25). In other cases, the Proponent has dismissed emissions in a sentence, taking, what we believe, an unacceptable approach to these emissions. The MND also makes unsupported statements, uses assumptions that result in less than maximum impacts, and either omits or incorrectly calculates emissions for a number of sources. CEQA GUIDELINES: CEQA guidelines require that a three step process be used to determine the appropriate document type as contained in the following section: 15002 GENERAL CONCEPTS (k) Three Step Process An agency will normally take up to three separate steps in deciding which document to prepare for a project subject to CEQA. (1) In the first step the Lead Agency examines the project to determine whether the project is subject to CEQA at all. If the project is exempt, the process does not need to proceed any farther. The agency may prepare a Notice of Exemption. (See: Sections 15061 and 15062.) (2) If the project is not exempt, the Lead Agency takes the second step and conducts an Initial Study (Section 15063) to determine whether the project may have a significant effect on the environment. If the Initial Study shows that there is no substantial evidence that the project may have a significant effect, the Lead Agency prepares a Negative Declaration. (See: Sections 15070 et seq.) (3) If the Initial Study shows that the project may have a significant effect, the Lead Agency takes the third step and prepares an EIR. (See: Sections 15080 et seq.)	This comment summarizes the specific comments outlined in the letter; please refer to responses to comments 26-3 through 26-7. As described in Section 3.3, Air Quality, impacts would be less than significant with mitigation. As described in Section 3.8, Greenhouse Gas Emissions, impacts would be less than significant. Therefore, from an air quality and greenhouse gas emissions standpoint, the Project would not create significant environmental effects and an EIR is not required. This comment also quotes Section 15002(k) of the CEQA Guidelines; no response is required.
26-3	03/18/22	Bob Onufer	onuferbob@gmail.com	While Section 15064(f)(2) of the guidelines allows a Proponent to mitigate the effects to the point where they are no longer significant, Section 15064(g) states that when there is substantial evidence there may be a significant impact on the environment coupled with a disagreement over the significance of the effect, the Proponent will treat the effect as significant and prepare an EIR. This process has been upheld in the courts (see No. Oil Inc. v. City of Los Angeles (1974) 13 Cal.3d 68). These guidelines are quoted as follows: 15064 DETERMINING THE SIGNIFICANCE OF THE ENVIRONMENTAL EFFECTS CAUSED BY A PROJECT (f) The decision as to whether a project may have one or more significant effects shall be based on substantial evidence in the record of the lead agency. (1) If the lead agency determines there is substantial evidence in the record that the project may have a significant effect on the environment, the lead agency shall prepare an EIR (Friends of B Street v. City of Hayward (1980) 106 Cal.App.3d 988). Said another way, if a lead agency is presented with a fair argument that a project may have a significant effect on the environment, the lead agency shall prepare an EIR even though it may also be presented with other substantial evidence that the project will not have a significant effect (No Oil, Inc. v. City of Los Angeles (1974) 13 Cal.3d 68). (2) If the lead agency determines there is substantial evidence in the record that the project may have a significant effect on the environment but the lead agency determines that revisions in the project plans or proposals made by, or agreed to by, the applicant would avoid the effects or mitigate the effects to a point where clearly no significant effect on the environment would occur and there is no substantial evidence in light of the whole record before the public agency that the project, as revised, may have a significant effect on the environment then a mitigated negative declaration shall be prepared. (3) If the lead agency determines there is no substantial evidence that the project may have a significant effect on the environment, the lead agency shall prepare a negative declaration (Friends of B Street v. City of Hayward (1980) 106 Cal.App. 3d 988). (4) The existence of public controversy over the environmental effects of a project will not require preparation of an EIR if there is no substantial evidence before the agency that the project may have a significant effect on the environment. (5) Argument, speculation, unsubstantiated opinion or narrative, or evidence that is clearly inaccurate or erroneous, or evidence that is not credible, shall not constitute substantial evidence. Substantial evidence shall include facts, reasonable assumptions predicated upon facts, and expert opinion support by facts. (6) Evidence of economic and social impacts that do not contribute to or are not caused by physical changes in the environment is not substantial evidence that the project may have a significant effect on the environment. (7) The provisions of sections 15162, 15163, and 15164 apply when the project being analyzed is a change to, or further approval for, a project for which an EIR or negative declaration was previously certified or adopted (e.g. a tentative subdivision, conditional use permit). Under case law, the fair argument standard does not apply to determinations of significance pursuant to sections 15162, 15163, and 15164.	Comment describes Section 15064 of CEQA Guidelines and does not identify environmental concerns regarding the Project. The comment has been noted by OCTA. No response is needed.
26-4	03/18/22	Bob Onufer	onuferbob@gmail.com	15064(g) After application of the principles set forth above in Section 15064(f)(g), and in marginal cases where it is not clear whether there is substantial evidence that a project may have a significant effect on the environment, the lead agency shall be guided by the following principle: If there is disagreement among expert opinion supported by facts over the significance of an effect on the environment, the Lead Agency shall treat the effect as significant and shall prepare an EIR. Failure to make a good faith effort: The Proponent did not demonstrate that the MND was, and is, the appropriate form of the document. The MND appears to have been prepared to justify the project as less than significant rather than present objective data to analyze potential effects on the environment. Project Alternatives: The MND does not evaluate project alternatives but rather alternative configurations within a single project site. Differences in the alternatives are trivial and do not address the appropriateness of this site versus other sites. Any economic benefits to the Proponent, City, or other stakeholders should not be considered as part of a more robust alternative site study. An EIR will allow for a thorough study of alternatives along with a no project option. Failure to include South Coast Air Quality Management District (SCAQMD) as a Responsible Agency: The MND spends 148 of its 651 pages addressing air quality and the associated environmental effects. This represents 22.7 percent of the document, yet SCAQMD is not identified as a Responsible Agency. This is, at a minimum, a tremendous oversight. SCAQMD is the premiere air quality agency in the basin and has responsibility for the attainment of air quality standards as well as extensive experience in permitting, toxic emissions, dispersion modeling, and health risk assessment. Consultation with SCAQMD prior to the preparation of the MND would have led valuable insight into the application of the methodologies used and the selection of appropriate parameters and assumptions. The proponent will need to obtain a number of permits from the SCAQMD and, at a minimum, comply with the following rules: • Rule 201 Permit to Construct • Rule 219 Equipment Not Requiring a Written Permit Pursuant to Regulation II (regarding elimination of exemption for equipment subject to New Source Performance Standards (NSPS) or National Emissions Standards for Hazardous Air Pollutants (NESHAPs)) • Rule 463 Organic Liquid Storage • Rule 1113 Architectural Coatings • Rule 1303 Requirements (for New Source Review)	Refer to comment response 26-2 regarding the environmental document prepared for this Project. Comment on the deficiency of the MND and a request to prepare an EIR has been forwarded to OCTA for consideration. Commenter states project alternatives were not evaluated, however, the evaluation of project alternatives is not required under CEQA for an ISMND. As detailed in Response to Comment 26-5, consultation with SCAQMD is not required for projects for which the SCAQMD is not the lead agency. In addition as detailed in SCAQMD's Risk Assessment Procedures for Rules 1401, 1401.1, & 212, SCAQMD modeling staff recommends consultation and a modeling protocol before performing a risk assessment which deviates from SCAQMD's methodology (emphasis added). Although the Project's air dispersion and risk assessment modeling were conducted for the purposes of CEQA environmental documentation and not for the SCAQMD Rules 1401, 1401.1, or 212, the risk assessment modeling was performed consistent with SCAQMD methodology and approval or consultation with SCAQMD is not required. The Project would obtain all applicable SCAQMD permits and comply with all applicable SCAQMD Rules.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
26-5	03/18/22	Bob Onufer	onuferbob@gmail.com	While not technically required to comply with the Leak Detection and Repair (LDAR) and component tagging requirements under Rule 1173, the CEQA document regardless of form must quantify all potential emissions and include these emissions as part of the worst-case day when assessing whether a project has significant effects on the environment. The MND fails to estimate the number and type of components associated with the project. These fugitive emissions need to be quantified in accordance with SCAQMD methodologies (copy attached). SCAQMD Rule 463 requires that permits be obtained for storage tanks with a volume of greater than 19,815 gallons storing organic liquids. The four proposed 30,000 gallon tanks fall into this category. Submittal of applications for these tanks requires compliance with SCAQMD Rule 1303. Rule 1303(a) requires the new source to employ Best Available Control Technology (BACT) or SCAQMD must deny the application. SCAQMD has established the installation of floating roofs as BACT for non-major polluting sources storing organic liquids with a true vapor pressure of less than 11 psia (copy of BACT document attached). The MND fails to address the BACT requirements. In addition to the rule requirements cited above, SCAQMD modelers generally need to approve the methods and parameters used when modeling pollutant dispersion. While the proponent makes a claim as to the appropriateness of its selected parameters, including the selection of meteorological data and receptor grid, it is possible, even likely, that SCAQMD would have a different opinion. The AERMOD model used in the study is a complex model which at times requires the use of data collected onsite. Since no modeling protocol was approved and no consultation with SCAQMD occurred, it is possible that all modeling performed for the MND would be deemed deficient by SCAQMD. A portion of the AERMOD implementation guide outlining the complexity of the modeling is attached. Failure to include all significant emissions: A major defect in the MND is the disregard of operational emissions from on-site operations, including locomotives. While the MND acknowledges the presence of these emissions and claims to utilize them in its Localized Significance Threshold (LST) analysis, it assumes the emissions do not exist for the purposes of comparing emissions with significance levels. Had the MND correctly identified these emissions as being present, the project would be significant for one or more pollutants including Greenhouse Gas emissions. The MND, however, states that these emissions don't "count" because they are currently being emitted elsewhere in the basin. This is an incorrect way to approach these emissions. The appropriate way to treat these emissions is to acknowledge they are real. quantifiable, and significant. If the proponent then wants to mitigate these emissions by offsetting them with reduced emissions elsewhere in the basin, it needs to do so through a legally enforceable, quantifiable, and permanent shutdown of these emissions. As presented in the MND, there is no offsetting emission reduction identified. Further, there is no requirement that any other existing OCTA facility could not operate at full capacity regardless of the operation of the proposed project. Even if the MND did provide an enforceable, pound-for-pound permanent offset, the MND (or more appropriately an EIR) would need to demonstrate the offset is environmentally equivalent. Removing pollutants, especially toxic pollutants such as diesel particulate matter, from a heavy industrial setting and transferring them to a residential setting near sensitive receptors is not environmentally equivalent. Even a pound-for-pound offset is not equivalent on its face if the offsets are coming from the inland portion of the basin. For example, if emission offsets are required for a project within the basin, offsets from the coastal area (which includes the proposed project site) may be used for either coastal or inland projects. However, offsets from inland sites may not be used for coastal area projects.	SCAQMD Rule 1173 is intended to control volatile organic compound (VOC) leaks and releases from components at refineries, chemical plants, lubricating oil and grease re-refiners, marine terminals, oil and gas production facilities, natural gas processing plants and pipeline transfer stations. As the Project is not a refinery, chemical plant, lubricating oil and grease re-refiner, marine terminal, oil and gas production field, natural gas processing plant, or pipeline transfer station, the Project would not be subject to component identification requirements under Rule 1173. As described in Section 3.3.3.2 of the MND, fugitive VOC emissions associated with train fueling and diesel fuel storage were estimated and accounted for in the operational emissions. As described in more detail in Appendix B to the MND, fugitive VOC emissions associated with fueling and fuel storage tanks were estimated using TankESP. TankESP accounts for fugitive VOC emissions associated with tank breathing losses and working losses (evaporative losses that are expelled through the vents on top of the roof of the tank). While the Project may include some valves and connectors, the quantity of such components would be minimal as the components would be limited to train fueling operations, which is negligible compared to facilities such as a refinery or transfer station that are typically operational uses of concern with regard to fugitive emissions. In addition, the fueling operations associated with the Project would only store California Low Sulfur Diesel, which has an aromatic hydrocarbon content, the compounds that affect volatility, of less than 10 percent by volume per CCR Section 2282; thus, resulting in low volatility compared to other fuels. Furthermore, as described in Section 3.3.3.2 of the MND, the operational VOC emissions associated with the Project are approximately 1.5 pounds per day, substantially below the SCAQMD VOC threshold of 55 pounds per day. SCAQMD has provided Guidelines for Fugitive Emissions Calculations (June 2003), available online at; http://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/guidelines-for-fugitive-emissions-calculations.pdf, with default emission factors for facilities subject to Rule 1173. Although this Project is not subject to Rule 1173, the default emission factors for a typical terminal/depot were reviewed. Based on an average of the default emission factors for the various types of sources at a terminal/depot, each source at a typical terminal or depot would result in approximately 0.31 pounds of VOC per day. Therefore, due to the few number of tanks and components associated with the Project and low volatility of diesel fuel, any fugitive emissions from the few additional components associated with the tanks would not generate a substantial source of emissions that would influence the significance findings of the MND. The Project would obtain all applicable SCAQMD permits for the storage tanks and comply with permit conditions, including BACT, as applicable, per SCAQMD Rule 463 and Rule 1303. The CEQA document is not a permit application to the SCAQMD for any project components; thus, BACT and any other SCAQMD permitting requirements are not applicable at this stage of the Project's CEQA environmental documentation. As described in Appendix B, pollutant concentrations were estimated using the American Meteorological Society/U.S. EPA Regulatory Model (AERMOD) dispersion model, consistent with SCAQMD modeling guidance. Advanced coordination or approval of modeling protocols with SCAQMD is not required for projects for which the SCAQMD is not the lead agency. In addition as detailed in SCAQMD's Risk Assessment Procedures for Rules 1401, 1401.1, & 212 (available online at: http://www.aqmd.gov/docs/default-source/permitting/rule-1401-risk-assessment/riskassessproc-v8-1.pdf), SCAQMD modeling staff recommends consultation and a modeling protocol before performing a risk assessment which deviates from SCAQMD's methodology (emphasis added). Although the Project's air dispersion and risk assessment modeling were conducted for the purposes of CEQA environmental documentation and not for the SCAQMD Rules 1401, 1401.1, or 212, the risk assessment modeling was performed consistent with SCAQMD methodology and approval of the modeling protocol from SCAQMD is not required. The analysis was conducted consistent with the AERMOD implementation guide and the project's localized emissions and health risk impacts were found to be less than significant. As described in Section 3.3.3 of the MND, operational activities would include emissions from locomotive operations; heavy-duty equipment used on-site (such as cranes and forklifts); fuel tank emissions; natural gas consumption; and on-road vehicle travel for worker, delivery, and haul trips to and from the site. The commenter incorrectly states that emissions from locomotive operations were not included for comparison to the significance thresholds. Table 3.3-10, Localized Operational Maximum Daily Emissions, summarizes the Project's total operational on-site emissions including locomotive operations and compares the emissions to the SCAQMD localized thresholds of significance. As shown in Table 3.3-10, the Project's on-site operational emissions, including locomotive activity, would not exceed the SCAQMD localized thresholds of significance. Thus, the impacts to the nearby sensitive receptors and surrounding land uses would be less than significant. For the purposes of the regional emissions analysis, based on information provided by OCTA, the Project would not result in an increase in commuter rail service or additional locomotive train travel in the region. Therefore, on a regional emissions basis, the locomotive operations due to the project would not be an increase beyond existing conditions. A maintenance facility located along the SCRRA Orange Subdivision through Orange County, such as the Project, would be the optimal location as it would reduce operating costs by limiting nonrevenue moves to the existing SCRRA storage and maintenance facilities in the cities of Los Angeles and Colton. The Project would provide equipment to inspect, clean, and maintain cars and locomotives on a regular and efficient basis. The storage and maintenance activities that would occur operationally at the OCMF would be a shift in current operations from the existing storage and maintenance facilities to the Project Site and would not be an "offset" as the commenter incorrectly describes. Rather, the activities at the OCMF would not be an increase beyond existing conditions at the regional level since these activities are already occurring at other facilities throughout the region. On the contrary, due to the optimal location of the Project Site, the Project is anticipated to result in reduced locomotive travel in the region and in a reduction in the emissions associated with locomotive travel in the region. It is also anticipated that total regional emissions associated with train idling would decrease at the existing maintenance facilities due to more efficient operations and logistics. Therefore, as described in Section 3.3.3.2, operational impacts would be less than significant and mitigation, including offsets, would not be required. Furthermore, irrespective of regional efficiencies in locomotive travel, the MND also estimated localized emissions and evaluated the impact of siting these emissions, including locomotive emissions, near the surrounding recreational, worker, and residential receptors and determined that impacts would be less than significant (refer to Tables 3.3-13, 3.3-15 and 3.3-16 of the MND).
26-6	03/18/22	Bob Onufer	onuferbob@gmail.com	Failure to use worst-case fleet data: Throughout the MND, the Proponent utilizes the fleet "mix" to develop emissions and perform calculations that inform significance and health risk thresholds. These are not worst-case or maximum day assumptions. Unless there is an enforceable requirement limiting locomotives to a "mix" favoring Tier 4 locomotives, Tier 2 locomotives should be used for emission calculations. This change alone will make the MEIR (currently at 9.25) exceed the significance threshold of 10. It will also result in the LST for PM2.5 exceeding the limit of 2.5 ug/m3. It is reasonable to assume that older locomotives will be relegated to maintenance facility work. There is also no guarantee that Tier 2 locomotives will be completely out-of-service even after 2028 especially with the expected growth of ridership noted in the MND. All calculations should assume Tier 2 engines unless the Proponent agrees to a legally enforceable condition outlawing the use of Tier 2 engines. Failure to analyze emissions using the facility's full potential: The MND does not cite any enforceable limits being placed on the proposed project. Since no limits are being placed on the proposed project, all emissions and environmental effects should be analyzed using the proposed project's maximum capacity. This does not appear to be the case as can be demonstrated using data presented in the MND that appears inconsistent. Page 357 of pdf version of the MND contains the calculations for Locomotive Operational Emissions. This table indicates that locomotives idle for approximately twenty minutes per day and otherwise operate for approximately two hours per day. Based on this locomotive use, the table shows the calculated emissions in lbs/day. To show inconsistencies in the MND report, the fuel usage corresponding to the reported emissions was calculated using the emissions presented for CO2, CH4, and N2O and the corresponding emission factors as cited in the notes provided with the tables. The daily emissions in lbs as presented in the MND are: CO2 – 38,943.59, CH4 – 3.06. and N2O – 0.99. The corresponding emission factors in grams/gallon of fuel as cited in the MND are: CO2 – 10,180, CH4 – 0.8, and N2O – 0.26. Converting to consistent units and calculating the amount of fuel corresponding to the reported emissions results in the following: CO2 – 1738.6 gallons, CH4 – 1736.6 gallons, and N2O – 1728.7 gallons. These results indicate that locomotive usage in line with the emissions used to determine significance in the MND would only require approximately 1730 gallons of diesel per day. Yet, the MND notes that the terminal will use 13,000 gallons of fuel per day on average and four 30,000-gallon storage tanks are planned to accommodate this usage. The difference in fuel requirements versus planned fuel deliveries cannot be attributed to other onsite equipment and the emergency generator since the MND also reports that annual CO2e emissions from onsite equipment is only 98 metric tons equaling 591.9 lbs/day on average, less than 2 percent of the emissions of CO2 alone from locomotive use. The planned fuel delivery is approximately 7.5 times greater than the value used for the locomotive emissions calculations. Should the actual fuel usage approach the fuel deliveries, all environmental effects would exceed significance by wide margins including the MEIR for cancer risk, and the LST thresholds for PM2.5 and NOx. Errors in modeling storage tanks: The proponent models tank emissions using TANKESP, a thirdparty software sold by Trinity Consultants. As third-party software, TANKESP may not have been vetted by SCAQMD and may not be deemed acceptable. Again, an upfront consultation with SCAQMD could have resolved this. E39While the USEPA no longer supports its TANKS Version 4.09d software, reliance on TANKESP may be premature. TANKESP does not contain data for renewable diesel, the commodity cited in the MND. The modeling, therefore, uses diesel as a surrogate for renewable diesel. Had the Proponent consulted with SCAQMD, it would have found out that SCAQMD does not consider these equivalent commodities. The vapor pressure of renewable diesel is two or more times that of traditional diesel used in the model. This discrepancy results in the model significantly underpredicting emissions. When permitting a tank to store diesel, renewable diesel or biodiesel (if envisioned later) each commodity needs to be uniquely permitted and appropriate parameters need to be developed when modeling or using the calculation methods contained in the USEPA AP-42 Chapter 7.1 (copies of the Safety Data Sheets for renewable and biodiesel are attached – see Section 9 for vapor pressure data). Without a daily limit on tank throughput, worst-case emissions must be based on the physical limits of the equipment. This means emissions should be based on a hot August day when all tanks are nearly empty and each receive 30,000 gallons of diesel. During the same day, a minimum of 10,000 gallons is transferred to the horizontal tank for fueling. This corresponds to approximately one-third of the monthly working loss emissions occurring on the worst-case day. As presented in the MND, evaporative emissions for the month of August for each of the 30,000-gallon tanks equal 2.868 lbs; working losses equal 3.307 lbs. Doubling the evaporative emissions to account for renewable diesel equals 5.736 lbs. Evaporative emissions are spread out over the entire month (although not quite evenly) and equal approximately 0.2 lbs for the worst-case day. To this are added one-third of the working loss emissions for a worst-case total of approximately 1.3 lbs or 5.2 lbs for the combined four tanks. Emissions from the 10,000-gallon tank need to be added to this total. This itself may not be significant but when to other worst-case numbers, totals may approach significance levels.	As described in Appendix B to the MND, based on information provided by OCTA, the current locomotive fleet mix includes approximately 27 percent Tier 2 engines and approximately 73 percent Tier 4 engines. The commenter incorrectly states that the project's impacts should have analyzed a Tier 2 fleet mix; this would not be an appropriate assumption to analyze the Project's impacts based on the reasonably foreseeable and available data, as OCTA has already made progress towards retiring Tier 2 engines. For example, as detailed in a May 2020 press release by OCTA, Metrolink Locomotives Move toward a Cleaner Future, by summer 2020, Metrolink's projected that approximately 40 locomotives would be Tier 4. SCRRA has committed to an all-Tier 4 locomotive fleet mix by 2028. The use of reasonably forseeable data is supported by CEQA case law, including Smart Rail v. Exposition Metro Line Construction Authority (2013) 57 Cal.4th 439. As described in Section 3.3.3, the Project would not result in an increase in commuter rail service or additional locomotive train travel in the region. Therefore, the locomotive emissions cited by the commenter are emissions associated with on-site locomotive idling operations only and are not representative of the fuel consumption or total emissions associated with regional travel required of the locomotives that would be serviced at the Project site. Converting the locomotive net increase in operational emissions due to on-site activity to fuel use provides only an estimate of fuel consumption associated with such on-site locomotive activity; whereas, the operational fuel throughput of the proposed fuel storage tanks reflects the fuel required of trains being serviced at the proposed OCMF for their regional travel. The commenter provides an incorrect comparison of the on-site fuel use (as estimated using a conversion of the locomotive operational emissions presented in the MND) to the proposed storage tank fuel throughput; however, these are not relevant points of comparison, as these are two distinct operational activities (onsite idling activities versus existing locomotive regional travel). Localized emissions analyses and health risk (e.g., cancer risk) evaluations are focused on the emissions occurring in the vicinity of the surrounding receptors; therefore, the on-site locomotive emissions which were used in the analysis correctly evaluated the impacts to the surrounding sensitive receptors. As presented in Table 3.3-13 for the LST analysis and Table 3.3-15 for excess cancer risks, the Project's operational emissions would not exceed the localized thresholds of significance or cancer risk thresholds and this impact would be less than significant. TankESP, follows the methodology in the latest United States Environmental Protection Agency guidance in AP-42: Compilation of Air Emissions Factors, Chapter 7: Liquid Storage Tanks (June 2020). Therefore, it is an appropriate tool for use in estimating storage tank emissions. Please refer to Response to Comment 26-5 for an explanation that advanced coordination with SCAQMD is not required. The model does not utilize diesel as a surrogate for renewable diesel. The commenter is incorrect in assuming that renewable diesel would be utilized for the Project. Locomotives would be diesel fueled; thus, the storage tanks would store diesel and the diesel-fuel storage tank emissions have been estimated correctly. As described in Section 3.3.3.2, emissions from Project operations, including storage tank emissions, would be less than significant.
26-7	03/18/22	Bob Onufer	onuferbob@gmail.com	Undercounting of fuel truck miles: Consistent with tank usage based on equipment capacity, fuel deliveries must be based on the worst-case day. To accommodate 120,000 gallons of diesel fuel, fifteen truck trips would be required. The MND states that two trips are required. In addition, the MND uses a default mileage of 6.9 for the distance travelled by fuel trucks. This default underpredicts emissions since no fuel terminals are located within 6.9 miles of the proposed project site. The closest fuel terminal to the proposed project site is the Kinder Morgan Terminal located in Orange approximately 12 miles from the proposed project site, the next closest is the Chevron Terminal located approximately 15 miles from the proposed project site in Huntington Beach. It is also possible fuel may need to come even further distances (e.g., Long Beach or the Carson area). Utilizing 15 miles and 15 trips results in 450 miles (for round trips). This is about 13 times greater than the mileage used in the MND. Using EMFAC emission factors (copy attached) results in the following emissions: Pollutant CO NOx ROG SOx PM10 PM2.5 CO2 CH4 Emission Factor (lbs/mile) 0.00457902 0.01031407 0.00090210 0.00004009 0.00052122 0.00039592 4.21 0.0004176 Lbs/day 2.06 4.64 0.40 0.02 0.24 0.18 1896.7 0.19 Use of regulatory compliance as mitigation measure: AQ-1 specified in the MND as mitigation for architectural coating emissions cites compliance with SCAQMD Rule 1113 as a mitigation measure. Compliance with regulation cannot be considered a mitigation measure. MANDATORY FINDINGS OF SIGNIFICANCE: The project creates significant environmental effects that were not appropriately identified in the MND which are supported by the evidence contained in this comment letter. As such, and in accordance with CEQA guidance, the Lead Agency must withdraw the MND and prepare an EIR in accordance with CEQA standards.	The fuel truck trip distance of 6.9 miles is based on California Emissions Estimator Model default data for trip lengths for vendor-type truck trips for the Orange County. CalEEMod is the widely accepted land use tool for estimating emissions; (the model was developed for the California Air Pollution Officers Association (CAPCOA) in collaboration with the California Air Districts. Default data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) have been provided by the various California Air Districts to account for local requirements and conditions). The commenter suggests that there are no fuel terminals located within 6.9 miles of the Project site; rather the closest fuel terminal is approximately 12 miles from the Project site. However, based on the emission estimates associated with staff and truck vehicles presented in Table 3.3-9, Operational Maximum Daily Increase in Regional Emissions, even if the trip distance for the fuel-delivery truck trips were to be doubled, the Project's operational emissions would continue to remain below the SCAQMD thresholds of significance. In addition, the commenter incorrectly states that fifteen truck trips would be required on a worst-case day to accommodate 120,000 gallons of diesel fuel based on the storage tank capacity. It is not reasonable to assume that all fuel delivery would occur in a single day as the facility would not be consuming and replenishing 120,000 gallons of diesel fuel per day. The intent of the CEQA analysis is to analyze the Project using the most reasonably available information, consistent with precedent CEQA case law including Smart Rail v. Exposition Metro Line Construction Authority (2013) 57 Cal.4th 439, which is 2 daily fuel truck trips per day. As described in Section 3.3, MM-AQ-1, Utilize low VOC paint for architectural coating activities during Phase 2 construction, would require that the contractor utilize water-based or low VOC interior and exterior paints. As noted in MM-AQ-1, the VOC content of the architectural coatings shall comply with the VOC content limits in SCAQMD Rule 1113 or not exceed 100 grams per liter, whichever is lower. SCAQMD Rule 1113 includes a table of standards with varying VOC limits based on the coating category. Per SCAQMD Rule 1113, some coating categories have VOC limits ranging from 50 grams per liter to 730 grams per liter for clear shellac coatings. Considering that MM-AQ-1 limits the VOC limits to 100 grams per liter or lower, MM-AQ-1 exceeds the regulatory requirements of SCAQMD Rule 1113. As described in Section 3.3, Air Quality, impacts would be less than significant with mitigation. As described in Section 3.8, Greenhouse Gas Emissions, impacts would be less than significant. As detailed in the responses above, the emissions estimates used to substantiate the air quality and greenhouse gas emissions analyses utilize industry accepted methodology and accurately reflect Project operations; any potential revisions to the inputs, as acknowledged in the responses above, would not change the impact determinations in either Section 3.3, Air Quality, or Section 3.8, Greenhouse Gas Emissions, of the MND. Therefore, from an air quality and greenhouse gas emissions standpoint, the Project would not create significant environmental effects and EIR is not required.
27	03/18/22	Jennifer Fematt	jennifernfematt@gmail.com	To Whom It May Concern, I am writing to express my deep concern and vehement opposition to the proposed OCTA Maintenance Facility in Irvine. I was shocked to receive a distraught call from my grandparents who reside in the nearby Travata 55+ community. They purchased a new construction home from Lenard in December of 2020. I read the available reports online and have many concerns about the negative impact to them personally as well as to the local community. My most immediate concern is for their health. Many seniors are a vulnerable population and as they continue to age, experience increased health issues. There is no way to guarantee chemicals, waste, debris and harmful substances from the proposed nearby facility, despite comments that efforts will be made to mitigate the impact, will not be released into the environment that will undoubtably aggravate or exacerbate existing health conditions and potentially create new health problems or diseases. Would you not have the same concern for yourself or elderly loved ones? Additionally, I am concerned about the negative impact this will have on their property value. Many retired seniors are on reduced incomes and their homes are often their most significant asset. My grandparents personally placed a significant cash down payment when purchasing this property and said if this information was previously disclosed to them, they would not have purchased the property. Being in the real estate business, I have no doubt that, if approved, this facility will reduce the value and desirability of surrounding homes due to noise, light pollution, visible cranes, increased traffic, reduced air quality/contaminated air and living by a construction site for many years. I implore you to reject this proposal and will end with this; Would you want to live by this maintenance facility or have one constructed by your home? Thank you for your time. Jennifer Fematt	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 4 for impacts related to land use and zoning. Refer to Comment Response 1 for impacts related to air quality, noise, and traffic. Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 2 for impacts related to lighting, aesthetics and visual quality. The analysis of impacts to property values is not required by CEQA Guidelines. Opposition of the Project has been noted and will be considered by OCTA.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
28-1	03/18/22	Frank B. Smith	smithfrankb@msn.com 864-640-5869 141 Palencia, Irvine CA	This email is to provide our feedback regarding the proposed OCTA Rail Yard within the Great Park. This facility is completely inconsistent with the Great Park as a focal point for community activities, sport facilities, and an area of quiet tranquility for Irvine's adjacent communities. This is particularly true for our Travata 55 Plus Community which is located within about 500 feet and will suffer from the disruption of its construction, and the ongoing nuisances of greater traffic, noise, light, and environmental pollution, plus other negative consequences for Travata, neighboring communities, and Great Park users. The project should have been rejected before the major investment in planning and design work because it just doesn't fit in this area. In addition, we had an opportunity to meet with OCTA management to explain their project and found them unable to answer questions regarding the design, hazards, risks, and other issues. In my opinion as a retired project manager/ project executive for major petroleum projects worldwide for nearly 40 years, the group we met with had neither the technical background, nor skills and knowledge to be handling a project such as this. The entire Travata Community is unified in opposition to this project being located in the Great Park and particularly within 500 feet of our community. Following are some more detailed and specific points developed amongst our community: ZONING: The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park recreational users. AIR QUALITY: The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.) The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the rail yard was located along Sand Canyon. At the proposed site, the MND estimates an increased cancer risk for the community of Travata. At a minimum, this finding alone should indicate that a more rigorous study of the negative impacts on nearby residents and park users be undertaken. NOISE: Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment used in the train yard into consideration. TRAFFIC: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy.	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 4 for impacts related to land use and zoning. Refer to Comment Response 1 for impacts related to air quality, noise, and traffic, and Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 2 for impacts related to lighting, aesthetics and visual quality. The analysis of impacts to property values is not required by CEQA Guidelines. Opposition of the Project has been noted and will be considered by OCTA.
28-2	03/18/22	Frank B. Smith	smithfrankb@msn.com 864-640-5869 141 Palencia, Irvine CA	HAZARDOUS MATERIALS: The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. This is a dangerous facility to be located anywhere near to such a busy area and one that already suffers from congested roadways. LIGHTING: Nighttime lighting would certainly impact residents' views over the site contrary to the report. As 80% of the train yard's operations will be during the overnight hours, all of the cranes and surrounding area will need to be well lit and quite visible from a large segment of Travata's residences along Marine Way and Ridge Valley. Any resident trying to sleep in the upstairs rooms will definitely look out onto the train yard and will be impacted by the lighting. The MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true. The sports fields at the Great Park are only lit until 10pm. CONCLUSION: The rail yard project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impacts on air quality, noise, hazardous materials and traffic as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its' current location. At a minimum, we urge the City of Irvine to require that OCTA prepare a more rigorous Environmental Impact Study. We believe that this study will prove that this rail yard does not belong in the Great Park neighborhood and needs to be relocated away from residents and park visitors. We would appreciate confirmation from each recipient of this communication and an indication of your position on this matter. Thankyou, Frank and Aileen Smith Travata Community 141 Palencia Irvine, CA92618 Phone 864-640-5869	Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 2 regarding impacts related to lighting and visual quality. Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.
29	03/18/22	Karen Koch	therealkochs@gmail.com	Dear Mayor and Staff: I own a home in the Tristania condo community across from the Great Park. I love living across from the Great Park and I walk there daily. I just learned that OCTA plans to build a 24/7 Metrolink maintenance facility with water treatment, (AKA Sewage Treatment) near my street which concerns me. As you may know, the typical treatment plant is NOT usually pleasant. To learn that a water (sewage) treatment facility is going up as well as an OCTA train maintenance facility is disturbing. This is not a good location being so close to residential property and a park that is used daily by so many children. This park is a TREASURE for Irvine and Orange County. To add a sewage treatment facility and diesel dumping ground here greatly diminishes Irvine and Orange County's reputation. The environmental disaster possibilities are endless!!! Who wants any child playing sports while smelling toxic odors, breathing lead, diesel fumes and other carcinogens?? I ask that the City Planners work with the Community Development Dept. and OCTA to relocate this facility to a more desolate location. I understand this area was chosen to keep it away from the concert venue and water park. This was good; however, we in Cypress Village live here too and breathe the air DAILY. Near our community is NOT a wise choice either. Thank You for Your Consideration, Karen Koch ☺	The Project does not include wastewater treatment, including a sewage treatment plant. Refer to Comment Response 14 regarding impacts to wastewater. Refer to Comment Response 4 regarding impacts related to hazardous materials, and Comment Response 9 regarding impacts related to diesel fuel and particulate matter.
30	03/18/22	Stephanie Liu	stephaniestliu@gmail.com	Good evening, I am writing to urge you to not relocate the OCTA rail yard to be near Travata Community residents and Great Park users. The negative impacts to our health and well-being cannot be sufficiently mitigated. The following points emphasize the hazards of having the rail yard so close to our community: ZONING: The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park visitors. AIR QUALITY: The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.) The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the rail yard was located along Sand Canyon. At the proposed site, the MND estimates an increased cancer risk for the community of Travata. At a minimum, this finding alone should indicate that a more rigorous study of the negative impacts on nearby residents and park users be undertaken. NOISE: Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment used in the train yard into consideration. TRAFFIC: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy. HAZARDOUS MATERIALS: The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. This is a dangerous facility to be located anywhere near to such a busy area and one that already suffers from congested roadways. LIGHTING: Nighttime lighting would certainly impact residents' views over the site contrary to the report. As 80% of the train yard's operations will be during the overnight hours, all of the cranes and surrounding area will need to be well lit and quite visible from a large segment of Travata's residences along Marine Way and Ridge Valley.	Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 1 regarding impacts related to air quality, noise, and traffic, and Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 2 regarding impacts related to lighting.
31	03/19/22	Debbie Noonan	noonansfive@gmail.com	I am writing to convey that I am vehemently opposed to this project's close proximity to our (husband and my) residence at Travata's senior community, neighboring homes, and Great Park. We already have to put up with the noise and traffic of Interstate 5, Highway 133, trains passing by and engaging their whistles, participants using Great Park and FivePoint Amphitheatre, and soon to be open Wild Rivers. We are resigned to this because we knew about this situation when we purchased our home a year ago. But now a rail maintenance facility so close? We do not wish to tolerate the rest of our lives with more noise, traffic, and additional health risks associated with diesel gas storage, sewage disposal, pollutants in the air from grinding train wheels and diesel fuel combustion which is known to contain cancer causing particles. Please put the health of Irvine residents first and require this project to be placed further away from homes and Great Park where there are seniors and growing children! Thank you, Debbie Noonan Noonansfive@gmail.com	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter, and Comment Response 5 regarding impacts related to cancer risk. Refer to Comment Response 16 regarding impacts related to hazardous materials. The Project does not include wastewater treatment, including a sewage treatment plant. Refer to Comment Response 14 regarding impacts to wastewater.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
32	03/19/22	Alex and Kristen Negvesky	negveskyfamily@icloud.com	To Whom It May Concern, My husband and I moved to Irvine from the East Coast because of the quality of life here. For us, part of that Quality of Life has been the clean air and abundance of parks, especially The Great Park. We now enjoy the Farmer's Market and other events at Great Park with our young family. We hope that our children will eventually be playing soccer or tennis or multiple other sports at Great Park as well. We have recently been made aware of a disturbing development—development of an OCTA MetroLink Rail Yard immediately across from the park! This information has not been widely shared throughout the Irvine community and it needs to be…this is a matter for all those that visit/use the park. We have many concerns with this development to include increased traffic, storage of hazardous materials/chemicals, noise; but MOST CONCERNING is the impact on air quality. From what we have read, OCTA has made numerous assumptions regarding their ability to mitigate the particulate matter. It is easy to see/feel that when at Great Park the winds blow from the ocean directly over the proposed location of the rail yard, and into Great Park! These particulates will be inhaled by any of the children and adults who are playing on the fields as well as residents of the nearby residential senior community. There are experts galore in the fine universities within Orange County and nearby locales. Why is there not an independent analysis by any of these experts offered by the OCTA? This heavy industrial operation does not appear appropriate for an area zoned as "institutional use." As Irvine residents, we expect the city of Irvine to place the wellness of the families here as a top priority. Sincerely, Mr. Alex and Dr. Kristen Negvesky	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 regarding impacts related to air quality, noise, and traffic. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter, and Comment Response 5 regarding impacts related to cancer risk. Refer to Comment Response 4 regarding impacts related to land use and zoning. Independent analysis from local universities and locals is not required by CEQA.
33	03/20/22	James Geiger	james.geiger@rcn.com	Dear City and County Officials, PLEASE vote to disapprove the Orange County Transit Authority's request to build a railway maintenance station directly across the street from Great Park and the Travata 55+ community! This horrific proposal would introduce an industrial complex operating 24 hours per day, seven days per week producing diesel contaminants into the air we breathe, non-stop overnight noise from moving trains and planned maintenance activities, and handling of hazardous materials where one mishap would spell disaster for the health of our senior community. As a military veteran with 26 years of active service, I have experienced first-hand the negative effects of continuous 24/7 diesel-fueled tent city and heavy machinery operations in two different forward-deployed conflict zones, further exacerbated by nighttime noise, glaring security lighting, and the ever-present danger of a mishap involving hazardous materials. That is exactly what our senior Travata community will face if this project goes through, a community where many residents are already dealing with a host of debilitating medical issues. For the thousands of families and community members wishing to pursue healthy outdoor recreation activities at the Great Park, they will be met with a blanket of foul air and harmful pollutants every hour of the day and night they plan to use that precious resource. Locating this industrial complex literally across the street from our retirement homes and the treasured community asset of Great Park would be terribly, terribly wrong. For a city that prides itself on being one of the best places to live in this country we all cherish and love, voting to approve this complex in it's currently proposed location would be devastating to every proximal community member valuing their own good health and the quality of life so espoused by Irvine leaders. Again, I implore you, please vote to disapprove the Orange County Transit Authority's request to build a railway maintenance station directly across the street from Great Park and the Travata 55+ community! Very Respectfully, James F. Geiger, Colonel, USAF (ret) Travata resident	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 1 regarding impacts related to air quality and noise. Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter, and Comment Response 5 regarding impacts related to cancer risk. Refer to Comment Response 4 regarding impacts related to land use and zoning.
34-1	03/20/22	Annie Leong	leong.aml@gmail.com 131 Palencia, Irvine CA	March 20, 2022 Dear Mayor and Council Members: I very strongly oppose locating the rail yard in such close proximity to my home in Travata for the following reasons: •TRAFFIC: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy. •NOISE: Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment used in the train yard into consideration. •HAZARDOUS MATERIALS: The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. This is a dangerous facility to be located anywhere near to such a busy area and one that already suffers from congested roadways. •AIR QUALITY: The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.) The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the rail yard was located along Sand Canyon. At the proposed site, the MND estimates an increased cancer risk for the community of Travata. At a minimum, this finding alone should indicate that a more rigorous study of the negative impacts on nearby residents and park users be undertaken. •ZONING: The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park visitors. •LIGHTING: Nighttime lighting would certainly impact residents' views over the site contrary to the report. As 80% of the train yard's operations will be during the overnight hours, all of the cranes and surrounding area will need to be well lit and quite visible from a large segment of Travata's residences along Marine Way and Ridge Valley. Any resident trying to sleep in the upstairs rooms will definitely look out onto the train yard and will be impacted by the lighting. The MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true. The sports fields at the Great Park are only lit until 10pm.	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 1 regarding impacts related to traffic and noise. Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 2 regarding impacts related to lighting.
34-2	03/20/22	Annie Leong	leong.aml@gmail.com 131 Palencia, Irvine CA	CONCLUSION: The rail yard project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impacts on air quality, noise, hazardous materials and traffic as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its' current location. At a minimum, we urge the City of Irvine to require that OCTA prepare a more rigorous Environmental Impact Study. We believe that this study will prove that this rail yard does not belong in the Great Park neighborhood and needs to be relocated away from residents and park visitors.	Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.
35	03/20/22	David and Mee Ro	davidro48@gmail.com 131 Burgess, Irvine CA	Dear Irvine Mayor and Council Members: My wife and I purchased our home In the Travata community(55 years and older senior citizens) across from the Great Park in September 2018. At that time, we gave careful consideration to our neighbors: the 133 and 5 Freeways, the railroad tracks, Cypress Village, the Great Park, and other surrounding communities. We believed that those were acceptable neighbors and would not infringe on our right to peaceful coexistence. We recently learned that OCTA plans to build a 24/7 Metrolink rail yard maintenance facility across Marine Way and Ridge Valley which is appalling. If any of you have traveled the 5 freeways at night over their facility in Oceanside, you will understand my community's alarm at this news. That facility is noisy and well-lit and most importantly, there are no residents anywhere near it, for good reason. And the operation that OCTA is proposing will be even larger combining operations from LA and Riverside as well. We have learned through our research that the Community Development Dept. and the City Planners did not even know that OCTA was considering the site for such an operation until late 2016 when OCTA responded during the public comment period for Travata. At that time this situation should have been discussed and an alternative site chosen. In response to OCTA's environmental report: why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park visitors?(zoning); at the proposed site, the Mitigated Negative Declaration estimates an increased cancer risk for the community of Travata(air quality); once operational, the train noise coupled with slowing trains, whistle, and the noise spikes would cause substantial spikes near senior Travata residents 24H/7D (noise); Marine Way is already well beyond its capacity to handle all users and showed inadequacy for use as an evacuation road during the October 2020 wildfire(traffic); this is a dangerous facility with the storage of petroleum/diesel fuel products and hazardous chemicals(hazardous materials); nighttime lighting would certainly impact residents' views over the site contrary to the report as 80% of the train yard's operation will be during the overnight hours, all of the cranes and surrounding area will need to be well lit and quite visible from a large segment of Travata residences along Marine Way and Ridge Valley. Please note that the sports fields at the Great Park are only lit until 10 pm(lighting). In conclusion, the rail yard project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impacts on zoning concerns, air/ground pollution, noise, hazardous materials, traffic, and potentially drastic alteration of everyone's lives and values of our properties and the surrounding communities as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its current location. At a minimum, we urge the City of Irvine to require that OCTA prepare a more rigorous Environmental Impact Study. Needless to say, this proposed facility is not an acceptable use of land so near to a residential neighborhood especially when there are alternative sites closer to the Metrolink station on Ada and Barranca where there are only park and commercial neighbors. I encourage the City Planners to work with the Community Development Dept. and OCTA to relocate this facility to a more acceptable location. Thank you for your assistance, David & Mee Ro 131 Burgess Irvine, CA 92618 For whoever exalts himself will be humbled, and whoever humbles himself will be exalted. Matthew 23:12	As described in Section 3.3.3 of the IS/MND, the Project would not result in an increase in commuter rail service or additional locomotive train travel in the region. Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 5 regarding impacts related to cancer risk. Refer to Comment Response 1 regarding impacts related to air quality, noise, and traffic, and Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter, and Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 2 regarding impacts related to lighting and visual quality. Refer to Comment Response 1 regarding relocation or alternative site of the Project. Comment on the deficiency of the MND and a request to prepare an EIR has been forwarded to OCTA for consideration.
36-1	03/20/22	Karen Blakeley	karensblakeley@gmail.com 109 Palencia, Irvine CA	My husband and I purchased a home in the Travata community in late 2019. In late 2021, our community learned that OCTA planned to develop a Metrolink Rail Maintenance Facility on 21 acres just across Marine Way from our community. No mention of such a facility was made during the sale process nor in the disclosures made by Lennar when we purchased our home. We subsequently learned that OCTA bought the 21+ acre site in 2015, one year before Cal-Atlantic, now Lennar, submitted a CUP Application to build Travata. OCTA's rail yard project never even came up until OCTA wrote a letter to the Community Development Department during the public comment period reminding the City Planner of its possible development of a rail yard within 500 feet of the southwest corner of Travata. This resulted in the inclusion of a disclosure requirement in the CUP that was not enforced and was ignored by Lennar. This is a grave error on the part of the City of Irvine and Lennar and our community should not have to live with the negative consequences of that mistake. At this time, we find ourselves in the public comment period for the Mitigated Negative Declaration submitted by OCTA in a lame effort to show that the rail yard will not negatively impact Travata residents and surrounding Cypress Village residents and Great Park visitors. For the reasons laid out below, this is a further insult to our community and OCTA should be required to prepare a more rigorous EIR instead of the inaccurate and self-serving MND. COMMENTS TO THE MITIGATED NEGATIVE DECLARATION Zoning: The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park recreational users. This facility belongs in an industrial neighborhood not a residential and recreational one. Noise Impacts: Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment used in the train yard into consideration. Since the majority of the rail yard's operations would be during the overnight hours, Travata residents would be expected to sleep through all this noise. Air Quality: The MND notes that rail yards are one of the highest emitters of diesel particulates and are a major contributor of toxic air contaminants. Trains are also a major contributor of toxic air contaminants along with construction equipment. The report states that 'diesel particulate matter continues to account for about two-thirds of the cancer risk from air toxins' which is a major concern for those living nearby. The MND should have analyzed the dispersion of contaminants at its Los Angeles train yard. Instead it discounts the presence of contaminants such as ozone and particulates and incorrectly applies SCAQMD methodology to the rail yard's risk to nearby residents in Travata and visitors to the Great Park. The MND uses methodology throughout its air quality analysis that, according to the South Coast Air Quality Management District (SCAQMD), is not applicable to a site as large as the proposed Great Park.	Refer to Comment Response 1 regarding concern over disclosure of project. Comment on the deficiency of the MND and a request to prepare an EIR has been forwarded to OCTA for consideration. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to noise and air quality, and Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 5 for impacts related to exposure of cancer risk toxins. Refer to Comment Response 20 regarding the methodology used in accordance with SCAQMD.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
36-2	03/20/22	Karen Blakeley	karensblakeley@gmail.com 109 Palencia, Irvine CA	Traffic: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy. Hazardous Materials: As proposed, the rail yard will have four 30,000 gallon tanks for refueling locomotives. These are to be located very near to the site's property line and thus within 500 or so feet of the Great Park. These tanks not only pose a risk from potential fire but the fumes related to their use is a great concern for residents and Great Park users given the North East wind flow. In addition, the need to refill the tanks will generate a great deal of tanker trips to and from the facility. The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. Aesthetics: The MND states that there will be no impact on the views of hills to the southwest. Yet the train yard will have a 5 story structure in the middle of the yard and 4 permanent cranes. Travata's view of the hills to the southwest (Quail Hill and Shady/Bommer Canyon) will certainly be negatively impacted. The report is deliberately misleading as neither of the photos provided show the hill formations which are quite attractive and very visible. In closing, the negative impacts described above cannot be mitigated to make the rail yard project feasible at its current location. At a minimum, we urge the City of Irvine to require that OCTA prepare a more rigorous Environmental Impact Study. We believe that this study will prove that this rail yard does not belong in the Great Park neighborhood and needs to be relocated away from residents and park visitors at an industrial site. Karen Blakeley 109 Palencia Irvine, CA 92618	Refer to Comment Response 1 regarding impacts related to traffic, and Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 2 regarding impacts related to aesthetics and visual quality.
37	03/20/22	Jack and Maureen Khaw	maureenkhaw1@gmail.com 111 Burgess, Irvine CA	To Whom It May Concern: We (Jack and Maureen) would like OCTA and City of Irvine officials to hear us loud and clear that we do NOT want the OCTA rail yard in Irvine. The negative impacts to our health and well-being cannot be sufficiently mitigated. Here are the concerns: Zoning, Air Quality, Noise, Aesthetics, Lighting, Traffic, Hazardous materials, Great Park users. The project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impacts on air quality, noise, hazardous materials and traffic as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its current location. At a minimum, we urge the City of Irvine to require that OCTA prepare a more rigorous Environmental Impact Study. We believe that this study will prove that this railyard does not belong in Irvine or the Great Park neighborhood and needs to be relocated away from residents and park visitors. Thank you very much, Jack and Maureen 111 Burgess	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 1 regarding impacts related to air quality, noise, and traffic. Refer to Comment Response 2 regarding impacts related to lighting and aesthetics. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 16 regarding impacts related to hazardous materials.
38	03/20/22	Richard Leong	leong.richann@gmail.com 131 Palencia, Irvine CA	March 20, 2022 Dear Mayor and Council Members: I live in travata and very strongly oppose locating the rail yard in such close proximity to my home for the following reasons: •TRAFFIC: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy. •NOISE: Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment used in the train yard into consideration. •HAZARDOUS MATERIALS: The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. This is a dangerous facility to be located anywhere near to such a busy area and one that already suffers from congested roadways. •AIR QUALITY: The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.) The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the rail yard was located along Sand Canyon. At the proposed site, the MND estimates an increased cancer risk for the community of Travata. At a minimum, this finding alone should indicate that a more rigorous study of the negative impacts on nearby residents and park users be undertaken. •ZONING: The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park visitors. •LIGHTING: Nighttime lighting would certainly impact residents' views over the site contrary to the report. As 80% of the train yard's operations will be during the overnight hours, all of the cranes and surrounding area will need to be well lit and quite visible from a large segment of Travata's residences along Marine Way and Ridge Valley. Any resident trying to sleep in the upstairs rooms will definitely look out onto the train yard and will be impacted by the lighting. The MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true. The sports fields at the Great Park are only lit until 10pm. CONCLUSION: The rail yard project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impacts on air quality, noise, hazardous materials and traffic as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its' current location. At a minimum, we urge the City of Irvine to require that OCTA prepare a more rigorous Environmental Impact Study. We believe that this study will prove that this rail yard does not belong in the Great Park neighborhood and needs to be relocated away from residents and park visitors.	Refer to Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 1 regarding impacts related to air quality, noise, and traffic. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 2 regarding impacts related to lighting. Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.
39	03/20/22	Judy Feng	fengqing1204@hotmail.com	To Whom This May Concern, This is email is to express our concerns and opposition to theproposed 24/7 OCTA train/rail yard project in the close proximity to us residents in the Travata Community. Below is a list of our concerns: ZONING: The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park recreational users. TRAFFIC: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy. HAZARDOUS MATERIALS: The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. This is a dangerous facility to be located anywhere near to such a busy area and one that already suffers from congested roadways. LIGHTING: Nighttime lighting would certainly impact residents' views over the site contrary to the report. As 80% of the train yard's operations will be during the overnight hours, all of the cranes and surrounding area will need to be well lit and quite visible from a large segment of Travata's residences along Marine Way and Ridge Valley. Any resident trying to sleep in the upstairs rooms will definitely look out onto the train yard and will be impacted by the lighting. The MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true. The sports fields at the Great Park are only lit until 10pm. In conclusion, the rail yard project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impacts on air quality, noise, hazardous materials and traffic as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its' current location.At a minimum, we urge the City of Irvine to require that OCTA prepare a more rigorous Environmental Impact Study. We believe that this study will prove that this rail yard does not belong in the Great Park neighborhood and needs to be relocated away from residents and park visitors. We appreciate your time of reading this email. Thank you, Judy Feng, Travata Resident	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 2 regarding impacts related to lighting and aesthetics. Refer to Comment Response 1 regarding impacts related to noise and traffic. Comment on the deficiency of the MND and a request to prepare an EIR has been forwarded to OCTA for consideration.
40	03/20/22	Letitia Leung	letitiapharmd@yahoo.com	Hello, We just moved into the Great Park and is aware of its prior "superfunded" status. However, we were not aware or it wasn't disclosed that OCTA will be building a train maintenance facility directly across the street from residential neighborhoods. Noise, light, air/ground pollution from diesel exhaust, storage tanks, etc have the potential to drastically decrease the quality of lives of residents, values of properties, increase health risks, etc. Please vote "NO" on the OCTA rail yard and have it relocate elsewhere. Thank you. Kind Regards, New Homeowner at the Great Park Letitia Leung, PharmD	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 regarding impacts related to noise and air quality, and Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 2 regarding impacts related to lighting. Refer to Comment Response 16 regarding impacts related to hazardous materials. CEQA does not require the analysis of economic impacts, including the analysis of property values. Refer to Comment Response 1 regarding relocation of the Project.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
41-1	03/21/22	Scott Blakeley	seblaekeley11@gmail.com 109 Palencia, Irvine CA	We bought our home in the Travata (55+) community in November 2019. In late 2021, we learned that OCTA planned to build a Metrolink Rail Maintenance Facility across Marine Way from our community, a distance of less than 1,000 feet from our home. No mention of such a facility was ever made during the sale process nor in the disclosures made by Lennar. We learned recently that OCTA bought the 21+ acre site in 2015, a year prior to the submittal by Cal-Atlantic, now Lennar, of an application to build Travata. OCTA's rail yard project never was mentioned during the review process for Travata until OCTA wrote a letter to the City Planner during the public comment period reminding the City Planner of its possible development of a rail yard within 500 feet of the southwestern edge of Travata. This resulted in the inclusion of a disclosure requirement in the CUP that was ignored by Lennar. This is a significant blunder on the part of the City of Irvine and Lennar and Travata residents should not have to live with the negative consequences of that error. We are now in the public comment period for the Mitigated Negative Declaration submitted by OCTA in an attempt to show that the rail yard will not negatively impact Travata residents, surrounding Cypress Village residents and Great Park visitors. For the reasons laid out below, this is a further insult to our community and OCTA should be required to prepare a more rigorous EIR instead of the inaccurate and self-serving MND. Zoning: The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park recreational users. This facility belongs in an industrial neighborhood not a residential and recreational one. Noise Impacts: Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment used in the train yard into consideration. Since the majority of the rail yard's operations would be during the overnight hours, Travata residents would be expected to sleep through all this noise. Air Quality: The MND notes that rail yards are one of the highest emitters of diesel particulates and are a major contributor of toxic air contaminants. Trains are also a major contributor of toxic air contaminants along with construction equipment. The report states that 'diesel particulate matter continues to account for about two-thirds of the cancer risk from air toxins' which is a major concern for those living nearby. The MND should have analyzed the dispersion of contaminants at its Los Angeles train yard. Instead it discounts the presence of contaminants such as ozone and particulates and incorrectly applies SCAQMD methodology to the rail yard's risk to nearby residents in Travata and visitors to the Great Park. The MND uses methodology throughout its air quality analysis that, according to the South Coast Air Quality Management District (SCAQMD), is not applicable to a site as large as the proposed Great Park site. SCAQMD advises instead that an air dispersion analysis be prepared. It appears that, rather than presenting objective data to measure the project's impacts, the MND seems to have been prepared to justify the project. There needs to be a serious analysis of the exposure to sensitive receptors (i.e. residents of Travata) that this rail yard project poses. An EIR would provide a much more rigorous analysis of these risks and is an absolute requirement in this situation. Traffic: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy.	Refer to Comment Response 1 regarding concern over disclosure of project. Comment on the deficiency of the MND and a request to prepare an EIR has been forwarded to OCTA for consideration. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter, and Comment Response 20 regarding the methodology used in accordance with SCAQMD. Refer to Comment Response 11-2 regarding impacts related to fire evacuation.
41-2	03/21/22	Scott Blakeley	seblaekeley11@gmail.com 109 Palencia, Irvine CA	Hazardous Materials: the rail yard will have four 30,000 gallon tanks for refueling locomotives. These are to be located very near to the site's property line and thus within 500 or so feet of the Great Park. These tanks not only pose a risk from potential fire but the fumes related to their use is a great concern for residents and Great Park users given the North East wind flow. In addition, the need to refill the tanks will generate a great deal of tanker trips to and from the facility. The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. Aesthetics: The MND states that there will be no impact on the views of hills to the southwest. Yet the train yard will have a 5 story structure in the middle of the yard and 4 permanent cranes. Travata's view of the hills to the southwest (Quail Hill and Shady/Bommer Canyon) will certainly be negatively impacted. The report is deliberately misleading as neither of the photos provided show the hill formations which are quite attractive and very visible. The negative impacts described above cannot be mitigated to make the rail yard project feasible at its current location. It needs to be relocated to a site that is appropriately zoned for industrial use.	Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 2 regarding impacts related to aesthetics. Refer to Comment Response 4 regarding impacts related to land use and zoning.
42	03/21/22	Kenneth and Annie Lam	lamspl2@yahoo.com	To whom it may concern, This letter is to address our concern regarding the proposed Transportation Maintenance Facility between Ridge Valley and Marine Way in the City of Irvine. As residents of the Travata Community, we are expressing our deepest concern regarding this proposed project being so close to Great Park and residential community. We would like the Planning Department and City Manager to address the basis of approval on the following points. 1. Zoning: Why is the Train Yard, which uses heavy duty equipment, such as cranes and forklifts be allowed in the proposed site. 2. Air Quality: Why is toxic air contaminants from train and construction be allowed so close to Great Park and residences. 3. Noises: No actual measurement of noise level were provided. No consideration of noise impact on close-by residents. 4. Aesthetics: Report deliberately misleading there is no impact on the views of hills to the Southwest. No clear photo of views along Marine Way. 5. Lighting: No concern for nighttime lighting, 24/7 days a week, especially lighting on the 4 tall cranes affecting the residents. 6. Traffic: Disregard already congested traffic along single lane Marine Way. The proposed project will definitely create more traffic jam, and thereby more unavoidable accidents along Great Park neighborhood. 7. Mandatory Finding of Significance: The project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impact on air quality, noise, light, aesthetic and traffic as discussed herein. These negative impacts cannot be mitigated to make the Rail Yard Project feasible at it's current location. Sincerely, Kenneth and Annie Lam	Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to air quality, noise, and traffic. Refer to Comment Response 2 regarding impacts related to lighting and aesthetics. Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.
43	03/21/22	Insoo Chin	insoochin@gmail.com 124 Palencia, Irvine CA	I am proud of living in our beautiful city of Irvine and the unique Great Park nearby but I heard our city is going to consider to approve Railroad Yard which will cause all the problems like pollution, noise, traffic, lights and so on. I don't quite understand why we need this facility and how it is going to be beneficial to our community. It does not make sense. This is only going to deteriorate the quality of life in our wonderful community. I want to live in a peaceful and quiet place like it is now for the rest of my life. I hope you understand the concerns of our community. Best regards Insoo Chin 124 Palencia, Irvine, CA 92618	Refer to Comment Response 1 regarding impacts related to air quality, noise, and traffic. Refer to Comment Response 2 regarding impacts related to lighting.
44	03/21/22	Harry Yessain	hyessain@gmail.com	Dear Sir OCTA railcar maintenance center at Great Park is just a wrong location for Irvine residents. It will affect the Great Park surrounding communities in air quality, noise, lights, traffic jam on Marine Way and potential diesel tank explosion or leaking. For this being a "proposed" project, there sure is much prep work already being done. This was never disclosed to the residents that bought in this community. It needs to be placed elsewhere. Best regards Harry Yessian	Refer to Comment Response 1 regarding impacts related to air quality, noise, and traffic. Refer to Comment Response 2 regarding impacts related to lighting. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter, and Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 1 regarding concern over disclosure of project.
45	03/21/22	Kenneth Lam	lamspl@yahoo.com	This letter is to address our concern regarding the proposed Transportation Maintenance Facility between Ridge Valley and Marine Way in the City of Irvine. As residents of the Travata Community, we are expressing our deepest concern regarding this proposed project being so close to Great Park and residential community. We would like the Planning Department and City Manager to address the basis of approval on the following points. 1. Zoning: Why is the Train Yard, which uses heavy duty equipment, such as cranes and forklifts be allowed in the proposed site. 2. Air Quality: Why is toxic air contaminants from train and construction be allowed so close to Great Park and residences. 3. Noises: No actual measurement of noise level were provided. No consideration of noise impact on close-by residents. 4. Aesthetics: Report deliberately misleading there is no impact on the views of hills to the Southwest. No clear photo of views along Marine Way. 5. Lighting: No concern for nighttime lighting, 24/7 days a week, especially lighting on the 4 tall cranes affecting the residents. 6. Traffic: Disregard already congested traffic along single lane Marine Way. The proposed project will definitely create more traffic jam, and thereby more unavoidable accidents along Great Park neighborhood. 7. Mandatory Finding of Significance: The project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impact on air quality, noise, light, aesthetic and traffic as discussed herein. These negative impacts cannot be mitigated to make the Rail Yard Project feasible at it's current location. Sincerely, Kenneth and Annie Lam	Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to air quality, noise, and traffic. Refer to Comment Response 2 regarding impacts related to lighting and aesthetics. Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
46	03/21/22	Anthony and Tali Halfpenny	thalfpenny34@gmail.com 144 Burgess, Irvine CA	To whom this may concern, As a resident of Travata Community, I wish to vigorously object to the location of a rail yard near the Great Park neighborhood. It is the opinion of my wife and I that the city of Irvine address the negative impacts arising from the proposed situation should be reviewed and a more logical positioning be considered. The proposed site for OCTA rail yard must be relocated so that it is not near residents and Great Park users. The negative impacts to our health and well-being can not be sufficiently mitigated. We urge the City of Irvine to require OCTA to prepare a more rigorous environmental impact study. Items to be considered as follows: 1. Zoning 2. Air Quality 3. Noise 4. Traffic 5. Hazardous Materials 6. Lighting Thank you for your consideration. Anthony and Tali Halfpenny 144 Burgess Irvine, CA 92618	Refer to Comment Response 1 regarding relocation of the Project. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to air quality, noise, and traffic. Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 2 regarding impacts related to lighting.
47	03/22/22	Beth and Bain Patrick	bpatrick8@aol.com 197 Carlow, Irvine CA	Dear Irvine Mayor and Council members: We purchased our home In the Travata community across from the Great Park in May 2021. At that time, we gave careful consideration to our neighbors: the 133 and 5 Freeways, the railroad tracks and the Park. We believed that those were acceptable neighbors and would not infringe on our right to a peaceful coexistence. We recently learned that OCTA plans to build a 24/7 Metrolink maintenance facility across the street which is appalling. If any of you have traveled the 5 freeway at night over their facility in Oceanside, you will understand my community's alarm at this news. That facility is noisy and well-lit and most importantly, there are no residents anywhere near it, for good reason. The operation that OCTA is proposing will be even larger combining operations from LA and Riverside as well. We have learned through our research that the Community Development Dept. and the City Planners did not even know that OCTA was considering the site for such an operation until late 2016 when OCTA responded during the public comment period for Travata. At that time, this situation should have been discussed and an alternative site chosen. Needless to say, this proposed facility is not an acceptable use of land so near to a residential neighborhood especially when there are alternative sites closer to the Metrolink station on Ada and Barranca where there are only park and commercial neighbors. I encourage the City Planners to work with the Community Development Dept. and OCTA to relocate this facility to a more acceptable location. Please vote "NO" to this proposal. Thank you for your assistance. Brian and Beth Patrick 197 Carlow Irvine CA 92618	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 4 regarding impact related to land use and zoning. Refer to Comment Response 1 regarding relocation of the Project.
48-1	03/21/22	Alfred Cheung	alfredcwc@yahoo.com	To: OCTA (ocmf@octa.net), Donald Wagner, 3rd District Supervisor, OCTA Board of Directors, City Of Irvine, Mayor Farrah Khan, Vice Mayor Anthony Kuo, Councilmember Tammy Kim, Councilmember Mike Carroll, Councilmember Larry Agran, Bill Rodrigues, Principle Planner, Victor Mendes, Asst. Planner To all above-named parties: My wife and I moved from the San Francisco Bay area to our new home in Irvine about 1 year ago. We settled in the Travata 55+ adult community for our retirement life due to its tranquil surroundings and close to many health facilities. However our peaceful retirement plan was abruptly interrupted after we learned only a month or 2 ago on the proposal for OCTA to build up the Metrolink Rail Depot at a location only about 500 feet where our Travata community is located. This news is very disturbing as it appears that there is lack of oversight in the proposal without proper scrutiny and sufficient time given to the public on the negative impacts to our daily life. My objections on the proposal on this Metrolink Rail Maintenance Yard are based on many common and specific personal factors. Since many residents in Travata have voiced numerous common concerns to you already and therefore I will focus primarily on my personal concerns in this email: 1.I just found out that I have cancer and thus having proper rest is very important for my proper recovery, in particular a good night sleep without woken up by the loud sound from the rail yard. The operation hours of the rail yard over the entire night, no doubt will not allow me to have a good night sleep with the sound pollution from the rail yard. 2.As I am in rather poorer health, the air pollution emitted from the train, plus additional possibility of other environmental pollutions, like chemical leaks from the storage tanks at the rail yard site. I feel my personal rights to a peaceful and rich retirement life is being taken away from me. I urge OCTA and City of Irvine to consider my personal plight with greater empathy. 3.With spring being here and summer approaching, there will be more frequent uses of the amphitheater at the Great Park which is only a few hundreds feet away from my neighborhood, I can only sleep without being disturbed from the loud sound from the concerts, often times after 10:30pm. This is already a considerable distress to my daily life and now with the proposed rail yard, the noises will carry on even after the concert, the entire night, into 7 days a week, 24 hours a day. This is not acceptable and is not something I look forward towards my retirement. Indeed, it is a nightmare that I would never dreamed of, after hearing of the rail yard proposal. 4.Knowing how important it is for proper rests for the older folks, I would never use my life time savings to buy my dream home in Travata if this proposal was properly disclosed to me a year ago when I purchased my home. Further, the value of this home is supposed to provide me with a quality retirement life, with the reputation of Irvine being one of the top, most livable cities in US. However, this proposal renders my dream broken with very negative financial consequences to my retirement. I again urge all of you to consider the negative implications to many Irvine citizens affected by this rail yard, located at the suggested site. 5.Other than the waste handling from the stored chemicals, fuel and air / sound pollutions, does anyone of you aware of the existing traffic jam on Ridge Valley and Marine Way during the usual busy morning hours and the additional traffic created by this proposal will no doubt causes more traffic bottlenecks. Yet, I have not heard anything from OCTA to rectify these 'guaranteed' problems with sound abatement and additional beautification measures, to 'hide' these unsightly OCTA rail yard buildings, which are higher than the surrounding buildings. Why is this allowed and permissions given to OCTA? 6.The additional sound, dust and traffic will also be created during the construction phase if indeed the proposal is allowed to go ahead. I urge the Irvine City Council to disapprove this OCTA proposal , as it is not complementary to the Great Park surroundings.	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter, and Comment Response 16 regarding impacts related to hazardous materials.
48-2	03/21/22	Alfred Cheung	alfredcwc@yahoo.com	In summary, it appears to me that OCTA is rushing to have this proposal approved but without proper disclosures, independent environment impact studies and public review period, so that the voices of the citizens affected by this proposal can be heard. I am making my plea to the Irvine City Council to disapprove and not consider this OCTA proposal as this does NOT serve the public interests for Irvine, in particular to the residents of Travata. I want to live even when inflicted with my 'killing' cancer and possibly additional health risks to me with the erection of this rail yard and I want to keep Irvine beautiful. I do NOT want to see this OCTA proposal considered at all at the current proposed site. Thank you for listening to my plight.	The comment has been noted and will be considered by OCTA.
49	03/22/22	Raymond and Dianne Wong	rswong@verizon.net 626-590-6608 167 Burgess, Irvine CA	This email is to provide our feedback regarding the proposed OCTA Orange County Maintenance Facility within the Great Park. This property is not zoned for this type of facility. Planning Area 51 is zoned for 6.1 institutional and a conditional use permit SHOULD NOT BE granted or even considered. Area 51 is designated as Lifelong Learning District. Area 51 allow for a mix of residential, commercial, and educational uses that promotes and supports a synergistic live/learn/work/play environment. If the conditional use permit is approved, the project should be scaled back to minimize impact on the Great Park and surrounding community. There should also be a Noise Abatement Plan imposed to limit operations between the bedtime hours of 11pm to 7am - much like the General Aviation Noise Ordinance (GANO) at the John Wayne Airport. Even the 5-points amphitheater limits noise after 10pm. This will ensure the health and well-being of residents and visitors to the Great Park. Key Points for Concern This facility is completely inconsistent with the Great Park as a focal point for community activities, sport facilities, and an area of quiet tranquility for Irvine's adjacent communities. This is particularly true for our Travata 55 Plus Community which is located within about 500 feet and will suffer from the disruption of its construction, and the ongoing nuisances of greater traffic, noise, light, and environmental pollution, plus other negative consequences for Travata, neighboring communities, and Great Park users. The project should have been rejected before the major investment in planning and design work because it just doesn't fit in this area. In addition, we had an opportunity to meet with OCTA management to explain their project and found them unable to answer questions regarding the design, hazards, risks, and other issues. In the EPA document "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (March 1974), the long-term health and welfare on an individual are related to cumulative noise exposure received. The Travata Community of sensitive seniors will be exposed to excessive noise 24/7. The noise at the OCMF will start after 9pm when trains are taken off-service entering the facility, sanding and maintenance of trains from 9-4am, and beginning at 4am trains leaving the station for going on service. The entire Travata Community is unified in opposition to this project being located in the Great Park and particularly within 500 feet of our community. Following are some more detailed and specific points developed amongst our community: ZONING: The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park recreational users. AIR QUALITY: The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.) The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the rail yard was located along Sand Canyon. At the proposed site, the MND estimates an increased cancer risk for the community of Travata. At a minimum, this finding alone should indicate that a more rigorous study of the negative impacts on nearby residents.	Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related noise, air quality, and traffic. Refer to Comment Response 2 regarding impacts related to lighting. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter, and Comment Response 5 regarding impacts related to the exposure of toxins and cancer risk. Opposition of the Project has been noted and will be considered by OCTA.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
50	03/23/22	Joseph Toma	joetoma@me.com 135 Palencia, Irvine CA	To Whom it may concern, Please find attached our concerns about the OCTA Maintenance Facility Project. Regards, Joe Toma Orange County Transportation Authority Attn: Lora Cross, Project Manager ocmf@octa.net Re: Comment and Objection to Orange County Transportation Authority's Draft Initial Study/Mitigated Negative Declaration for the Metrolink Orange County Maintenance Facility Project To Whom It May Concern: We are opposed to the proposed Metrolink Orange County Maintenance Facility Project. OCTA is proposing to put this 24-hour heavy industrial maintenance facility use in an institutional zone a few feet away from our residential community. The defects of this ill-advised project are numerous. OCTA's Draft Initial Study/Mitigated Negative Declaration ignores the significant impacts to the existing residential community. It ignores specific impacts to the project site and the surrounding community. It improperly defers analysis. OCTA has not adequately analyzed the environmental issues and the impact to the residential homes just across the street. Further analysis and a full Environmental Impact Report should be prepared to consider: □ The noise impacts from the 24-hour operation of the proposed heavy industrial Metrolink maintenance facility. □ The traffic impacts from the 24-hour operation of the proposed heavy industrial Metrolink maintenance facility. □ The impacts caused by the use of and storage of hazardous materials at the proposed heavy industrial Metrolink maintenance facility. □ The air quality impacts from the 24-hour operation of the proposed heavy industrial Metrolink maintenance facility. □ The land use impacts of putting a proposed heavy industrial use in an institutional zone. The proposed use is not allowed in the existing City of Irvine zoning. □ The aesthetic impacts from the 24-hour operation of the proposed heavy industrial Metrolink maintenance facility including light pollution and related issues. The "mitigation measures" are not enough to mitigate the impacts from this heavy industrial Metrolink maintenance facility. The measures are not specific and instead put off actual analysis to a later date. We are very against this project. This proposed Metrolink maintenance facility should not be located at this OCTA property. Sincerely, Joseph and Sandy Toma 135 Palencia Irvine, CA 92618 cc: Lora Cross, Project Manager	Opposition of the Project has been noted and will be considered by OCTA. Comment on the deficiency of the MND and a request to prepare an EIR has been forwarded to OCTA for consideration. Refer to Comment Response 1 regarding impacts related to noise, traffic, and air quality. Refer to Comment Response 4 regarding impacts related to land use and zoning, and Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 2 regarding impacts related to lighting and aesthetics.
51	03/23/22	Howard Hewitt	howardh1971@yahoo.com 249 Carlow, Irvine CA	Howard Hewitt 249 Carlow Irvine Ca. 92618 I am writing this letter to oppose the proposed Metrolink Rail Maintenance Facility to be built at Marine Way and Ridge Valley. I purchased my home in the Travata Community in 2019. I purchased this home because I wanted to retire in a peaceful. quiet community. I have read the Mitigated Negative Declaration Document and the Contour Map of the 30 year Cancer Risk report on the Proposed Metrolink Facility and I have several objections to this project. I am very concerned about the added noise, light, traffic, and air pollution that the building and operation of this facility would bring to my community. I would have never purchased my new home had I know this was to be developed just 500 feet from my neighborhood. I would appreciate your support in choosing another site for this project. Thank you. Sincerely, Howard Hewitt	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter, and Comment Response 5 regarding impacts related to the exposure of toxins and cancer risk. Refer to Comment Response 1 regarding impacts related to noise, traffic, and air quality. Refer to Comment Response 2 regarding impacts related to lighting. Refer to Comment Response 1 regarding relocation of the Project.
52	03/23/22	Harry Yessain	hyessain@gmail.com	Attn: Darrell E. Johnson; Jennifer Bergener; Lora Cross, My wife and I purchased our home in the Travata community across from the Great Park in 2019. At that time, we gave careful consideration to our neighbors: the 133 and 5 Freeways, the railroad tracks and the Park. We believed that those were acceptable neighbors and would not infringe on our right to a peaceful coexistence. We recently learned that OCTA plans to build a 24/7 Metrolink maintenance facility across the street which is appalling. If any of you have travelled the 5 freeway at night over their facility in Oceanside, you will understand my community's alarm at this news. That facility is noisy and well-lit and most importantly, there are no residents anywhere near it, for good reason. And the operation that OCTA is proposing will be even larger combining operations from LA and Riverside as well. We have learned through our research that the Community Development Dept. and the City Planners did not even know that OCTA was considering the site for such an operation until late 2016 when OCTA responded during the public comment period for Travata. At that time this situation should have been discussed and an alternative site chosen. An OCTA railcar maintenance center at Great Park is just a wrong location for Irvine residents. It will affect the Great Park surrounding communities in air quality, noise, lights, traffic jam on Marine Way and potential diesel tank explosion or leaking. For this being a "proposed" project, there sure is much prep work already being done. This was never disclosed to the residents that bought in this community. It needs to be placed elsewhere.It must be stopped and not approved by the city. Needless to say, this proposed facility is not an acceptable use of land so near to a residential neighborhood especially when there are alternative sites closer to the Metrolink station on Ada and Barranca where there are only park and commercial neighbors. I encourage the City Planners to work with the Community Development Dept. and OCTA to relocate this facility to a more acceptable location.	Refer to Comment Response 1 regarding impacts related to noise, traffic, and air quality. Refer to Comment Response 2 regarding impacts related to lighting. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 regarding relocation of the Project.
53	03/23/22	Swaroop Mallegari	swaroopmallegari@gmail.com	Hi, Please VOTE NO the OCTA Train Maintenance Facility in Irvine. We do not want this in our community and do not need it. The repercussions are too high. -- Swaroop Benjamin Mallegari	Opposition of the Project has been noted and will be considered by OCTA.
54-1	03/23/22	Raymond and Kenny Wong	rdewong@gmail.com 626-590-6608 151 Carlow, Irvine CA	This email is to provide our feedback regarding the proposed OCTA Orange County Maintenance Facility within the Great Park. This property is not zoned for this type of facility. Planning Area 51 is zoned for 6.1 institutional and a conditional use permit SHOULD NOT BE granted or even considered. Area 51 is designated as Lifelong Learning District. Area 51 allows for a mix of residential, commercial, and educational uses that promotes and supports a synergistic live/learn/work/play environment. If the conditional use permit is approved, the project should be scaled back to minimize impact on the Great Park and surrounding community. There should also be a Noise Abatement Plan imposed to limit operations between the bedtime hours of 11pm to 7am - much like the General Aviation Noise Ordinance (GANO) at the John Wayne Airport. Even the 5-points amphitheater limits noise after 10pm. This will ensure the health and well-being of residents and visitors to the Great Park. Key Points for Concern This facility is completely inconsistent with the Great Park as a focal point for community activities, sport facilities, and an area of quiet tranquility for Irvine's adjacent communities. This is particularly true for our Travata 55 Plus Community which is located within about 500 feet and will suffer from the disruption of its construction, and the ongoing nuisances of greater traffic, noise, light, and environmental pollution, plus other negative consequences for Travata, neighboring communities, and Great Park users. The project should have been rejected before the major investment in planning and design work because it just doesn't fit in this area. In addition, we had an opportunity to meet with OCTA management to explain their project and found them unable to answer questions regarding the design, hazards, risks, and other issues. In the EPA document "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (March 1974), the long-term health and welfare on an individual are related to cumulative noise exposure received. The Travata Community of sensitive seniors will be exposed to excessive noise 24/7. The noise at the OCMF will start after 9pm when trains are taken off-service entering the facility, sanding and maintenance of trains from 9-4am, and beginning at 4am trains leaving the station for going on service. The entire Travata Community is unified in opposition to this project being located in the Great Park and particularly within 500 feet of our community. Following are some more detailed and specific points developed amongst our community: ZONING: The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park recreational users. AIR QUALITY: The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.) The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the rail yard was located along Sand Canyon. At the proposed site, the MND estimates an increased cancer risk for the community of Travata. At a minimum, this finding alone should indicate that a more rigorous study of the negative impacts on nearby residents.	Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 2 regarding impacts related to lighting. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter.
54-2	03/23/22	Raymond and Kenny Wong	rdewong@gmail.com 626-590-6608 151 Carlow, Irvine CA	NOISE: Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment used in the train yard into consideration. TRAFFIC: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy. HAZARDOUS MATERIALS: The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. This is a dangerous facility to be located anywhere near to such a busy area and one that already suffers from congested roadways. LIGHTING: Nighttime lighting would certainly impact residents' views over the site contrary to the report. As 80% of the train yard's operations will be during the overnight hours, all of the cranes and surrounding area will need to be well lit and quite visible from a large segment of Travata's residences along Marine Way and Ridge Valley. Any resident trying to sleep in the upstairs rooms will definitely look out onto the train yard and will be impacted by the lighting. The MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true. The sports fields at the Great Park are only lit until 10pm. CONCLUSION: The rail yard project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impacts on air quality, noise, hazardous materials and traffic as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its' current location. At a minimum, we urge the City of Irvine to require that OCTA prepare a more rigorous Environmental Impact Study. We believe that this study will prove that this rail yard does not belong in the Great Park neighborhood and needs to be relocated away from residents and park visitors. We would appreciate confirmation from each recipient of this communication and an indication of your position on this matter. Thank you, Raymond and Dianne Wong	Refer to Comment Response 1 regarding impacts related to noise and traffic, and Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 2 regarding impacts related to lighting. Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.

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55	03/23/22	Bijan and Zina Towfigh	bijan6@me.com 107 Carlow, Irvine CA	Dear OCTA, We are writing to you on a matter of great concern. It has come to our attention that the OCTA has plans to develop a rail yard within close proximity to the Travata housing development. It is our understanding that this rail yard is proposed to be developed within 500-1000 feet of most Travata residents. We have also learned that the Air Resources Board does not advise locating rail yards within 1000 feet of residential areas due to significant health concerns. Further, we fail to understand why such a development is under consideration to be built along side newly built residential homes as opposed to a more sensible industrial or commercial location. The development of a project posing significant health concerns within close proximity to a residential housing community is clearly unacceptable. First and foremost, there is the issue of air quality. A rail yard will emit toxic diesel particulates into the neighboring air. Further we are concerned about excessive noise levels, disruptive lighting and incremental traffic along a single lane road that has already proven to be inadequate in the case of an emergency. These are all serious health and safety problems that will be brought to the neighboring community. Needless to say, all of the above along with the damage this will cause to the aesthetics of our peaceful neighborhood, will destroy quality of life and negatively impact property values. Please keep in mind, Travata is a 55 and over community. You are proposing a development of a dangerous project next door to a community of our more vulnerable city residents. We fail to accept the OCTA's Mitigated Negative Declaration for all of the reasons stated above. To date we have not heard of any adequate mitigants to the health and safely issues you are proposing to bring to our community. Frankly, we cannot see how these obvious dangers can be mitigated without relocating this project to an appropriate location. We sincerely hope that you will take these matters into serious consideration and put peoples health and safety above an industrial project that can and should be moved to a location where damage and harm will not come to the residents of our city. Thank you. Respectfully, Bijan and Zina Towfigh 107 Carlow Irvine, CA 92618 bijan6@me.com	Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter, and Comment Response 5 regarding impacts related to the exposure of toxins and cancer risk. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic, and related to the exposure of toxins and cancer risk Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 2 regarding impacts related to lighting and aesthetics. Refer to Comment Response 1 regarding relocation of the Project.
56	03/24/22	Karen Blakeley	karensblakeley@gmail.com	Please find a petition signed by over 70% of the residents of the 55+ community of Travata that would be impacted negatively by the proposed rail facility across from their homes. None believe that the negative effects can be mitigated and respectfully ask that the City of Irvine and OCTA find a more suitable site for the facility. The Residents of Travata	Refer to Comment Response 1 regarding relocation or alternative site of the Project.
57	03/24/22	Rana Azimi	rana.azimi@gmail.com	Dear City leaders, I write this on behalf of the children who can not self advocate for their right to play sports and enjoy the Great Park. Moving forward on the OCTA railcar Maintenance center (which included all the benzene storage) is not the right move for Irvine. I have lived in several cities where the storage tanks have leaked or spilled, causing disastrous outcomes to the health of its residents and the reputation of the city. This would increase cancer risks in the area. Do we really want Irvine to have the reputation of high cancer clusters? Irvine is already dealing with All American Asphalt, it does not need another major polluter to add to its list of toxic emitters in the so-called "safest city". The diesel tanks are at risk of leaks and explosions as kids and grandkids, or any one of us are at the Great Park. Please deny the OCTA permit application and do not allow any loopholes or future permits to prevail. Please make Irvine safe to live, work, and play in....SHUT DOWN AAA and do not add the railcar maintenance center....PLEASE!!! This will be your legacy. Sincerely, Rana Azimi Irvine Resident (I do not even live near Great Park and am concerned enough to take time to send this out, you should be concerned too if you visit the area even once!)	Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter, and Comment Response 5 regarding impacts related to the exposure of toxins and cancer risk.
58	03/24/22	James and Hilma	jimandhilma@gmail.com 265 Carlow, Irvine CA	To the OCTA, In regards to the OCTA Metrolink Rail Yard, which is proposed to be located very close to the Travata Community where my wife and I reside, please consider a different location. There is no advantage to the City of Irvine and especially the Irvine citizens that live near the proposed location or to the thousands of families that visit The Great Park regularly from all over Orange County and beyond. There are many reasons to move the proposed location. Noise and emissions pollution and an overall degradation of the quality of life for us who live in the Travata Community, The Great Park communities and visitors to The Great Park. The usage of proposed site and facilities is clearly industrial with inherent dangers associated with industrial plants, which may include but not limited to serious accidents, fuel and chemical spills and explosions. The proposed location is a great and grave hazard to the citizens of Travata, Cypress Village and all of The Great Park communities, as well as The Great Park itself. The City of Irvine has a stellar history of planning and development that has yielded superior community advantages of education, health care, business, nature and lifestyle. Please continue to employ the same kind of wisdom that has made the City of Irvine great, and move the location of the OCTA Metrolink Yard. Sincerely, James Martin and Hilma Martin 265 Carlow Irvine, CA 92618	Refer to Comment Response 1 regarding relocation or alternative site of the Project. Refer to Comment Response 1 regarding impacts related to noise and air quality. Refer to Comment Response 4 regarding impacts related to land use and zoning, and Comment Response 16 regarding impacts related to hazardous materials.
59	03/25/22	Crystal Antognelli	cantognel@att.net	Hello, my name is Crystal, I live in the Travata Community in Irvine at the corner of Marine way and Ridge Valley where they want to build a Maintence Rail Train Yard. I moved to this community because I wanted to live in a Quiet, Environmentally Safe Healthy Community and Home. I am very much oppose to the construction of this Train Maintenance yard being built so close to my home and community. I have serious health issues and I am so worried this Train yard will impact the air quality that will make me even sicker. Not to mention the noise and extra traffic on Marine Way that is already become a traffic clutter jam at given times of the day. I'm asking that they find another spot for this Train yard site far way from the Travata Retirement Community. Thank you, Crystal Antognelli	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 1 regarding relocation or alternative site of the Project.
60	03/25/22	Se Oh	sehyuckoh@hotmail.com 256 Carlow, Irvine CA	Dear Irvine Mayor and Council Members: My wife and I purchased our home in the Travata Community across from the Orange County Great Park in September 2019 to enjoy our retirement life in sunny California. At the time of purchase, there were no disclosure documents informing about the plan to build a rail yard maintenance facility in such proximity to our house. We recently learned, with a BIG surprise, about the OCTA's plan to build a 24/7 Metrolink rail yard maintenance facility across Marine Way and Ridge Valley. Such a facility located so close to our senior residential community clearly poses substantial adverse effects on human health, environments, noise, and traffic in the surrounding communities, and the impacts will be most direct and severe on the Travata community. Thus, we feel that this proposed rail yard maintenance facility is not an acceptable use of land so close to a residential (like Travata) and recreational (like Great Park) neighborhood, and strongly urge the City Planners to work with the OCTA and Community Development Department to find an alternative site that is more consistent with the land use assumptions in Irvine's General Plan. Thank you for your assistance. Se H. Oh 256 Carlow, Irvine CA 92618	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 regarding impacts related to noise and traffic. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding relocation or alternative site of the Project.
61	03/25/22	Ben Thatcher	btrules8@gmail.com	Will the construction of this railroad facility impact nearby Technology Drive? Will the facility have full security? Will the outskirts be patrolled? I don't want the area to become a hotspot for graffiti on the railroad tracks or train cars. You also have homeless to worry about that could get access to the tracks. How gated off will the facility be? This relates to my question above and new concerns where it could become a downside to the community. I know the maintenance facility that's closer to Carlsbad for trains is no where near any housing, offices, and just sits close to the freeway. A facility needs to be closed off to the public unless otherwise.	No construction impacts would occur along Technology Drive. Section 2.3.2 of the IS/MND states the only site access comes from the new Ridge Valley Extension. At the entrance a security booth, gate arms, and fencing are provided to limit unauthorized access to the site. Additionally, Section 3.1.3.4 states the Project would include installation of new standard exterior and interior security lighting around and within the OCMF, including buildings, which would operate continuously. A solid 6-foot concrete wall along Marine Way would be installed as part of the Project.
62	03/26/22	Ji Oh and Jeon Sook Song	songjioh@gmail.com 143 Palencia, Irvine CA	Dear Irvine Mayor and Council Members: My wife and I purchased our house in the Travata Community across from the Orange County Great Park in October 2019 as our retirement home in California. At the time of purchase, there were no disclosure documents informing us about the plan to build a rail yard maintenance facility in such proximity to our house. We recently learned, with a BIG surprise, about the OCTA's plan to build a 24/7 Metrolink rail yard maintenance facility across Marine Way and Ridge Valley, which must be a heavy industrial facility. Such a facility located so close to our senior residential community clearly poses substantial adverse effects on human health, environments, noise, and traffic in the surrounding communities, and the impacts will be most direct and severe not only on the Travata community but also on the Orange County Great Park. If you don't mind, we would like to convey our points using very simple terms. Assuming the maintenance facility is built here and in operation as you planned in the near future. 1) Would you recommend your parents or grandparents to choose this senior community as their desirable retirement place? 2) Would you have your children or grandchildren to play and do exercise in the Great Park as usual? If your answer to the above two questions is negative (even slightly negative), it would be a good idea to stop this project as it is, for this community, Great Park, and Irvine City as well. We don't want to see the reputation of Irvine City being slowly deteriorated and 'Great Park' becoming 'Terrible Park' in the foreseeable future. Thus, we feel that this proposed rail yard maintenance facility is not an acceptable use of land so close to a residential (like Travata) and recreational (like Great Park) neighborhood, and strongly urge the City Planners to work with the OCTA and Community Development Department to find an alternative site that is more consistent with the land use assumptions in Irvine's General Plan. We are looking forward to seeing the mutually agreeable solutions soon. Thank you in advance for your assistance. Best Regards, Ji Oh Song and Jeong Sook Song 143 Palencia Irvine, CA 92618	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 regarding impacts related to noise and traffic. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding relocation or alternative site of the Project.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
63	03/27/22	Amy Doyle	guppy35@yahoo.com	Dear OCTA, I am writing to oppose the OCTA Proposed Rail Yard in Irvine. This industrial yard with heavy equipment is much too close to housing and athletic fields in the Irvine Great Park. The increased diesel particles in the air will be detrimental to vulnerable older adults in the community of Travata, which is directly adjacent to the proposed train yard. The Great Park attracts many sporting tournaments and activities. The reduction in the area's air quality will discourage recreational and sporting use of the park. The Marine Way roadway is already hopelessly clogged at various points during the day. Adding this facility would compound the problem. The noise and light pollution from this project are also of great concern. Please relocate this project to a more industrial area or completely enclose the project to mitigate its effects on its immediate radius. Sincerely, Amy Doyle MBA, CMA Travata Resident	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 2 regarding impacts related to lighting. Refer to Comment Response 1 regarding relocation or alternative site of the Project.
64-1	03/27/22	Rutnam and Yaso Bavan	rsbavan@gmail.com 949-378-9598	March 27, 2022 COMMENTS REGARDING OCTA'S PROPOSED RAIL MAINTENANCE FACILITY (OCRMF) AND ITS MITIGATED NEGATIVE DECLARATION The proposed site of the OCTA rail yard is wholly and fully incompatible and inappropriate to be located in such close proximity to Irvine's Great Park and the over 55+ Senior Community Travata for the reasons set out below. But especially because the negative impacts to the health and well-being of Irvine Great Park users and the Travata Senior Community residents cannot be adequately mitigated for the following reasons: ZONING The train yard is classed as an 'institutional' land use, the same categorization as for a school or church. The proposed uses of 'heavy duty equipment such as cranes and forklifts' along with the anticipated high levels of diesel emissions and the use of industrial chemicals and round the clock operation 24/7 for 365 days a year it qualifies as heavy industry usage. With the MND admission that 'The Project type is closest to an industrial type' it is clear that the City of Irvine should have no hesitation or misgivings in disallowingsuch a use adjacent Irvine's Great Park and a Senior Community and deny the issuance of the use permit OCTA is seeking purely based on that fact. AIR QUALITY The MND notes that rail yards are because of the use of equipment's and vehicles such as trains, locomotives, trucks, cranes, etc are high emitters of diesel and other toxic particulates and are a major contributor of air contaminants. The report states that 'diesel particulate matter continues to account for about two-thirds of the cancer risk from air toxins' which is a major concern for those living nearby. The MND attempts to discount the presence of contaminants such as lead, ozone and other particulates and incorrectly applies SCAQMD methodology to the rail yard's risk to nearby residents in Travata and visitors to the Great Park where the air quality can be made unsafe for young children and seniors. NOISE Noise emanating from trains and locomotives entering and leaving, train horns, boxcars banging up against each other and other associated noises such as wheel sanding, brake repairs etc., will have severe negative effects on the health and well-being of Travata's senior residents and also on Great Park users. With no actual measurements of noise levels being provided at existing Metrolink train yards, and no adequately satisfactory discussion of train noises and whistles from more than the 20+ trains that are to enter and exit the yard daily during its 24/7 operation it is difficult to agree with MND's conclusion that the noise increase expected is not significant when measurements of sound at the proposed rail yard site showed that the significant spikes in sound levels were due to passing trains and they were not even using their whistles. An illogical and unrealistic expectation between 8 pm and 6 am when nearby residents, most of them seniors are expecting to get a reasonable night of sleep. HOURS OF OPERATION Round the clock 24/7 operation 365 days of the year will disrupt the ability of nearby residential areas to function let alone inevitably bound to suffer unacceptable health issues. AESTHETICS & INDUSTRIAL BLIGHT The MND states that there will be no impact on the views of hills to the southwest. Yet the train yard will have a 5 story structure in the middle of the yard and 4 permanent cranes. Travata's view of the hills to the southwest (Quail Hill and Shady/Bommer Canyon) will be negatively impacted. The screening of activities within the yard is unachievable and be a blight wrecking the view enjoyed by nearby residences and adjacent Irvine Great park users.	Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 1 regarding impacts related to noise and air quality. Refer to Comment Response 2 regarding impacts related to lighting, aesthetics and visual quality.
64-2	03/27/22	Rutnam and Yaso Bavan	rsbavan@gmail.com 949-378-9598	LIGHTING Contrary to what the MND states, lighting at night would impact Travata residents' views across the site. With train yard maintenance operations continuing during the night, and the need for cranes and other equipment to be safely used, the surrounding area will be well lit. This will be visible to Travata residences and is bound to cause disruptions to sleep patterns of many seniors and adversely impact their health and well being. TRAFFIC Access to the rail yard is along Marine Way, a single lane road that is presently way beyond capacity to handle existing traffic safely. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto this one single lane road. Evacuation during emergencies for fire etc., are bound to be disastrous and catastrophic. HAZARDOUS MATERIALS As proposed, the rail yard will have four 30,000 gallon tanks for refueling locomotives. These are to be located near the site's property line and within 500 feet of the Great Park. These tanks not only pose a risk from potential fire but the toxic fumes related to their use is a great concern for Travata residents and Great Park users, many of them young children. The activities proposed - restroom maintenance, fueling, train washing etc., there is a great likelihood that other toxic substances used for refueling, cleaning and waste treatment, etc., can cause major health hazards to seniors and children in adjacent residential communities and users of adjacent Irvine Great Park. PUBLIC SAFETY AND SECURITY Even with gates at entrances and parking lots being secured properly the potential introduction of criminal elements using the trains to gain entry OCRMF cannot be ruled out. Unacceptable consequences could ensue as a result for the safety of the surrounding neighborhoods. MANDATORY FINDINGS OF SIGNIFICANCE The proposed OCTA's Rail Maintenance Facility environmental impacts cause substantial adverse effects both directly and indirectly as a result of the negative impacts on air quality, noise, hazardous materials and traffic as discussed herein. These negative impacts cannot be mitigated adequately to make the rail yard project feasible as currently proposed at its current location. Rutnam Bavan And Yaso Bavan	Refer to Comment Response 2 regarding impacts related to lighting. Refer to Comment Response 1 regarding impacts related to noise and traffic, and Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 22 regardg impacts related to safety. Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.
65	03/27/22	Nikolai Korsun	nkorsun@gmail.com 661-312-8981 112 Burgess, Irvine CA	Dear Lora Cross, I want to demand you to STOP this project, which will impact all of the neighborhoods including the Travata community where I and my family live. This new industrial facility will create unacceptable noise and harmful pollution to our homes and our health. Please STOP this project. Thank you, Nikolai Korsun 112 Burgess, Irvine CA 92618 Tel.(661)-312-8981	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 1 regarding impacts related to noise and air quality.
66-1	03/27/22	John Roese	roesej@cox.net 138 Burgess, Irvine CA	As a homeowner and permanent resident of Irvine's Cypress Village Travata 55+ residential community, I am sending this email to STRONGLY PROTEST the proposed location for the new Orange County Transit Authority Maintenance Facility (OCMF). In 2018, my wife and I decided to relocate to Irvine. After careful evaluation of alternative locations, a significant factor in our decision to purchase property and permanently live in the City of Irvine was that Irvine is nationally recognized as a well-managed master-planned community with governing body decisions based on maintaining a high quality of life for its citizens. Unfortunately, as proposed, the site of the new OCMF rail yard is adjacent to pre-existing Cypress Village (Travata in particular), other nearby Great Park neighborhood residential areas and Great Park family recreation facilities. This is the antithesis of what we expected to experience in the City of Irvine. The following summarizes several important quality of life, health hazard, financial and zoning issues identified by Travata community residents which would be negatively impacted by the proposed OCMF site location: (1) routine OCMF operations would inherently generate emissions of diesel particulate matter which will negatively affect local residential and Great Park air quality. The Mitigated Negative Declaration (MND) prepared by the Orange County Transit Authority for the City of Irvine MND notes that as of 2005, the Federal Air Resources Board recommends a 1,000 foot buffer between residences and rail yards. Note that In the OCMF proposal, multiple Travata residences would be less than 500ft from the OCMF. The MND estimates an increased cancer risk for local (e.g. Travata) residents; (2) daily positioning, cleaning and maintenance of METROLINK cars and diesel locomotives will create noise over and above what is currently attributable to existing local rail use. Once operational, the OCMF train noise from large numbers of trains being serviced and, for example, the possible use of locomotive whistles for rail yard entry and exit, would substantially increase the frequency and duration of railroad related noise. Railroad noise is already distinctly heard within the Travata community multiple times during the day and night under current rail line usage. Additional noise resulting from OCMF servicing of multiple trains, especially during early morning, nighttime or weekends, would be highly objectable to Travata as well as other nearby residents; (3) primary surface street access to the proposed OCMF rail yard from San Canyon Blvd (the closest main surface thoroughfare) would be via Marine Way. Traffic on Marine Way is already frequently congested and at full capacity due in part to a single lane bottleneck between the San Canyon intersection and the proposed OCMF site. This section of Marine Way provides primary automobile, truck and bicycle access for Cypress Park (especially Travata) and other Great Park neighborhood residents, Great Park visitors, as well as food bank, distribution center, recycling plant, nursery and soon water park users. It should be noted that the inadequacy of Marine Way for use as an evacuation route was evident when Cypress Village residents were placed under a voluntary evacuation status during the October 2020 wildfire event. Locating an OCMF entrance on Marine Way would only exacerbate currently existing Cypress Village and Great Park neighborhood traffic issues; (4) OCMF operations will require the use and long-term storage of petroleum-based and other environmentally hazardous chemicals. Normal operational needs will require on-site storage of these materials. Accidental spillages, container leaks and fires will inevitably occur. This poses an unacceptable and preventable 7/24 threat to all Cypress Village neighborhood inhabitants as well as to Great Park visitors;	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 5 regarding impacts related to the exposure of toxins and cancer risk. Refer to Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 16 regarding impacts related to hazardous materials.
66-2	03/27/22	John Roese	roesej@cox.net 138 Burgess, Irvine CA	(5) full disclosure of the cumulative effects of these and other negative quality of life issues attributable to the OCMF will, in all likelihood, suppress and even reduce local residential (e.g. Travata 55+ community) property values. Since our homes are generally our largest financial assets, this could have severe financial impacts for Travata 55+ community residents. An additional issue is that the OCMF proposal is inconsistent with the existing "institutional" zoning designation for the proposed site. According to the MND, the proposed OCMF train yard is "closest to an industrial type". This characterization of "industrial" relates to the OCMF's inherent dependence on heavy machinery (e.g., large cranes), use of hazardous chemicals and particulate emissions. Therefore, the OCMF should be prohibited from using the proposed site since this is an "institutional" zoned area. I feel that attempts to "mediate" some or all of the above mentioned negative impacts would, in all likelihood, prove to be marginally effective and difficult to monitor, enforce and maintain on a permanent basis. Mediation would also be very expensive with the associated costs ultimately being borne by the paying customers the OCTA serves or by government agencies. As demonstrated by the Central Maintenance Facility (CMF) rail yard located in Cypress Park in Los Angeles, mediation to the point of being a "good neighbor" to the nearby community is both operationally restrictive to rail yard maintenance operations and expensive. By way of comparison, San Diego's North County Transit District placed its maintenance facility rail yard at Stuart Mesa (visible along Hwy 5, just north of the city of Oceanside) and, due to its location, essentially negated the negative OCMF impacts identified above. In summary, the proposed OCMF proposal represents a highly inappropriate use of land adjacent to already established Irvine residential and family recreational areas and environmentally friendly industrial complexes. I strongly urge that we instruct the Orange County Transit Authority to study alternative OCMF site locations and not undermine our city's hard won status as a nationally recognized example of a master-planned community that puts quality of life issues first. The big picture is that Irvine's master-planned community is a pristine, environmentally friendly, unique national treasure. Although there are financial justifications for location of a new OCMF, these justifications alone should not be used to justify the location of the new maintenance facility. Respectfully submitted, John A. Roese, Ph.D. 138 Burgess, Irvine, CA 92618	Impacts on residential property values is not required under CEQA. Refer to Comment Response 4 regarding impacts related to land use and zoning.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
67	03/28/22	Effie Woo	sosunnee@gmail.com 103 Carlow, Irvine CA	To Whom It May Concern, Our senior community of Travata will be impacted negatively by the proposed Metrolink Rail Facility as we are less than 1,000 feet away. We are opposed to the railyard because of the high volume of diesel exhaust that will blow over our homes and also because of the nighttime noise from the heavy machinery and train whistles. The MND is bought and paid for by OCTA and is not a reliable trusted source of analysis of the negative impacts from the construction and operation of the railyard. This is NOT the right use for land that is so near to residences and the visitors to the Great Park. We ask that you locate this in an area that will NOT be harmed by this facility. Sincerely, Effie Woo 103 Carlow Irvine, CA 82618	Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding relocation or alternative site of the Project.
68	03/28/22	Richard and Phyllis Keegan	rich.keegan@cox.net 172 Palencia, Irvine CA	My wife and I are residents of Travata 55+ community. We are writing to express our objections to the proposed OCTA rail yard project. Objection 1. Compatibility. The proposed project is not compatible with a residential neighborhood nor is it compatible with a sports park that is used by many children playing soccer, lacrosse, baseball. There are specific areas in great park designed for very small children as well professional level baseball, softball and soccer stadiums. Irvine is very proud of this sports park and has many plans on improvements. The proposed project would devalue both the residential neighborhood, Travata, as well as the sports park, Irvine Great Park. Objection 2. Pollution. This proposed project would create Noise Pollution, Air Pollution, and Visual Pollution. It would also significantly increase traffic on adjacent streets. The principal time of operation is overnight when the residents of Travata are trying to sleep. The Air and Visual pollution would be a great distraction to the users of Great Park and the adjacent water park, as would the significant increase in street traffic. A complete Environment Impact study would have identified all of these issues but it was not carried out. How is that the case? Sincerely, Richard and Phyllis Keegan 172 Palencia Irvine, CA 92618	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 4 regarding impacts related to lighting and visual quality.
69	03/28/22	Sonal, Dilip and Ashwin Patel	patelsdp@hotmail.com 157 Palencia Irvine CA	As residents of Travata (55plus community on the corner of Ridge Valley and Marine Way), we would like to voice our opposition to the construction and operation of the proposed OCTA Metrolink Railyard. We believe that this facility falls under "heavy industry " zoning and not "institutional" as OCTA is currently claiming it would be. Particularly concerning to us is the adverse air quality, noise, traffic, and lighting. Living in this community, we do hear train's whistles and hear them passing by early in the morning. Using this land for train maintenance would mean many more trains stopping there overnight and being released in the morning. The sound impact of this will be significant. Also concerning are the possible smells from cleaning the trains, emptying train toilets, and so on. Diesel particulates being released on site are also a major concern. The 4.5 year construction time frame is not temporary. That is long term as far as residents of Travata are concerned. And even after the construction period, the additional noise from operation of the facility, smells, overnight lighting which will be an eyesore, cranes, additional traffic, and air contamination is not at all acceptable to us. I attended the online informational meeting run by OCTA back in October last year. After more information about this project came out this year, I believe that OCTA deliberately mislead and omitted vital negative consequences of this facility. They made it seem that there was negligible noise, traffic, aesthetic and air quality consequences. I feel as though they almost successfully pulled the wool over our eyes! They gave the impression that this would look like and feel like an office building. Please do not allow them to continue with this proposed project that will harm not only residents, but also children playing at the Great Park. Please do not reward their deception at the expense of Travata residents. Thank you so much, Sonal Patel, Dilip Patel, Ashwin Patel 157 Palencia Irvine CA 92618	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 4 regarding impacts related to lighting and visual quality. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter.
70-1	03/28/22	Joanne Yu Chan	abacus205@yahoo.com 626-710-2099 200 Carlow, Irvine CA	Dear Sir/Madam: I am a resident of Travata Senior Community and this email is to address the Draft Initial Study/Mitigated Negative Declaration for Metrolink Orange County Maintenance Facility. I thank you in advance for your attention in this matter! Introduction 1. Page 1, fourth paragraph (Section 1.1 Background): The Project is intended to relieve capacity at the Central Maintenance Facility (CMF) at Los Angeles that currently provide service to Orange County. Please provide demand projections to support statement stating, "…Orange County line has the highest ridership within the Metrolink system…" Cite reference/documentation to support these ridership projections throughout the Metrolink system. Also, state how many of the train cars will be transferred from CMF to the proposed Orange County Maintenance Facility (OCMF) for service on a daily basis. Simply stating "a portion of the current fleet" will be transferred from CMF to OCMF does not provide any quantitative measure for assessing the project's impact. 2. Page 3, first paragraph: Please explain what is described as "heavy overhaul capabilities at OCMF" that may be part of any future operation of the Project. Any future use of the facility that has not been previously approved and may have an adverse impact upon the environment and surrounding community will need to be publicly reviewed and approved by the City of Irvine (City) prior to any future change in operation. 3. Page 4, fourth paragraph: Any City approval of the CUP application shall contain community outreach and participation provisions to inform and address ongoing construction and post-construction activities on the Project site. Any proposed changes to the Project will also be subject to review under a new CUP application. 4. Figure 1.3-1.3.1 (Project Location): For clarity, please show proposed track alignment on exhibit and identify project components to be completed as part of phases 1 and 2. Project Description 5. Page 7, fourth paragraph, line 4: The project description states that a total of 11 tracks and 6 storage tracks will be constructed for the Project. The planned facilities at OCMF represents a significant expansion over the current operations at CMF where there exists 4 tracks with shorter track lengths at 800 foot storage each as opposed to proposed 1,200 to 1,600 foot track storage along 6 tracks at OCMF. Please provide a table matrix showing current capacity at CMF and future planned capacity at OCMF under phase 1 and 2 conditions. Will CMF also expand its current operations to meet future capacity demand? If not, will OCMF receive their overcapacity demand as part of its future operation? 6. Page 7, fourth paragraph, line 7: Please further describe what is a conversion of the West Lead Track into a drill track. Explain its purpose and operation. 7. Figure 2.3-1 (Project Layout and Elements): Identify/label all track functions (storage, lead, run-around, set-out, etc.). Include a map scale. Also identify parking spaces near Water Treatment Room, Maintenance Shop and S&I areas that are currently not shown on exhibit but are described in Section 2.3.2. 8. Page 13, fifth paragraph, line 3: What are "…layouts 2 and 3…" in reference to? Please explain and how it applies to requiring a second run-around. 9. Page 14, second paragraph: At total project build out, 21 trains can be accommodated on site with 12 trains on storage tracks. With a design train length of 750 feet per Section 2.3.5, OCMF will occupy approximately 15,750 feet of total track and approximately 9,000 feet of storage track. The planned OCMF would represent a 300% increase from CMF with a current capacity of 3,000 feet of estimated storage track. Will projected ridership in Orange County warrant 3X capacity of CMF within 3-4 year completion of phase 1 and 6 years for completion of phase 2? Please provide supporting documentation for ridership projections.	Figure 2.3-1 (Project Layout and Elements) shows the proposed track alignment, and Section 2.3.7 describes Project components that would be completed during Phase 1 and Phase 2. Section 2.3.5 of the IS/MND states the Project would not increase operational services or expand ridership through the increase in vehicle numbers or capacity. OCMF capacity is not part of the analysis of this project and that information would be determined by Metrolink at a later date. Removed reference to Layouts 2 and 3 since Layout 3 is the preferred alternative.
70-2	03/28/22	Joanne Yu Chan	abacus205@yahoo.com 626-710-2099 200 Carlow, Irvine CA	10. Page 18, third paragraph (Section 2.4.1): Please indicate a completion date for Phase 1 construction. Provide truck and vehicle trips required during construction such as routing, number of deliveries and daily number of employees requiring access to site for both construction phases. 11. Page 19, first paragraph (Section 2.5.1): Please list/identify all light repair and maintenance activities to be performed at OCMF. Also provide a description of activities considered to be heavy repair that will continued to be performed at CMF. There is no discussion regarding anticipated vehicle trips during project operation. Please identify number of expected truck deliveries to Project, including type of delivery (fuel, sand), type of truck (single- or double-tanker), and delivery time of day. Provide other vehicle trips such as shift hours and number of employees working on each shift. Appendix B – Air Quality and Greenhouse Gases Technical Memorandum 12. Page 38, second paragraph (Section 8.1.4): Please provide the source of the data used to assess the project's locomotive operations (including in-transit and idling). As stated in the HRA, the methodology used for the emissions modeling identified 11 track segments for Phase 1 and 5 segments for Phase 2 for a total of 16 segments. Does the "segments" reference intend to suggest a train segment? If yes, the project description has indicated that project build out can accommodate up to a total of 21 trains and 16 trains for storage. Explain the discrepancy between the numbers used in the Project Description and the one used in the AQ and GHG Technical Memorandum. 13. Page 52, first paragraph, line 1: The nearest sensitive receptor, a senior housing community, is located approximately 800-900 feet from the project's closest emission source which within 1,000 feet of the rail yard and would suffer the greatest adverse impact from the Project. Regardless, the Project will introduce additional source of pollutants to an existing vulnerable community surrounded by a junction of two major freeways, Interstate 5 and Highway 133 and Marine Way, a heavily travelled arterial street adjacent to the community. Since the majority (80%) of the project activities would occur during evening hours (6pm to 9am), the residents of the senior community will be subject to all kinds of disturbances, odors and noxious emissions during a time requiring rest and sleep. Initial Study – Air Quality 14. Page 53, second paragraph: See Comment No. 12. Need to determine if the modeling analyses coincides with the project parameters as described in the Project Description. There appears to be a discrepancy in the identified project elements from the Air Quality Study that may underestimate the emissions impact of the Project, resulting in a less than significant impact. Please explain why the descriptions differ and any resulting impact regarding assessment of the project. Nevertheless, the Project needs to provide best available practices that would reduce or eliminate on- and off-site emissions as much as possible such as minimizing idling of locomotives by using plug-in power, switching to non-fossil fuel tanker trucks, or converting fleet to renewable diesel or upgrading to zero-emission technology when available. Many of these best practices have been implemented at CMF and noted in an annual action plan update to the surrounding communities of Cypress Park and Elysian Valley which are predominantly low-density residential neighborhoods.	

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
70-3	03/28/22	Joanne Yu Chan	abacus205@Yahoo.com 626-710-2099 200 Carlow, Irvine CA	General Comments 15. Pending City review and approval of the Project's CUP application, I have provided several provisions to be included as conditions of approval to ensure community concerns are addressed and best practices are followed during the different stages of construction and operation of the Project. They include: a. Any expansion of use/operation of facility deemed separate from prior approvals will require a formal review under a new CUP application and subject to environmental review and compliance as well. b. OCTA to provide quarterly or biannual project updates and outreach to the community during project construction and operation. These outreach efforts including Great Park users will help provide accountability while minimizing potential conflicts that may rise during project implementation. c. Limit the daily number of truck deliveries to the Project site and within certain hours of the day to minimize excessive traffic on Marine Way during evening hours from 6 pm to 9 am. d. Require noise and air quality monitoring during Project's construction and post-construction activities. If project is deemed to exceed City ordinances or other critical thresholds impacting public health and safety, appropriate mitigation measures will be implemented as needed. 16. There appears to be a lack of consistency regarding the project description among the technical analyses performed for the project. Such discrepancy needs to be clarified and any subsequent analyses checked for accuracy. 17. This document has not been well prepared, filled with too many errors and inconsistent information that I am not quite sure that a comprehensive analysis has been competently performed. Throughout the environmental document, impacts are discussed in broad general terms where operations will be shifted from CMF to the proposed location which will create efficiencies and provide cost cutting benefits while real and detrimental impacts to the surrounding community are seemingly glossed over. Many of these impacts will have severe consequences to residents in the senior community when this project will mostly be operational during the night with associated activities considered to be a heavy industrial use. The MND further states that only "portion" of the maintenance facility will be shifted away from CMF with light servicing and repair to meet future ridership demand within Orange County. However, comparing the size and facilities between the proposed Project site and the CMF site, the proposed Project will triple the track storage at CMF. Clearly, a finding that the Project will have minimal impacts does not match the outsize operation and facilities that is currently proposed for the site. I would appreciate confirmation of this email from each of the recipient and your respond to the issues mentioned. Thank you! Joanne Yu Chan 200 Carlow Irvine, CA 92618 626-710-2099	
71	03/28/22	Jeannie Chiu	jeannie.chiu@gmail.com 626-403-7216	I object to the proposed Metrolink railyard maintence facilities project. I am a senior citizen resident of Travata 55+ Community, we moved to this lovely community for all the serene environment in our neighborhood. The proposed Metrolink project will be detrimental to our air quality, noise, and the hazardous waste material will negatively impact our golden years, stripping of all we worked for to have a healthy retirement living. I opposed the planned railyard maintenance facilities to be developed so close to the Tavata Community. Please look for alternative locations further away from any residential community. The following are some of my concerns. ZONING: The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park recreational users. AIR QUALITY: The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.) The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the rail yard was located along Sand Canyon. At the proposed site, the MND estimates an increased cancer risk for the community of Travata. At a minimum, this finding alone should indicate that a more rigorous study of the negative impacts on nearby residents and park users be undertaken. NOISE: Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment used in the train yard into consideration. TRAFFIC: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy. HAZARDOUS MATERIALS: The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. This is a dangerous facility to be located anywhere near to such a busy area and one that already suffers from congested roadways. LIGHTING: Nighttime lighting would certainly impact residents' views over the site contrary to the report. As 80% of the train yard's operations will be during the overnight hours, all of the cranes and surrounding area will need to be well lit and quite visible from a large segment of Travata's residences along Marine Way and Ridge Valley. Any resident trying to sleep in the upstairs rooms will definitely look out onto the train yard and will be impacted by the lighting. The MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true. The sports fields at the Great Park are only lit until 10pm.	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic, and Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 2 regarding impacts related to lighting.
72-1	03/28/22	Christine Lee	christinekain1018@gmail.com 142 Burgess, Irvine CA	To whom it may concern I have been living in Irvine since 2014. I have been so happy that I chose Irvine as my final retirement place, but now I am so concerned about the news that OCTA will make Metro train yard in Irvine. I am strongly opposing that plan because of the following reasons. The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park visitors. The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.) The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the rail yard was located along Sand Canyon. At the proposed site, the MND estimates an increased cancer risk for the community of Travata. At a minimum, this finding alone should indicate that a more rigorous study of the negative impacts on nearby residents and park users be undertaken. Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment used in the train yard into consideration. Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy. The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. This is a dangerous facility to be located anywhere near to such a busy area and one that already suffers from congested roadways. Nighttime lighting would certainly impact residents' views over the site contrary to the report. As 80% of the train yard's operations will be during the overnight hours, all of the cranes and surrounding area will need to be well lit and quite visible from a large segment of Travata's residences along Marine Way and Ridge Valley. Any resident trying to sleep in the upstairs rooms will definitely look out onto the train yard and will be impacted by the lighting. The MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true. The sports fields at the Great Park are only lit until 10pm.	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic, and Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 2 regarding impacts related to lighting and visual quality.
72-2	03/28/22	Christine Lee	christinekain1018@gmail.com 142 Burgess, Irvine CA	The rail yard project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impacts on air quality, noise, hazardous materials and traffic as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its' current location. At a minimum, we urge the City of Irvine to require that OCTA prepare a more rigorous Environmental Impact Study. We believe that this study will prove that this rail yard does not belong in the Great Park neighborhood and needs to be relocated away from residents and park visitors.	Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.
73	03/28/22	Keumju Oh	keumjuoh@hotmail.com 256 Carlow, Irvine CA	Dear Irvine Mayor and Council Members: My husband and I purchased our home in the Travata Community across from the Orange County Great Park in September 2019 to enjoy our retirement life in sunny California. At the time of purchase, there were no disclosure documents informing about the plan to build a rail yard maintenance facility in such proximity to our house. We recently learned, with a BIG surprise, about the OCTA's plan to build a 24/7 Metrolink rail yard maintenance facility across Marine Way and Ridge Valley. Such a facility located so close to our senior residential community clearly poses substantial adverse effects on human health, environments, noise, and traffic in the surrounding communities, and the impacts will be most direct and severe on the Travata community. Thus, we feel that this proposed rail yard maintenance facility is not an acceptable use of land so close to a residential (like Travata) and recreational (like Great Park) neighborhood, and strongly urge the City Planners to work with the OCTA and Community Development Department to find an alternative site that is more consistent with the land use assumptions in Irvine's General Plan. Thank you for your assistance. Keumju Oh 256 Carlow, Irvine CA 92618	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 1 regarding relocation or alternative site of the Project.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
74-1	03/28/22	Kevin Lee	keunwoong@gmail.com 142 Burgess, Irvine CA	To whom It may concern, I am a retired physician and have been living in Irvines since 2014. I have been so happy that I chose Irvine as my final retirement place, but now I am so much concerned about the news that OCTA plans to make a train/rail yard next to the great park where many children including my grand children love to visit. We are living in a senior community not far from the planed train yard area and many of us are suffering from heart and lung diseases which will obviously get worse from the OCTA plan. I am strongly opposing that plan because of the following reasons. The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park visitors. The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.) The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the rail yard was located along Sand Canyon. At the proposed site, the MND estimates an increased cancer risk for the community of Travata. At a minimum, this finding alone should indicate that a more rigorous study of the negative impacts on nearby residents and park users be undertaken. Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment used in the train yard into consideration. Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy. The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. This is a dangerous facility to be located anywhere near to such a busy area and one that already suffers from congested roadways.	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic, and Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 16 regarding impacts related to hazardous materials.
74-2	03/28/22	Kevin Lee	keunwoong@gmail.com 142 Burgess, Irvine CA	Nighttime lighting would certainly impact residents' views over the site contrary to the report. As 80% of the train yard's operations will be during the overnight hours, all of the cranes and surrounding area will need to be well lit and quite visible from a large segment of Travata's residences along Marine Way and Ridge Valley. Any resident trying to sleep in the upstairs rooms will definitely look out onto the train yard and will be impacted by the lighting. The MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true. The sports fields at the Great Park are only lit until 10pm. The rail yard project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impacts on air quality, noise, hazardous materials and traffic as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its' current location. At a minimum, we urge the City of Irvine to require that OCTA prepare a more rigorous Environmental Impact Study. We believe that this study will prove that this rail yard does not belong in the Great Park neighborhood and needs to be relocated away from residents and park visitors. Sincerely, Kevin Lee, M.D. 142 Burgess, Irvine CA 92618	Refer to Comment Response 2 regarding impacts related to lighting and visual quality. Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.
75	03/28/22	Archana Darekar	darekar.archana@gmail.com 109 Augustine, Irvine CA	Dear City leaders: OCTA railcar maintenance center at Great Park is just the wrong location for Irvine residents. It will affect the Great Park surrounding communities in air quality, noise, lights, traffic jam on Marine Way and potential diesel tank explosion or leaking. Please deny OCTA permit application with dense population around it and children sports amenities. Best regards Archana Darekar 109 Augustine Irvine CA 92618	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 2 regarding impacts related to lighting and visual quality.
76	03/28/22	Revital Gallen	revital.gallen@gmail.com 118 Full Sun, Irvine CA	Hello, We were concerned to hear about the request to permit OCTA to open a railcar maintenance center at Great Park. That location for a maintenance center should be denied as it will raise health and environmental issues to the surrounding Irvine residents. A different location should be searched. If approved at the location currently requested, it will affect the Great Park surrounding communities in air quality, noise, lights, traffic jam on Marine Way and potential diesel tank explosion or leaking. The Great Park surrounding communities already deal with increased traffic due to the activities taking place across the street, however, a maintenance center will put an unduly burden on us and will impact our wellbeing. We urge you to protect our interests and wellbeing and seek to request OCTA permit application elsewhere. We requested the city to reject the application for the same reasons. Kind regards, Revital Gallen 118 Full Sun Irvine, CA	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 1 regarding relocation or alternative site of the Project. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 2 regarding impacts related to lighting and visual quality.
77	03/28/22	Frank and Aileen Smith	smithfrankb@msn.com 864-640-5869 141 Palencia, Irvine CA	Following is an email which I shared with various OCTA and Irvine Officials regarding the proposed Metrolink Railyard facility in the Great Park. Comments below pertain to The Mitigated Negative Declaration and its deficient environmental report (MND). As detailed below, we and all of our neighbors in the nearby Travata Community, strongly oppose this project and take exception with the way it has been developed. There are many deficiencies which we have discovered as outlined below. There is a very strong consensus that this project should never have been proposed for this location and should never be built here. It is inexplicable how so much time and effort has been devoted to this project without seeking input from the nearby communities and users of the Great Park. We strongly urge that this location should be abandoned and that no more time and money should be wasted trying to justify the project. We hope that you will give due consideration to all of the issues outlined below. Thank you, Frank and Aileen Smith Travata Community 141 Palencia, Irvine, Ca 92616 Phone 864-640-5869	Opposition of the Project has been noted and will be considered by OCTA Refer to Comment Response 1 regarding relocation or alternative site of the Project. Section 2.7 of the IS/MND describes public outreach activities completed for this Project.
78	03/29/22	Ed Olivares	eolivares7603@gmail.com 127 Burgess, Irvine CA	OCTA Maintenance Facility Project Planners: Hello, my name is Edgar Olivares, I live at 127 Burgess, Irvine CA, 92618. I am a full-time resident of the community located at the corner of Ridge Valley and Marine Way. I am writing this to ask that the Conditional Use Permit Application for the development of the OCTA Railroad Maintenance Facility be withdrawn on the basis that the Initial Study/Mitigated Negative Declaration prepared by OCTA does not adequately address many issues that are critical to the environmental space, and the health and welfare of the residents in my community. Location of the facility as currently proposed does not allow for mitigation of these issues. A more appropriate siting is near the existing railway station near the end of Marine Way at Barranca. Three examples of issues follow: 1- The Project Site boundary; integral in the project is the development of a Ridge Valley Road extension designated as a private road (presumably) exclusive to OCTA use. The entrance at Marine Way is approximately 150' from homes in my community. Supplies of materials and wastes from the operation will be regularly transported and and potentially staged in too-close proximity to existing family homes. 2- The IS/MND is not independently detailed to determine the level of negative impact to the existing environmental space, and the health and welfare of members of my community - in part as pertains to air quality, noise, lighting, and visual esthetics. 3- Years prior to the purchase of my home in 2018, the OCTA formally communicated the intended development and use of the current site to the City of Irvine. This information was omitted from required hazard disclosures during my purchase process. I appreciate the opportunity to provide input and look forward to your modified efforts moving forward. Sincerely, Ed Olivares	Refer to Comment Response 16 regarding impacts related to hazardous materials. Refer to Comment Response 1 regarding impacts related to air quality and noise, and Comment Response 2 regarding impacts related to lighting, visual quality, and aesthetics. Refer to Comment Response 1 regarding concern over disclosure of project.
79	03/29/22	Siliang Zhang	siliang1973@gmail.com	Good morning, I saw the news last week that the metro link train maintenance facility will be proposed near the Great Park. I live in cypress village, very close to the great park. I am opposed to this plan. You really should pick somewhere else with less people living there. Your plan will affect a lot of people who live near Great Park. It will take 6 years to be finished, and for all those years the residents will have to live with noise, air pollution and traffic. So why not stop it now. In addition, if you build the facility, the Great Park neighborhood will have a much worse environment and the residents will be very angry and disappointed. I think the Metrolink train maintenance facility does not fit the environment of Great Park at all. Irvine was voted the best city to live in for the fourth consecutive year. And I believe the proposed project will damage the city's image. I hope the great park is getting better and better. Please don't construct a metro link train maintenance facility near great park. I will be very grateful if you could take my opinion seriously Thank you. Best regards, Siliang Zhang	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 1 regarding impacts related to air quality, noise, and traffic. Refer to Comment Response 4 regarding impacts related to land use and zoning.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
80	03/29/22	Bonnie and David Gabai	bgabai@me.com	To Whom This May Concern: > I am writing to you to please vote against placing the OCTA train maintenance facility that is planned at the corner of great park across from my community Travata at Marine Way and Ridge Valley. My husband and I bought this home to enjoy our final years. Many months after moving here, we learned that OCTA was going to be placing a facility to maintenance trains during the hours of 10 PM to 6 AM - all through the middle of the night. Lennar never informed us of this development as we made the purchase of our home. This facility is planned to be near the current train tracks that bring tremendous noise to where we live already. Bringing a maintenance facility to this area would only disturb any quiet that still exists near us. Between the freeway, the 5 point amphitheater, loud sporting games at the park, as well as the nearby trains - it's loud enough. Most importantly, I'm asking that you consider the health of our community as you make this decision and place this facility in another location. The effects of this will be great and includes diseases, crime, and more. Please imagine you, a family member, parent, child, sister, brother or any other relative finding out that there was going to be a maintenance facility that imposes direct danger to their community within walking distance from their front door. Our 55+ community is filled with good people that care about the Irvine community and have family members, children, grandchildren, nieces, nephews, and friends that lives nearby. We have spent our hard earned money to make Irvine Great Park our home. I know that planning commissioners are happy to place these sort of facilities near by senior residences because they believe that they're not able to hear, smell, or see in their older years. We are here, fighting this battle, using our voice and asking for your help and consideration. I would like you to reconsider this heinous idea to place this facility next to us. The environmental hazards alone would make this a toxic environment for all of us. Many of the people in our community and our family have serious health problems -this can only make it worse. Many of you may have family members that play at great Park- this will affect them as well. Perhaps a child with asthma will get the downwind as we will from these dirty trains and the Harsh toxic chemicals that they clean the trains with. The proposal includes 100,000 gallon gas tanks that can, if ignited, cause a severe fire through the entire community and park within seconds. I have seen firsthand the dangerous effects of fires and toxic chemicals can do. I just moved from a community where my home was damaged from the Woolsey fire. Gasoline from Rocketdyne penetrated the ground soil for years and the fire ruined many friends homes, and our home incurred much damage. One reckless cigarette - and what you hold dearest is gone. I grew up in Newport Beach and am familiar with the history of the El Toro marine base, going back to World War II, and the toxins in the ground that Super fund just cleaned up to make Great Park the new and thriving community it is. Why dirty land that just got cleaned up? Please vote to relocate this facility far away from us. Please don't let bureaucratic dollars influence your decision to build this facility. We elect you to protect all of our families and your families too. If the roles were reversed, we would be making sure that all families in Irvine are protected from the horror this facility will cause. Please do your job and do what is right by not building this disastrous OCTA train maintenance facility. If you have a conscience, make sure not to destroy all our neighborhood. > Sincerely, > Bonnie and David Gabai	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 regarding impacts related to air quality, noise, and traffic. Section 3.15.1 of the IS/MND states three police stations are located near the Project Site. They are the Irvine Valley College Police Department, the Cal State Fullerton Police Department, and the Irvine Police Department – Spectrum Substation. The Spectrum Substation will be the principal service provider to the Project Site. The two school police departments do not usually answer requests outside of their respective campuses; however, additional staff could be dispatched for emergencies. In addition, the Irvine Police Department headquarters located 4.4 miles northwest of the Project Site could also serve as a backup in situations where the other three closer police departments are short in staff. With a low crime rate, the capacity of police service is sufficient for the Project Site through coordination of the three police departments. Refer to Comment Response 16 regarding impacts related to hazardous materials.
81	03/29/22	Carolyn Peter	carolyn.peter@gmail.com 116 Burgess, Irvine CA	To the Mitigated Negative Declaration regarding OCTA and its proposed Metrolink Rail Yard: I am a resident of the Travata Community across from the proposed Rail Yard Maintenance Facility. This project highly concerns many residents. 1) Noise: Logically noise will be an unending factor if the rail yard is built. It is not only an issue during construction but will continue as trains are brought in for maintenance, repair (sanding of wheels), washing of rail cars, refueling, trucks bringing supplies, equipment, moving of rail cars here and there, workers coming and going. Only estimates can be made as to the noise levels. It cannot actually be measured. Maintenance will be done all hours of the night and during the day. Noise carries farther than people realize. 2) Zoning: The train yard is being classed as "institutional" land use, such as a school or church. This is indeed "heavy industry" land use. This includes heavy equipment, forklifts, cranes plus industrial chemicals. 3) Aesthetics: MND claims there will be no impact on the views of the hills southwest of our community and the Great Park. But with a 5 story building being planned and 4 permanent cranes (what is their height?) being installed there is no way our views will not be negatively impacted. An eyesore to say the least. Irvine is known for its commitment to maintaining a safe and beautiful city. 4) Air Quality: Noise and air quality are two very important negative factors. a) MND admits rail yard activities produce high levels of particulates. Trains are major contributors of toxic air contaminants including construction equipment. Diesel particulate matter accounts for two thirds of the cancer risk from air toxins. b) Air Resources Board of 2005 (a Federal Agency) recommends a 1000 ft buffer between rail yards and residences. Some of the Travata homes would be within 500 ft of the proposed rail yard. c) MND says EPA is trying to reduce diesel fuel emissions by as much as 90% but we as residents have no idea where Metrolink's fleet is regarding this attempt. d) Rail yards and residential areas are not compatible. Not one Metrolink station is as close to a residential area as this rail yard will be to our residential area. And don't think the Great Park will not be affected as well. e) Lastly four .....30,000 gallon fuel tanks will be built on site. Not only a hazard but a potential risk to the entire community. A fire? 5) Lighting: Night time lighting would certainly be a negative impact on our community. Will the 4 cranes be lit up at night? Of course they will since maintenance will be happening all night. MND mentions that we already deal with the light from the Great Park. Really? The lighting is a completely different form of atmosphere and much farther away. 6) Traffic: The road Marine Way is ill equipped to handle the traffic as is. Then when the Water Park is completed that will add even more traffic. It is a one lane road. Great Park uses, distribution, events recycling plant, nursery, people cutting over from Sand Canyon. It is a thoroughfare. Now add the construction trucks, fuel trucks etc. Lastly when there was a potential to need to evacuate because of an ensuing wildfire, it was a real concern. Can we get out? 7) This proposed project of a rail yard has serious adverse effects on this community directly and indirectly because of the negative impact on air quality, risk, noise, light, aesthetics and traffic. These cannot be mitigated. Find another site away from residential and park areas. Would any of you be willing to live within 500 feet of a Rail Yard Maintenance Facility? Carolyn Peter 116 Burgess Irvine, CA 92618	Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 1 regarding impacts related to noise and traffic, and Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 2 regarding impacts related to lighting, visual quality, and aesthetics. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 16 regarding impacts related to hazardous materials.
82-1	03/29/22	John Chapman	chapman8544@gmail.com 949-422-6704 237 Carlow, Irvine, CA	To Whom It May Concern: My name is John Chapman a homeower in the Irvine neighborhood of Travata and I am opposed to the OCTA Metrolink Rail Yard. I am shocked, as a long time resident of Irvine that the City would even consider allowing this kind of an addition to our beautiful City. I do understand they have to take this application & go though the steps of reviewing this application. The city needs to unanimously vote NO on this application; as soon as, the process allows them to do so. They are certainly well aware that the entire community of Travata is united in fierce opposition to locating the rail yard in such close proximity to our homes. It is really important that OCTA and City of Irvine officials hear loudly and clearly that the proposed site for the OCTA rail yard must be relocated so that it is not near residents and Great Park users. The negative impacts to our health and well-being cannot be sufficiently mitigated. RESPONSE TO OCTA'S ENVIRONMENTAL REPORT ZONING: The train yard site within Irvine's Great Park is not compatible with the existing institutional zoning designation. A train yard that involves the use of heavy machinery, hazardous chemicals and emits high levels of particulates into the surrounding residential and recreational areas violates the planning area's purpose. Per the MND, 'The Project type is closest to an industrial type' and therefore does not belong in an institutional zone. Why was this land ever sold to OCTA for a rail yard when it is clearly not compatible with the nearby residents and Great Park visitors. AIR QUALITY: The operational impacts from the rail yard will be primarily from diesel particulate matter. The MND notes that as of 2005, the Air Resources Board (Federal Agency) recommended a 1,000 foot buffer between residences and rail yards. (Travata's closest homes are within 500 feet of the train yard's nearest property line.) The next highest impact was determined to be between one-half to one mile from the site, which is where the original site for the rail yard was located along Sand Canyon. At the proposed site, the MND estimates an increased cancer risk for the community of Travata. At a minimum, this finding alone should indicate that a more rigorous study of the negative impacts on nearby residents and park users be undertaken. NOISE: Measurements of sound levels at the site were taken at a time when trains were only passing by Travata and yet they caused substantial spikes in noise near Travata. Once operational, the train noise from many more trains compounded by the longer noise impact of the slowing trains and possible use of the whistle to enter the yard would substantially increase the frequency and duration of the noise spikes. The noise impact alone may explain why Metrolink stations are not located anywhere near residential areas. This is not even taking the sounds from the equipment used in the train yard into consideration. TRAFFIC: Access to the rail yard is along the same single lane road (Marine Way) that is presently well beyond its capacity to handle all users. Travata residents, Great Park users, food bank, distribution center, recycling plant, nursery and soon water park users all are forced onto a single lane road. This road already clearly showed its inadequacy for use as an evacuation road when the Cypress Village community (that includes Travata) was under a voluntary evacuation during the October 2020 wildfire. Traffic was jammed and very slow moving and at a time when the Great Park sports fields were closed due to the pandemic. This inadequate roadway could see the same result as we all witnessed during the Paradise, California fire tragedy. HAZARDOUS MATERIALS: The MND repeatedly uses the word 'normal' when discussing the storage of petroleum products and hazardous chemicals. There is nothing more concerning than having these types of substances within such a short distance of residences and Great Park visitors. On any given day, there might be thousands of people within 1,000 feet of the site. This is very concerning given that we hear constantly about leaks, fires, etc. occurring at industrial sites such as the rail yard. This is a dangerous facility to be located anywhere near to such a busy area and one that already suffers from congested roadways.	Opposition of the Project has been noted and will be considered by OCTA. Refer to Comment Response 4 regarding impacts related to land use and zoning. Refer to Comment Response 9 regarding impacts related to diesel fuel and particulate matter. Refer to Comment Response 1 regarding impacts related to noise and traffic, and Comment Response 11-2 regarding impacts related to fire evacuation. Refer to Comment Response 16 regarding impacts related to hazardous materials.
82-2	03/29/22	John Chapman	chapman8544@gmail.com 949-422-6704 237 Carlow, Irvine, CA	LIGHTING: Nighttime lighting would certainly impact residents' views over the site contrary to the report. As 80% of the train yard's operations will be during the overnight hours, all of the cranes and surrounding area will need to be well lit and quite visible from a large segment of Travata's residences along Marine Way and Ridge Valley. Any resident trying to sleep in the upstairs rooms will definitely look out onto the train yard and will be impacted by the lighting. The MND incorrectly states that field lighting at the Great Park obscures our views anyway which is not true. The sports fields at the Great Park are only lit until 10pm. CONCLUSION: The rail yard project has environmental impacts that will cause substantial adverse effects on humans both directly and indirectly as a result of the negative impacts on air quality, noise, hazardous materials and traffic as discussed herein. These negative impacts cannot be mitigated to make the rail yard project feasible at its' current location. We believe that this rail yard does not belong in the Great Park neighborhood and needs to be relocated away from residents and park visitors. Thank you in advance for your consideration of stopping this proposed rail yard. John Chapman 237 Carlow Irvine CA 92618	Refer to Comment Response 2 regarding impacts related to lighting and visual quality. Section 3.21 of the IS/MND states the Project with mitigation measures would not result in substantial adverse effects on human beings, either directly or indirectly.
83	03/29/22	Christine Chiang	erhpei@yahoo.com	To whom it may concern, The railcar maintenance center at Great park is just a wrong location for Irvine residents. It will affect the Great Park surrounding communities in air quality, noise, lights traffic jam. We have children and family that love to enjoy the outdoors and this facility can adversely affect our health and well being. We do have concerns for this project and hope our voice can be heard. Thank you. Christine Chiang	Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 2 regarding impacts related to lighting.

Comment No.	Date Received	Commentor Name(s)	Contact Info	Comment Received	Response to Comment
84	03/29/22	Patty Olvera	averybusymom2@gmail.com 169 Carlow, Irvine, CA	Hello, I lived in Santa Ana for 35 years before moving to Irvine in 2019. I just love this city. I am a Registered Nurse and retired recently. I am blessed to live in the beautiful neighborhood of Travata. The OCTA rail maintenance facility looks like it will be very efficient, as well as aesthetically pleasing. What you cannot see in the drawings is the amount of noise that it will create. In a recent report that I read, it said that the decibels will be at acceptable levels. I do not believe that this will be the case, especially because the facility will operate mainly throughout the night. This is just my opinion and a suggestion, but I think that most of the opposition will go away if you move this facility to the Southern section of this empty lot as opposed to the Northern section. This would place the rail facility in an industrial area and much further away from homes. While no one wants this facility "in their backyard," it doesn't have to be in anyone's backyard, if you move to the Southern section of this same empty lot. While OCTA only purchased the Northern section of this lot from Orange County, they failed to notice or didn't care about the homes that were 1000 feet away. Maybe Orange County will exchange the Southern sections of this lot with OCTAs Northern section. I know it is not that simple, but it will make a huge difference to the quality of our lives. Sincerely, Patty Olvera, 169 Carlow Irvine, CA 92618	Refer to Comment Response 1 regarding impacts related to noise. Refer to Comment Response 4 regarding impacts related to land use and zoning.
85	03/29/22	Richard and Bonnie Kettering	dbkettering@cox.net 166 Palencia Irvine CA	Bonnie Kettering 166 Palencia Irvine, CA 92618 March 29, 2022 Dear Mayor and council members: Our recently constructed Travata community (55 years and over) has been given a major blow by finding out about the plans to build an OCTA train maintenance facility directly across the street from our community. This project was never disclosed to us in the required disclosure documents, prior to purchasing our properties, and we would have never bought our homes in the Travata development if we had known what was being planned. A 24 hour a day train maintenance facility within 500 feet of our community is totally unacceptable. Noise, light, air/ ground pollution and its visual presence have the potential to drastically alter the quality of our lives and values of our properties. Our community is made up of senior citizens and this is the wrong project for the proposed location. It is our understanding that the OCTA is asking for an additional $273,974 for additional engineering services related to the Metrolink Rail Facility. This will increase that maximum available on the contract to the firm that prepared the Mitigated Negative Declaration to $4.04 million. Our community has submitted numerous comments during the public comment period objecting to the MND and the project as a whole. Additional spending for further work by a firm, Gannett Fleming, Inc., that already produced an unacceptable report is a waste of county funds. At a minimum, OCTA should wait until the end of the public comment period to determine what action to take as far as additional environmental analysis of the Rail Facility. We need to have a meeting with city council and city planner representatives as soon as possible to discuss this matter and to voice our concerns. A meeting at our Travata Community Center with city representatives is requested as soon as possible. This is a very serious matter and we do not want to end up with another "North Irvine - All American Asphalt Plant" nightmare in our backyard. Any help you can give to Travata with these issues is appreciated. Sincerely, Bonnie Kettering	Refer to Comment Response 1 regarding concern over disclosure of project. Refer to Comment Response 1 regarding impacts related to noise, air quality, and traffic. Refer to Comment Response 2 regarding impacts related to lighting. Refer to Comment Response 2 regarding All-American Asphalt.

Appendix K
Mitigation Monitoring and Reporting Program

Metrolink Orange County Maintenance Facility

Prepared for:

Orange County Transportation Authority

550 S. Main St.
Orange, CA 92868
and

Gannett Fleming
20 Pacifica, Suite 430
Irvine, CA 92618

Prepared by:

AECOM
300 S. Grand Ave.
Los Angeles, CA 90071

September 2023

REVISION	DESCRIPTION	DATE
0	Draft Mitigation Monitoring and Reporting Program	4/1/2022
1	Update of Mitigation Measures per coordination with Kizh Nation	9/22/2023

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1. PURPOSE OF THIS MITIGATION MONITORING AND REPORTING PROGRAM

This Mitigation Monitoring and Reporting Program (MMRP) has been prepared pursuant to the California Environmental Quality Act (CEQA) and the State CEQA Guidelines to provide for monitoring of the mitigation measures required by adoption of the Initial Study/Mitigated Negative Declaration (IS/MND) of the Southern California Regional Railroad Authority (SCRRA) Metrolink Commuter Rail System (Metrolink) Orange County Maintenance Facility (hereafter referred to as "OCMF" or "the Project"). Section 21081.6 of the Public Resources Code and Section 15091(d) of the CEQA Guidelines require public agencies to "adopt a reporting or monitoring program for changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment." As the lead agency under CEQA, the Orange County Transportation Authority (OCTA) must define specific reporting and/or monitoring requirements to be enforced during project implementation prior to the Project's final approval.

The MMRP stipulates how all required mitigation measures are to be implemented and completed during the appropriate project phase. It also facilitates documentation necessary to verify that mitigation measures were in fact properly implemented.

2. MITIGATIONS MONITORING AND REPORTING PROGRAM PROCEDURES

2.1 PURPOSE OF THE MMRP

This MMRP gives OCTA the primary responsibility for taking all actions necessary to implement the mitigation measures according to the specifications provided for each measure and for demonstrating that the action has been successfully completed. The OCTA's designated environmental monitor will track and document compliance with mitigation measures, note any problems that may result, and take appropriate action to remedy problems. OCTA, at its discretion, may delegate responsibility for measure implementation and monitoring, or portions thereof, to other responsible individuals and agencies, such as a licensed contractor.

Specific responsibilities for the OCTA include:

- Coordination of all mitigation monitoring activities
- Management of the preparation, approval, and filing of monitoring or permit compliance reports
- Maintenance of records concerning the status of all approved mitigation measures
- Quality control assurance of field monitoring personnel
- Coordination with other agencies regarding compliance with mitigation or permit requirements
- Reviewing and recommending acceptance and certification of implementation documentation
- Acting as a contact for interested parties or surrounding property owners who wish to register concerns regarding environmental issues; verifying any such circumstances; and developing any necessary corrective actions.

2.2 RESOLUTION OF NONCOMPLIANCE COMPLAINTS

Any person or agency may file a complaint regarding noncompliance with the mitigation measures addressed in the MMRP. The complaint shall be directed to OCTA at the mailing address listed below in written form providing detailed information on the purported violation.

Orange County Transit Authority
600 S Main St
Orange, CA 92868

OCTA will investigate any complaints filed to determine the validity of the complaint. If noncompliance with a mitigation measure is verified, OCTA will take the necessary action(s) to remedy the violation. The complainant will receive written confirmation indicating the results of the investigation, including any corrective actions.

2.3 MITIGATION MONITORING AND REPORTING PROGRAM MATRIX

The MMRP is organized in a matrix format.

- The first column identifies the mitigation measure.
- The second column, entitled “Time Frame for Implementation,” refers to when monitoring will occur. The timing for implementing mitigation measures and the definition of the approval process has been provided to assist OCTA staff to plan for monitoring activities.
- The third column, entitled “Responsible Party,” refers to the agency or other party responsible for ensuring that the mitigation measure is implemented.
- The fourth column, entitled “Monitoring Party,” refers to the party that will conduct the monitoring to ensure compliance with the mitigation measure.
- The fifth column, entitled “Monitoring Period”, indicates when monitoring will occur during implementation of the Project.

The mitigation measures are presented by environmental issue area.

MITIGATION MEASURE		IMPLEMENTATION TIMEFRAME	RESPONSIBLE PARTY	MONITORING PARTY	MONITORING MILESTONE/ PERIOD
AIR QUALITY					
MM-AQ-1: *Utilize low VOC paint for architectural coating activities during Phase 2 construction.*	To reduce volatile organic compound (VOC) emissions during construction, the Project contractor shall utilize water-based or low VOC interior and exterior paints. The VOC content of the architectural coatings shall comply with the VOC content limits in South Coast Air Quality Management District (SCAQMD) Rule 1113 or not exceed 100 grams per liter, whichever is lower. To ensure that low VOC paint will be used during Project construction, this requirement will be included in applicable bid documents, purchase orders, and contracts. Successful contractor(s) must demonstrate the ability to supply the compliant architectural coatings for use prior to any coating activities. A copy of each proposed architectural coating Material Safety Data Sheet and VOC content shall be available upon request. Alternatively, the contractor may utilize tilt-up concrete buildings that do not require the use of architectural coatings.	Pre-Construction and Construction	Construction Contractors	OCTA	Incorporation of this mitigation measure in the final design specifications provided to the contractor Equipment log provided at intervals during construction
BIOLOGICAL RESOURCES					
MM-BIO-1: *Designate Project Biological Monitor(s).*	Ground-disturbing activities during construction shall occur outside of the nesting bird season (generally February 15 through September 1). If avoiding the nesting season is not practicable, the following additional measures shall be employed: • A pre-construction nesting survey shall be conducted by a qualified biologist within 3 days prior to the start of construction activities to determine whether active nests are present within or directly adjacent to the construction zone. All nests found shall be recorded. • If construction activities must occur within 300 feet of an active nest of any passerine bird or within 500 feet of an active nest of any raptor, with the exception of an emergency, a qualified biologist shall monitor the nest on a weekly basis, and the activity shall be postponed until the biologist determines that the nest is no longer active. • If the recommended nest avoidance zone is not feasible, the qualified biologist shall determine whether an exception is possible and obtain concurrence from the resource agencies before construction work can resume within the avoidance buffer zone. All work shall cease within the avoidance buffer zone until either agency concurrence is obtained or the biologist determines that the adults and young are no longer reliant on the nest site.	Final Design and Construction	Final Design and Construction Contractors	OCTA	Final Plan Check and Ongoing during Construction
MM-BIO-2: *Compliance with USACE SAMP Mitigation Procedures.*	Pursuant to Special Area Management Plan (SAMP) requirements, if a permanent loss of regulated waters or streambed occurs because of the Project, compensatory mitigation (purchase of credit at an in-lieu fee or mitigation bank approved by the resource agencies, or applicant proposed enhancement or establishment of waters or streambed) shall be provided at a minimum ratio of 1:1. Temporary impacts shall be restored to pre-Project conditions to the extent practicable.	Final Design and Construction	Final Design and Construction Contractors	OCTA and USACE	Final Plan Check and Ongoing during Construction
CULTURAL RESOURCES					
MM-CUL-1: *Cultural Resources Awareness Training.*	Prior to construction, OCTA shall retain a qualified archaeologist who meets the Secretary of the Interior's Guidelines for Archaeology (36 CFR Part 61). The qualified archaeologist shall prepare a Cultural and Tribal Cultural Resources Awareness Training as part of the Project Worker Environmental Awareness Program (WEAP). The training will instruct workers as to the laws protecting cultural and tribal cultural resources and also give examples of the kinds of resources that can be reasonably expected to be found in the Area of Potential Effect (APE). An environmental compliance contact responsible for enforcing mitigation measures and who is to be notified in the event of a find will be identified in the training. Training will be delivered to all staff involved in ground-disturbing activities prior to their working on the project.	Final Design and Construction	Final Design and Construction Contractors	OCTA	Final Plan Check and Ongoing during Construction

MITIGATION MEASURE		IMPLEMENTATION TIMEFRAME	RESPONSIBLE PARTY	MONITORING PARTY	MONITORING MILESTONE/ PERIOD
MM-CUL-2: *Preparation of a Cultural Resources Monitoring and Discovery Plan.*	Prior to construction, a project-specific cultural resources monitoring and discovery plan (CRMDP) will be developed by a qualified archaeologist who meets the Secretary of the Interior's Guidelines for Archaeology (36 CFR Part 61). The monitoring plan should identify what construction activities that occur in native soils would require archaeological and tribal monitoring, describe monitoring procedures, and outline the protocol to be followed in the event of a find. Criteria will be defined and triggers identified as to when further consultation is required for the treatment of finds. Plans of treatment of typical finds will be detailed, as will a plan of treatment for any human remains that are inadvertently encountered. If a potentially significant discovery is made and cannot feasibly be avoided, then additional work, potentially including data recovery excavations, may be required. Key staff will be identified, and the process of notification and consultation will be specified within the CRMDP. A curation plan will also be outlined within the CRMDP. All work should be conducted under the direction of a qualified archaeological Principal Investigator who meets the Secretary of the Interior's standards for archaeology. Consulting tribes under AB52 for the Project shall have the opportunity to review and comment on the draft CRMDP.	Final Design and Construction	Final Design and Construction Contractors	OCTA	Final Plan Check and Ongoing during Construction
PALEONTOLOGICAL RESOURCES					
MM-GEO-1: *Worker Environmental Awareness Program.*	Prior to construction, OCTA shall retain a qualified paleontologist who meets the requirements to be included in Orange County's list of qualified paleontologists. The qualified paleontologist shall prepare a WEAP. The WEAP will describe the types of resources that may be encountered during construction, the laws protecting those resources, and the procedures to follow when finds are encountered. The WEAP will be presented either in person or in video form to all construction employees involved in ground-disturbing activities before they begin work at the Project Site.	Final Design and Construction	Final Design and Construction Contractors	OCTA	Final Plan Check and Ongoing during Construction
MM-GEO-2: *Response to Unanticipated Paleontological Finds.*	If buried paleontological resources are uncovered during construction, all work shall be halted in the vicinity of the discovery until a qualified paleontologist can visit the site of discovery and assess the significance of the resource and, if necessary, recommend treatment.	Construction	Construction Contractors	OCTA	Ongoing during Construction
HAZARDS AND HAZARDOUS MATERIALS					
MM-HAZ-1: *Notifications to Federal, State and Local Agencies.*	The Project applicant shall notify the appropriate agencies (e.g., Orange County Health Care Agency [OCHCA], Department of Toxic Substances Control [DTSC], United States Environmental Protection Agency [EPA], or the Regional Water Quality Board) regarding soil, soil gas and/or groundwater contamination in connection with the ongoing military clean-up site associated with the former El Toro Marine Corps Air Station (MCAS) Superfund site.	Final Design and Construction	OCTA	OCHCA, DTSC, EPA, Santa Ana Regional Quality Board	Final Plan Check
MM-HAZ-2: *Groundwater Monitoring Requirements.*	Where the Project Site construction and operational activities coincide with the current groundwater monitoring systems (e.g., wells, water transfer conveyance lines), the requirements of the Institutional Control (IC) in connection with IRP Site 24 for the ongoing military clean-up site associated with the former El Toro MCAS Superfund site shall be adhered to in order to protect human health and the environment from potential hazardous materials exposures.	Final Design and Construction	Construction Contractors	OCTA	Final Plan Check and Ongoing during Construction
MM-HAZ-3: *Soil Assessment for Hazardous Materials.*	Prior to construction activities at the Project Site, if required by the state or local regulatory oversight agencies, then further assessment including soil, soil vapor and/or groundwater investigations shall be conducted to reveal the presence, if any, of potential hazardous materials at the Project Site that were identified as a result of the Phase I ESA, and would assist in determining further mitigations required to address human health and/or the environmental impacts due to potential hazardous materials exposures.	Final Design and Construction	OCTA and Construction Contractors	EPA	Final Plan Check and Ongoing during Construction

MITIGATION MEASURE		IMPLEMENTATION TIMEFRAME	RESPONSIBLE PARTY	MONITORING PARTY	MONITORING MILESTONE/ PERIOD
NOISE					
MM-NOI-1: *Relocate Pile Driving Activities*.	If feasible, relocate Project elements requiring pile driving to locations greater than 250 feet from occupied buildings.	Final Design and Construction	Final Design and Construction Contractors	OCTA	Final Plan Check and Ongoing during Construction
MM-NOI-2: *Alternative Pile Insertion*.	If MM-NOI-1 is not feasible, use a less intrusive form of pile insertion, such as pre-augured piling.	Final Design and Construction	Final Design and Construction Contractors	OCTA	Final Plan Check and Ongoing during Construction
MM-NOI-3: *Schedule Pile Driving Activities.*	Arrange to conduct pile driving activities during a period when the affected building(s) are not in use (such as Saturdays).	Final Design and Construction	Final Design and Construction Contractors	OCTA	Final Plan Check and Ongoing during Construction

MITIGATION MEASURE		IMPLEMENTATION TIMEFRAME	RESPONSIBLE PARTY	MONITORING PARTY	MONITORING MILESTONE/ PERIOD
TRIBAL CULTURAL RESOURCES					
MM-TCR-1: *Native American Monitoring.*	Retain a Native American Monitor Prior to Commencement of Ground-Disturbing Activities. A. The project applicant/lead agency shall retain a Native American Monitor from or approved by the Gabrieleño Band of Mission Indians – Kizh Nation. The monitor shall be retained prior to the commencement of any "ground-disturbing activity" for the subject project at all project locations (i.e., both on-site and any off-site locations that are included in the project description/definition and/or required in connection with the project, such as public improvement work). "Ground-disturbing activity" shall include, but is not limited to, demolition, pavement removal, potholing, auguring, grubbing, tree removal, boring, grading, excavation, drilling, and trenching. B. A copy of the executed monitoring agreement shall be submitted to the lead agency prior to the earlier of the commencement of any ground-disturbing activity, or the issuance of any permit necessary to commence a ground-disturbing activity. C. The monitor will complete daily monitoring logs that will provide descriptions of the relevant ground-disturbing activities, the type of construction activities performed, locations of ground-disturbing activities, soil types, cultural-related materials, and any other facts, conditions, materials, or discoveries of significance to the Tribe. Monitor logs will identify and describe any discovered TCRs, including but not limited to, Native American cultural and historical artifacts, remains, places of significance, etc., (collectively, tribal cultural resources, or "TCR"), as well as any discovered Native American (ancestral) human remains and burial goods. Copies of monitor logs will be provided to the project applicant/lead agency upon written request to the Tribe. D. On-site tribal monitoring shall conclude upon the latter of the following (1) written confirmation to the Kizh from a designated point of contact for the project applicant/lead agency that all ground-disturbing activities and phases that may involve ground-disturbing activities on the project site or in connection with the project are complete; or (2) a determination and written notification by the Kizh to the project applicant/lead agency that no future, planned construction activity and/or development/construction phase at the project site possesses the potential to impact Kizh TCRs. E. Upon discovery of any TCRs, all construction activities in the immediate vicinity of the discovery shall cease (i.e., not less than the surrounding 50 feet) and shall not resume until the discovered TCR has been fully assessed by the Kizh monitor and/or Kizh archaeologist. The Kizh will recover and retain all discovered TCRs in the form and/or manner the Tribe deems appropriate, in the Tribe's sole discretion, and for any purpose the Tribe deems appropriate, including for educational, cultural and/or historic purposes.	Final Design and Construction	Final Design and Construction Contractors	OCTA and Kizh Nation	Final Plan Check and Ongoing during Construction

MITIGATION MEASURE		IMPLEMENTATION TIMEFRAME	RESPONSIBLE PARTY	MONITORING PARTY	MONITORING MILESTONE/ PERIOD
MM-TCR-2: *Unanticipated Discovery of Human Remains and Associated Funerary Objects*	Unanticipated Discovery of Human Remains and Associated Funerary Objects. A. Native American human remains are defined in PRC 5097.98 (d)(1) as an inhumation or cremation, and in any state of decomposition or skeletal completeness. Funerary objects, called associated grave goods in Public Resources Code Section 5097.98, are also to be treated according to this statute. B. If Native American human remains and/or grave goods discovered or recognized on the project site, then all construction activities shall immediately cease. Health and Safety Code Section 7050.5 dictates that any discoveries of human skeletal material shall be immediately reported to the County Coroner and all ground-disturbing activities shall immediately halt and shall remain halted until the coroner has determined the nature of the remains. If the coroner recognizes the human remains to be those of a Native American or has reason to believe they are Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission, and Public Resources Code Section 5097.98 shall be followed. C. Human remains and grave/burial goods shall be treated alike per California Public Resources Code section 5097.98(d)(1) and (2). D. Construction activities may resume in other parts of the project site at a minimum of 200 feet away from discovered human remains and/or burial goods, if the Kizh determines in its sole discretion that resuming construction activities at that distance is acceptable and provides the project manager express consent of that determination (along with any other mitigation measures the Kizh monitor and/or archaeologist deems necessary). (CEQA Guidelines Section 15064.5(f).) E. Preservation in place (i.e., avoidance) is the preferred manner of treatment for discovered human remains and/or burial goods. Any historic archaeological material that is not Native American in origin (non-TCR) shall be curated at a public, non-profit institution with a research interest in the materials, such as the Natural History Museum of Los Angeles County or the Fowler Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, it shall be offered to a local school or historical society in the area for educational purposes. F. Any discovery of human remains/burial goods shall be kept confidential to prevent further disturbance.	Final Design and Construction	Final Design and Construction Contractors	OCTA and Kizh Nation	Final Plan Check and Ongoing during Construction

MITIGATION MEASURE		IMPLEMENTATION TIMEFRAME	RESPONSIBLE PARTY	MONITORING PARTY	MONITORING MILESTONE/ PERIOD
MM-TCR-3: *Procedures for Burials and Funerary Remains.*	Procedures for Burials and Funerary Remains. A. As the Most Likely Descendant ("MLD"), the Koo-nas-gna Burial Policy shall be implemented. To the Tribe, the term "human remains" encompasses more than human bones. In ancient as well as historic times, Tribal Traditions included, but were not limited to, the preparation of the soil for burial, the burial of funerary objects with the deceased, and the ceremonial burning of human remains. B. If the discovery of human remains includes four or more burials, the discovery location shall be treated as a cemetery and a separate treatment plan shall be created. C. The prepared soil and cremation soils are to be treated in the same manner as bone fragments that remain intact. Associated funerary objects are objects that, as part of the death rite or ceremony of a culture, are reasonably believed to have been placed with individual human remains either at the time of death or later; other items made exclusively for burial purposes or to contain human remains can also be considered as associated funerary objects. Cremations will either be removed in bulk or by means as necessary to ensure complete recovery of all sacred materials. D. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24-hour guard should be posted outside of working hours. The Tribe will make every effort to recommend diverting the project and keeping the remains in situ and protected. If the project cannot be diverted, it may be determined that burials will be removed. E. In the event preservation in place is not possible despite good faith efforts by the project applicant/developer and/or landowner, before ground-disturbing activities may resume on the project site, the landowner shall arrange a designated site location within the footprint of the project for the respectful reburial of the human remains and/or ceremonial objects. F. Each occurrence of human remains and associated funerary objects will be stored using opaque cloth bags. All human remains, funerary objects, sacred objects and objects of cultural patrimony will be removed to a secure container on site if possible. These items should be retained and reburied within six months of recovery. The site of reburial/repatriation shall be on the project site but at a location agreed upon between the Tribe and the landowner at a site to be protected in perpetuity. There shall be no publicity regarding any cultural materials recovered. G. The Tribe will work closely with the project's qualified archaeologist to ensure that the excavation is treated carefully, ethically and respectfully. If data recovery is approved by the Tribe, documentation shall be prepared and shall include (at a minimum) detailed descriptive notes and sketches. All data recovery data recovery-related forms of documentation shall be approved in advance by the Tribe. If any data recovery is performed, once complete, a final report shall be submitted to the Tribe and the NAHC. The Tribe does NOT authorize any scientific study or the utilization of any invasive and/or destructive diagnostics on human remains.	Final Design and Construction	Final Design and Construction Contractors	OCTA and Kizh Nation	Final Plan Check and Ongoing during Construction